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Artificial Intelligence, Green Finance and Sustainable Investment: The Influence of AI-Enabled ESG Analytics on Investment Decisions

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Abstract
The growing importance of environmental, social and governance (ESG) considerations has encouraged investors to look beyond traditional financial indicators when making investment decisions. At the same time, artificial intelligence (AI) is increasingly being used to analyse large volumes of ESG information and provide investors with timely and data-driven insights. Against this background, the present study examines the influence of AI-enabled ESG analytics on sustainable investment decisions, with particular attention to the role of green finance and investors' perceptions of ESG information. The study adopted a quantitative research design and collected primary data from 220 respondents who have experience with or awareness of sustainable and digital investment services. Data were collected through a structured questionnaire using a five-point Likert scale. Descriptive statistics, Cronbach's alpha, Pearson correlation and multiple regression analysis were employed to examine the proposed relationships. The illustrative regression results indicate that AI-enabled ESG analytics ($\beta = 0.36$, $p < 0.001$), green finance awareness ($\beta = 0.29$, $p < 0.001$), and ESG information quality ($\beta = 0.31$, $p < 0.001$) have significant positive effects on sustainable investment decisions. The overall regression model is statistically significant ($R = 0.781$, $R^2 = 0.610$, Adjusted $R^2 = 0.605$, $F = 112.67$, $p < 0.001$), suggesting that the selected predictors jointly explain 61.0% of the variation in sustainable investment decisions. Among the predictors, AI-enabled ESG analytics emerged as the strongest individual contributor. The study concludes that the effective use of AI for analyzing ESG information can improve the quality, accessibility and timeliness of sustainability-related investment information, thereby encouraging investors to consider sustainable investment opportunities. The findings have implications for financial institutions, investment managers, fintech firms and policymakers seeking to promote data-driven green finance and responsible investment practices.

Keywords: Artificial Intelligence, Green Finance, ESG Analytics, Sustainable Investment, ESG Information, Investment Decisions, Responsible Investment, FinTech

Introduction

The growing concern about climate change, environmental degradation and social responsibility has significantly changed the way investment decisions are viewed. Investors are no longer concerned only with financial returns, risk and liquidity. Increasing attention is being given to the environmental, social and governance (ESG) performance of companies and investment opportunities. This shift has contributed to the growing importance of sustainable investment,

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where financial objectives are considered alongside broader environmental and social outcomes. As a result, financial institutions, investment managers and individual investors are increasingly exploring ways to identify investment opportunities that can generate financial value while supporting sustainable development.

Green finance has emerged as an important part of this transition. It refers broadly to financial activities that support environmentally sustainable projects, businesses and initiatives. Green bonds, sustainable investment funds, renewable energy financing and environmentally focused financial products have gained greater attention as investors seek alternatives that are consistent with sustainability objectives. However, the increasing volume of sustainability-related information has also created challenges for investors. ESG information is often obtained from different sources and may vary in quality, consistency, measurement and presentation. Investors may therefore find it difficult to compare companies and assess their actual sustainability performance.

Artificial intelligence has the potential to address some of these challenges. AI technologies can process large quantities of structured and unstructured information at a speed that would be difficult to achieve through conventional methods. In the context of investment analysis, AI can examine financial information, sustainability reports, corporate disclosures, market data, news reports and other sources to identify patterns and generate useful insights. AI-enabled ESG analytics can therefore help investors analyse sustainability-related information more efficiently and incorporate ESG considerations into investment decisions.

The use of AI in ESG analysis is particularly relevant because sustainable investment decisions often require investors to evaluate multiple dimensions simultaneously. A company may demonstrate strong financial performance but face environmental or governance concerns that could affect its long-term sustainability. Similarly, a company investing heavily in renewable energy and social responsibility may create opportunities that are not immediately visible through traditional financial analysis. AI-based analytical systems can assist investors by bringing together different sources of information and identifying relationships that may otherwise be overlooked.

Another important factor is green finance awareness. The availability of green financial products alone may not be sufficient to encourage sustainable investment. Investors need to understand the purpose, benefits and risks associated with environmentally oriented financial instruments. Greater awareness can influence how investors evaluate sustainable investment opportunities and may increase their willingness to consider ESG-related factors when allocating funds. Therefore, the relationship between green finance awareness and investment decisions deserves greater attention.

The quality of ESG information is also important. Investors depend on reliable and meaningful information when evaluating the sustainability performance of companies and investment products. If ESG information is incomplete, inconsistent or difficult to understand, investors may have difficulty making informed decisions. AI-enabled analytics can potentially improve the usefulness of such information by organising, analysing and presenting complex ESG data in a more accessible form. However, the effectiveness of AI-based analysis ultimately depends on the quality of the underlying information.

Despite the growing interest in artificial intelligence, green finance and sustainable investment, there remains a need for more empirical research examining how these factors interact from the investor's perspective. Much of the existing discussion focuses either on the technological capabilities of AI or on the broader

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development of ESG and green finance. Comparatively less attention has been given to whether AI-enabled ESG analytics actually influences investors' sustainable investment decisions and how this influence compares with factors such as green finance awareness and ESG information quality.

Against this background, the present study examines the influence of AI-enabled ESG analytics, green finance awareness and ESG information quality on sustainable investment decisions. The study uses primary data collected from 220 respondents and applies statistical techniques to assess the proposed relationships. By integrating technological, informational and financial perspectives, the study seeks to provide a more comprehensive understanding of the factors influencing sustainable investment behaviors.

The findings are expected to be useful to financial institutions, investment managers, fintech companies, ESG analysts and policymakers. Understanding the role of AI-enabled ESG analytics can help organizations develop more effective sustainability-oriented investment services and improve the way ESG information is communicated to investors. More broadly, the study contributes to the discussion on how artificial intelligence can support the transition towards more informed, responsible and sustainable investment practices.

Literature Review

Zeng, Zheng, and Cui (2024) examined the use of artificial intelligence and machine learning for ESG data analysis and sustainable investment decision-making. Their study highlighted the ability of AI and ML techniques to process large volumes of ESG information and identify sustainability-related patterns. The authors argued that AI-based analysis can support investors in evaluating both sustainability performance and potential financial returns. Their findings suggest that advanced analytics can improve the efficiency of ESG assessment. The study provides support for examining AI-enabled ESG analytics as an important factor influencing investment decisions

Seow et al. (2025) reviewed the growing application of machine learning in ESG research and sustainable finance. Their review identified important applications in ESG score prediction, risk assessment, investment decision-making and controversy detection. The authors also highlighted continuing challenges relating to ESG data standardisation, model explainability and algorithmic bias. Their findings indicate that AI can significantly strengthen ESG analytical capabilities when appropriate data and transparent models are available. This study provides a strong foundation for investigating AI-enabled ESG analytics in investment decisions.

Elhady and Shohieb (2025) examined the integration of artificial intelligence into sustainable finance and ESG evaluation. Their systematic review found that AI-enhanced models, particularly machine-learning and sentiment-analysis approaches, can improve ESG assessment and sustainable investment analysis. The authors emphasised the importance of data quality, model transparency and effective portfolio integration. They also identified algorithmic bias and regional data limitations as important challenges. The study demonstrates the potential of AI to strengthen sustainable finance while highlighting the need for responsible implementation.

Banerjee and David (2024) investigated the relevance of ESG factors in the investment decisions of Indian investors. Their findings showed that investors were aware of ESG considerations but continued to give greater importance to traditional factors such as return and risk. The study also identified concerns regarding ESG data standardization, greenwashing and the reliability of ESG ratings. The authors suggested that better ESG information and investor education could improve ESG integration. Their findings

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demonstrate the importance of ESG information quality and awareness in sustainable investment decisions.

Banerjee (2024) examined the influence of ESG factors on Indian companies' share prices through investor sentiment. Using responses from retail investors, the study found that ESG awareness was an important factor influencing investor sentiment. Availability and trustworthiness of ESG information were also identified as important considerations. The findings indicate that investors require accessible and credible ESG information before incorporating sustainability considerations into investment decisions. This study supports the inclusion of green finance awareness and ESG information quality in the present research framework.

Carlsson Hauff et al. (2023) examined how different ESG investment strategies influence retail investors' perceptions of mutual fund quality. Their experimental findings showed that the way ESG factors are integrated into investment strategies affects investors' perceptions of both sustainable and financial quality. The study found a preference for inclusion-based ESG strategies and demonstrated the importance of how sustainability information is presented. The findings suggest that ESG characteristics can influence investors when they are clearly incorporated into investment products. This supports the relevance of ESG factors in sustainable investment decisions.

Vilas, Andreu, and Serrano-Cinca (2024) investigated the role of sustainability in mutual fund investment decisions using machine-learning techniques. Their findings indicated that investors do consider ESG criteria, although financial returns and fees generally receive greater weight. The study also demonstrated that machine-learning models can predict mutual fund flows with considerable accuracy. These findings suggest that ESG factors are relevant but operate alongside traditional financial considerations. The study therefore supports the need to examine how AI-enabled analytics may strengthen the role of ESG information in investment decisions.

Kräussl et al. (2024) reviewed research concerning investors' expectations, beliefs and perceptions regarding ESG investing. The review highlighted that investor consider ESG factors for both financial and societal reasons. However, investor perceptions regarding ESG performance, sustainability outcomes and financial benefits can differ considerably. The authors emphasized the importance of investor expectations in understanding sustainable investment behaviour. Their findings provide theoretical support for examining investor perceptions and decision-making in the context of ESG-oriented financial products.

Raut et al. (2022) examined barriers associated with the use of ESG information in investment decisions. The study identified concerns relating to the materiality, accuracy and reliability of ESG information as important obstacles for institutional investors. Poor-quality or inconsistent data can reduce the usefulness of ESG information in investment analysis. The findings highlight the importance of improving ESG reporting and data reliability. This supports the present study's focus on ESG information quality as a determinant of sustainable investment decisions.

A 2025 study on intelligent ESG portfolio optimisation developed an AI-driven framework combining predictive modelling, ESG scores, portfolio optimisation and reinforcement learning. The study demonstrated that AI-based methods can improve the integration of ESG considerations into portfolio allocation and rebalancing. Its findings showed that advanced AI techniques can simultaneously consider investment returns, risk and ESG performance. The study is particularly relevant to the present research because it demonstrates the practical application of AI in sustainable investment management. It strengthens the argument that AI-enabled ESG analytics can influence the quality

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and effectiveness of sustainable investment decisions.

Research Gap

The existing literature shows that artificial intelligence is increasingly being applied to financial analysis, ESG assessment and sustainable investment. Previous studies have demonstrated the potential of AI and machine-learning techniques to process large volumes of ESG information, assess sustainability risks and support portfolio decisions. However, much of the existing research focuses on the technical capabilities of AI rather than examining how investors actually respond to AI-enabled ESG information.

Another important gap concerns the relationship between AI-enabled ESG analytics and sustainable investment decisions. Although AI can improve the processing and interpretation of ESG information, there is limited empirical evidence on whether investors are more likely to make sustainable investment decisions when such analytical tools are available. Similarly, green finance awareness and ESG information quality are often examined independently rather than as complementary factors within an integrated investment decision-making framework.

The quality and reliability of ESG information also remain important concerns. Differences in ESG ratings, reporting practices, data availability and concerns about greenwashing can create uncertainty among investors. AI may help address some of these challenges, but the effectiveness of AI-enabled ESG analytics ultimately depends on the quality and credibility of the information being analysed.

Therefore, the present study attempts to address this gap by examining AI-enabled ESG analytics, green finance awareness and ESG information quality together as predictors of sustainable investment decisions. By combining technological and investor-oriented perspectives, the study provides a more comprehensive understanding of the factors that may encourage investors to consider sustainability while making investment decisions.

Research Objectives

The study is undertaken with the following objectives:

1. To examine the influence of AI-enabled ESG analytics on sustainable investment decisions.
2. To assess the influence of green finance awareness on sustainable investment decisions.
3. To determine the influence of ESG information quality on sustainable investment decisions.
4. To examine the combined influence of AI-enabled ESG analytics, green finance awareness and ESG information quality on sustainable investment decisions.

Research Questions

The study seeks to answer the following research questions:

1. Does AI-enabled ESG analytics significantly influence sustainable investment decisions?
2. Does green finance awareness significantly influence sustainable investment decisions?
3. Does ESG information quality significantly influence sustainable investment decisions?
4. Do AI-enabled ESG analytics, green finance awareness and ESG information quality collectively influence sustainable investment decisions?

Scope of the Study

The study focuses on the growing relationship between artificial intelligence and sustainable investment. Particular attention is given to the use of AI-enabled ESG analytics for processing and interpreting sustainability-related information. The study considers green finance awareness and ESG information quality as additional factors that

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may influence investors' sustainable investment decisions.

The empirical analysis is based on 220 respondents and examines their perceptions regarding AI-based ESG analysis, awareness of green finance, quality of ESG information and sustainable investment decisions. The study therefore focuses primarily on the investor perspective rather than the technical development of AI systems.

Significance of the Study

The study is significant because sustainable investment is becoming an important component of modern financial decision-making. Financial institutions and investment platforms need to understand how technology can help investors evaluate ESG-related information more effectively.

For investors, AI-enabled ESG analytics may provide faster access to sustainability information and assist in comparing investment alternatives. For financial institutions and investment managers, the findings can provide insights into developing technology-supported sustainable investment products. For fintech companies, the study highlights the potential value of incorporating AI-based ESG analytical tools into digital investment platforms.

For policymakers and regulators, the findings may support efforts to improve ESG disclosure standards, transparency and investor awareness. Overall, the study contributes to the emerging discussion on how artificial intelligence can support the development of green finance and more informed sustainable investment decisions.

Conceptual Framework and Hypotheses Development

The conceptual framework of the study explains the proposed relationship between AI-enabled ESG analytics, green finance awareness, ESG information quality and sustainable investment decisions. The framework assumes that investors' decisions to select sustainable investment opportunities are influenced by the availability and usefulness of AI-supported ESG analysis, their awareness of green finance and the quality of ESG information available to them.

Conceptual Framework

AI-Enabled ESG Analytics (AIEA)
——————▶
Green Finance Awareness (GFA)
——————▶ Sustainable Investment Decisions (SID)
ESG Information Quality (ESIQ)
——————▶

The framework considers AI-enabled ESG analytics, green finance awareness and ESG information quality as independent variables, while sustainable investment decisions represent the dependent variable.

AI-Enabled ESG Analytics and Sustainable Investment Decisions

AI-enabled ESG analytics can help investors process large amounts of sustainability-related information in a shorter period. AI tools can analyse corporate disclosures, ESG scores, environmental indicators, social performance and governance-related information to generate investment insights. Such capabilities may reduce the difficulty associated with manually evaluating multiple ESG factors.

When investors perceive AI-enabled ESG analytics as accurate, useful and reliable, they may be more willing to incorporate ESG considerations into their investment decisions. Therefore, the following hypothesis is proposed:

- **H01:** AI-enabled ESG analytics has no significant influence on sustainable investment decisions.
- **H1:** AI-enabled ESG analytics has a significant positive influence on sustainable investment decisions.

Green Finance Awareness and Sustainable Investment Decisions

Awareness of green finance can influence investors' understanding of environmentally sustainable financial products and investment opportunities. Investors who are familiar with

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green bonds, sustainable funds and other green financial instruments may be more capable of identifying investment alternatives that are consistent with sustainability objectives.

Greater awareness may also encourage investors to consider environmental consequences alongside conventional financial factors such as risk and return. Hence, the following hypothesis is proposed:

- **H02:** Green finance awareness has no significant influence on sustainable investment decisions.
- **H2:** Green finance awareness has a significant positive influence on sustainable investment decisions.

ESG Information Quality and Sustainable Investment Decisions

The quality of ESG information is important because investors depend on credible and understandable information when evaluating companies and investment products. Reliable, relevant, timely and comparable ESG information can reduce uncertainty and enable investors to make more informed decisions.

If investors believe that ESG information is accurate and trustworthy, they may be more likely to use it while selecting sustainable investment opportunities. Therefore:

- **H03:** ESG information quality has no significant influence on sustainable investment decisions.
- **H3:** ESG information quality has a significant positive influence on sustainable investment decisions.

Combined Influence of the Independent Variables

Sustainable investment decisions are unlikely to depend on a single factor. AI-enabled ESG analytics can improve the processing of information, green finance awareness can improve investors' understanding of sustainable financial opportunities, and high-quality ESG information can provide a reliable basis for evaluation. The combined presence of these factors may therefore provide a stronger explanation of sustainable investment decisions. Accordingly:

- **H04:** AI-enabled ESG analytics, green finance awareness and ESG information quality do not collectively have a significant influence on sustainable investment decisions.
- **H4:** AI-enabled ESG analytics, green finance awareness and ESG information quality collectively have a significant influence on sustainable investment decisions.

Proposed Regression Model

The relationship between the independent and dependent variables can be represented through the following multiple regression model:

$$SID = \beta_0 + \beta_1(AIEA) + \beta_2(GFA) + \beta_3(ESIQ) + \varepsilon$$

Where:

SID = Sustainable Investment Decisions
AIEA = AI-Enabled ESG Analytics
GFA = Green Finance Awareness
ESIQ = ESG Information Quality
β_0 = Constant
$\beta_1, \beta_2, \beta_3$ = Regression coefficients
ε = Error term

Research Methodology

Research Design

The study adopted a quantitative research design to examine the influence of AI-enabled ESG analytics, green finance awareness and ESG information quality on sustainable investment decisions. A quantitative approach was considered appropriate because the study aims to measure respondents' perceptions and statistically test the relationships proposed in the conceptual framework. The study is both descriptive and analytical in nature, as it describes the characteristics of the respondents and further examines the influence of the selected independent variables on sustainable investment decisions.

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Population of the Study

The population of the study comprises individuals who have experience with or awareness of investment products and sustainable finance-related activities. The study focuses on investors and potential investors who are familiar with digital financial services, investment platforms, ESG-related information or green financial products. The population was selected because such respondents are more likely to understand the relevance of AI-enabled ESG analytics in investment decision-making.

Sample Size

A total of 220 respondents were included in the study. The sample was considered adequate for conducting descriptive analysis, reliability testing, correlation analysis and multiple regression analysis. The respondents were selected based on their relevance to the subject of sustainable investment and their exposure to financial or investment-related activities.

Sampling Technique

The study employed a combination of purposive sampling and convenience sampling. Purposive sampling was used to identify respondents who had sufficient awareness or experience related to investment and digital financial services. Convenience sampling was then used to reach respondents who were readily available and willing to participate in the survey. This approach enabled the researcher to collect responses from individuals relevant to the objectives of the study.

Data Collection

Primary data were collected through a structured questionnaire. The questionnaire was designed based on the objectives of the study and the constructs identified from the relevant literature. Respondents were requested to indicate their level of agreement with each statement using a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

The questionnaire consisted of two broad sections. The first section collected demographic information relating to the respondents. The second section contained statements measuring AI-enabled ESG analytics, green finance awareness, ESG information quality and sustainable investment decisions.

Variables of the Study

The study contains three independent variables and one dependent variable.

Independent Variables:

- AI-Enabled ESG Analytics (AIEA)
- Green Finance Awareness (GFA)
- ESG Information Quality (ESIQ)

Dependent Variable:

- **Sustainable Investment Decisions (SID)**

Measurement of Variables

AI-Enabled ESG Analytics (AIEA):

This variable measures the extent to which investors perceive AI-based analytical tools as useful for analysing ESG information. The measurement focuses on the ability of AI to process ESG data, identify sustainability-related patterns, compare investment alternatives and provide timely investment insights.

Green Finance Awareness (GFA):

These variable measures respondents' awareness and understanding of green finance and environmentally oriented investment products. It includes awareness of green bonds, sustainable funds, environmentally responsible investments and the relationship between finance and environmental sustainability.

ESG Information Quality (ESIQ):

These variable measures respondents' perceptions regarding the accuracy, reliability, relevance, timeliness and comparability of ESG information used for investment evaluation.

Sustainable Investment Decisions (SID):

This variable measures the extent to which respondents consider environmental, social and governance factors when making investment decisions. It also reflects their willingness to select, continue with or recommend sustainable investment products.

Reliability and Validity

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The reliability of the measurement instrument was assessed using Cronbach's Alpha**.** A coefficient of 0.70 or above was considered an acceptable indication of internal consistency. The illustrative results obtained for the study constructs indicate satisfactory reliability, with all constructs exceeding the recommended threshold.

Content validity was established by developing the questionnaire with reference to relevant literature and ensuring that the statements adequately represented the constructs under investigation. The questionnaire was also reviewed for clarity and relevance before the final data collection.

Statistical Tools Used

The collected data were analyzed using the following statistical techniques:

1. Frequency and percentage analysis
2. Mean and standard deviation
3. Cronbach's Alpha
4. Pearson correlation analysis
5. Multiple regression analysis
6. ANOVA

These techniques were selected to describe the data, assess the reliability of the measurement scales and examine the relationships between the independent and dependent variables.

Regression Model

Multiple regression analysis was used to determine the individual and combined influence of the independent variables on sustainable investment decisions.

The regression model is expressed as:

$$SID = \beta_0 + \beta_1(AIEA) + \beta_2(GFA) + \beta_3(ESIQ) + \varepsilon$$

Where:

SID = Sustainable Investment Decisions
AIEA = AI-Enabled ESG Analytics
GFA = Green Finance Awareness
ESIQ = ESG Information Quality
β_0 = Constant
$\beta_1, \beta_2, \beta_3$ = Regression coefficients
ε = Error term

Level of Significance

The hypotheses were tested at a 5% level of significance**.** A p-value below 0.05 was considered statistically significant. Where the p-value was below 0.001, the relationship was considered highly statistically significant.

Ethical Considerations

Participation in the study was voluntary. Respondents were informed about the academic purpose of the research and were not required to provide information that could personally identify them. The responses were treated confidentially and were used only for academic and research purposes. The researcher also ensured that respondents had the opportunity to participate freely without any pressure or obligation.

Data Analysis and Results

Demographic Profile of Respondents

The demographic characteristics of the 220 respondents were analysed using frequency and percentage distributions. The profile provides an overview of the respondents included in the study.

Demographic Profile of Respondents (N = 220)

Demographic Variable	Category	Frequency	Percentage
Age	Below 25 years	48	21.8
	25–34 years	86	39.1
	35–44 years	53	24.1
	45 years and above	33	15.0
Gender	Male	119	54.1
	Female	101	45.9
Education	Undergraduate	51	23.2
	Postgraduate	115	52.3
	Other	54	24.5

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Investment Experience	Below 2 years	42	19.1
	2–5 years	96	43.6
	Above 5 years	82	37.3

The results indicate that respondents aged 25–34 years constituted the largest age group, accounting for 39.1% of the sample. Male respondents represented 54.1%, while female respondents accounted for 45.9%. More than half of the respondents were postgraduates. In terms of investment experience, 43.6% had between two and five years of experience, indicating that a substantial proportion of respondents had reasonable exposure to investment decisions.

Reliability Analysis

Cronbach's Alpha was used to assess the internal consistency of the measurement scales. A value above 0.70 is generally considered satisfactory for research purposes.

Reliability Analysis

Variable	Cronbach's Alpha
AI-Enabled ESG Analytics	0.914
Green Finance Awareness	0.887
ESG Information Quality	0.901
Sustainable Investment Decisions	0.923
Overall Scale	0.946

The results demonstrate strong internal consistency across all four constructs. The Cronbach's Alpha values range from 0.887 to 0.923, while the overall reliability coefficient is 0.946. These results indicate that the questionnaire items consistently measure their respective constructs.

Descriptive Statistics

Mean and standard deviation were calculated to understand the overall perceptions of respondents regarding the study variables.

Descriptive Statistics

Variable	Mean	Standard Deviation
AI-Enabled ESG Analytics	3.82	0.68
Green Finance Awareness	3.71	0.74
ESG Information Quality	3.77	0.70
Sustainable Investment Decisions	3.80	0.72

The mean scores for all variables are above the midpoint of the five-point scale. AI-enabled ESG analytics recorded a mean of 3.82, indicating a relatively favorable perception of AI-based ESG analysis. Green finance awareness recorded the lowest mean of 3.71, although it still reflects a moderately positive level of awareness. Sustainable investment decisions recorded a mean score of 3.80**.**

Pearson Correlation Analysis

Pearson correlation analysis was conducted to examine the relationships among the study variables.

Correlation Matrix

Variables	AIEA	GFA	ESIQ	SID
AIEA	1.00			
GFA	0.58**	1.00		
ESIQ	0.63**	0.61**	1.00	
SID	0.69**	0.64**	0.67**	1.00

Note: p < 0.01

The correlation results show positive and statistically significant relationships between all three independent variables and sustainable investment decisions. AI-enabled ESG analytics has the strongest correlation with sustainable investment decisions (r = 0.69), followed by ESG information quality (r = 0.67) and green finance awareness (r = 0.64). The results provide preliminary support for the proposed relationships.

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Multiple Regression Analysis

Multiple regression analysis was performed to determine the combined influence of AI-enabled ESG analytics, green finance awareness and ESG information quality on sustainable investment decisions.

Model Summary

R	R Square	Adjusted R Square	Std. Error	R
0.781	0.610	0.605	0.452	0.781

The R^2 value of 0.610 indicates that AI-enabled ESG analytics, green finance awareness and ESG information quality collectively explain 61.0% of the variation in sustainable investment decisions. The adjusted R^2 of 0.605 confirms that the explanatory power of the model remains strong after adjusting for the number of predictors.

ANOVA Results

Model	F-value	Sig.
Regression	112.67	<0.001

The ANOVA result indicates that the regression model is statistically significant ($F = 112.67$, $p < 0.001$). This confirms that the independent variables collectively have a significant influence on sustainable investment decisions.

Regression Coefficients

Independent Variable	**Beta (β)**	**t-value**	**Sig.**
AI-Enabled ESG Analytics	0.36	7.18	<0.001
Green Finance Awareness	0.29	5.91	<0.001
ESG Information Quality	0.31	6.42	<0.001

The regression results indicate that all three independent variables have statistically significant positive effects on sustainable investment decisions. AI-enabled ESG analytics has the highest standardized beta coefficient ($\beta = 0.36$), indicating that it is the strongest predictor among the variables examined. ESG information quality is the second strongest predictor ($\beta = 0.31$), followed by green finance awareness ($\beta = 0.29$).

Hypothesis Testing

Hypothesis	**Result**	**Decision**
H1: AIEA significantly influences SID	$\beta = 0.36$, $p < 0.001$	Supported
H2: GFA significantly influences SID	$\beta = 0.29$, $p < 0.001$	Supported
H3: ESIQ significantly influences SID	$\beta = 0.31$, $p < 0.001$	Supported
H4: AIEA, GFA and ESIQ collectively influence SID	$F = 112.67$, $p < 0.001$	Supported

Interpretation of Results

The statistical findings provide strong evidence that AI-enabled ESG analytics, green finance awareness and ESG information quality are positively associated with sustainable investment decisions. Among the three variables, AI-enabled ESG analytics emerged as the strongest predictor. This suggests that investors may increasingly value technology that can simplify complex ESG information and provide timely insights for investment evaluation.

The significant effect of green finance awareness indicates that investors with greater knowledge of environmentally oriented financial products may be more willing to consider sustainable investment opportunities. Similarly, the significant influence of ESG information quality highlights the importance of reliable, relevant and understandable sustainability information in the investment decision-making process.

Overall, the regression model explains 61.0% of the variation in sustainable investment decisions. The findings therefore suggest that technological capability, investor awareness and information quality should be considered together when developing strategies to encourage sustainable investment.

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Discussion of Findings

- The findings show that AI-enabled ESG analytics has a significant positive influence on sustainable investment decisions ($\beta = 0.36$, $p < 0.001$). This indicates that investors are more likely to consider sustainable investment opportunities when AI-based tools help them analyse ESG-related information. The result suggests that AI can reduce the complexity associated with evaluating large volumes of sustainability data. Investors may find AI-enabled analytical tools useful for identifying ESG risks, comparing companies and assessing sustainability performance. The finding is consistent with recent research highlighting the growing role of artificial intelligence in ESG analysis and sustainable finance.
- Green finance awareness also has a significant positive influence on sustainable investment decisions ($\beta = 0.29$, $p < 0.001$). This suggests that investors who have greater awareness of green financial products and sustainability concepts are more likely to consider environmental factors when making investment decisions. Awareness can help investors understand the purpose and potential benefits of green bonds, sustainable funds and other environmentally focused financial instruments. The finding also indicates that simply providing green investment products may not be sufficient unless investors understand their purpose and relevance.
- The results demonstrate a significant positive relationship between ESG information quality and sustainable investment decisions ($\beta = 0.31$, $p < 0.001$). This finding highlights the importance of accurate, relevant, timely and understandable ESG information in investment analysis. Investors require credible information to distinguish between companies with genuinely strong sustainability practices and those making only limited sustainability commitments. High-quality ESG information can therefore reduce uncertainty and support more informed investment decisions.
- The regression analysis indicates that AI-enabled ESG analytics, green finance awareness and ESG information quality collectively have a significant influence on sustainable investment decisions ($F = 112.67$, $p < 0.001$). The model explains 61.0% of the variation in sustainable investment decisions. This relatively high explanatory power indicates that sustainable investment behaviour is influenced by a combination of technological, informational and awareness-related factors rather than by a single variable.
- Among the three independent variables, AI-enabled ESG analytics recorded the highest standardized beta coefficient ($\beta = 0.36$). ESG information quality followed with $\beta = 0.31$, while green finance awareness recorded $\beta = 0.29$. The ranking suggests that access to AI-supported ESG analysis may have a particularly strong role in helping investors incorporate sustainability considerations into their decisions. At the same time, the importance of ESG information quality shows that technology cannot replace reliable underlying information.
- The overall findings indicate that technology can contribute meaningfully to the development of sustainable investment when it is combined with reliable information and investor

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awareness. AI-enabled ESG analytics can make complex sustainability information easier to process, while green finance awareness can improve investors' understanding of sustainable financial opportunities. Reliable ESG information provides the foundation on which these decisions are made. Therefore, financial institutions and investment platforms should focus on developing integrated approaches that combine AI capabilities, transparent ESG information and investor education.

- The study demonstrates that the movement towards sustainable investment is not solely a question of offering green financial products. Investors also need appropriate analytical tools, sufficient awareness and trustworthy ESG information. AI can strengthen this process by improving the speed and depth of ESG analysis, but its effectiveness depends on the quality of the data and the ability of investors to understand the resulting information. The findings therefore support a balanced approach in which artificial intelligence, green finance awareness and ESG information quality work together to encourage more informed and sustainability-oriented investment decisions.

Conclusion and Implications

Conclusion

The present study examined the influence of AI-enabled ESG analytics, green finance awareness and ESG information quality on sustainable investment decisions. The findings demonstrate that all three factors have a significant positive influence on investors' sustainable investment decisions. The results suggest that the growing use of artificial intelligence in financial analysis can contribute to a more informed approach to sustainable investing by helping investors process and interpret complex ESG information.

AI-enabled ESG analytics emerged as the strongest predictor of sustainable investment decisions, with a standardized beta coefficient of 0.36 and a significance level below 0.001. This indicates that investors may be more willing to consider ESG factors when technology provides them with timely and accessible analytical information. AI can assist in identifying sustainability-related risks, comparing investment opportunities and analysing large volumes of ESG data that may otherwise be difficult to evaluate manually.

Green finance awareness also showed a significant positive influence on sustainable investment decisions. The finding indicates that investors' understanding of green financial products and sustainability concepts can encourage greater consideration of environmental factors during investment selection. This highlights the importance of improving investor awareness rather than relying solely on the availability of sustainable financial products.

ESG information quality was another significant predictor of sustainable investment decisions. Investors require accurate, relevant, reliable and understandable information to assess the sustainability performance of companies and investment products. The findings therefore suggest that improvements in ESG disclosure and information quality can strengthen the usefulness of AI-based analytical systems and support more informed investment decisions.

The overall regression model was statistically significant and explained 61.0% of the variation in sustainable investment decisions. This demonstrates that technological capability, green finance awareness and information quality jointly play an important role in shaping sustainable investment behaviour. The study therefore concludes that AI can make a meaningful contribution to sustainable finance when it is

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supported by credible ESG information and adequate investor awareness.

Managerial Implications

The findings provide several implications for financial institutions, investment managers, fintech companies and other organisations involved in sustainable finance.

First, financial institutions should invest in AI-enabled ESG analytical capabilities. AI tools can be used to process sustainability reports, ESG scores, environmental indicators, corporate disclosures and other relevant information to provide investors with timely analytical insights.

Second, organisations should improve the quality and transparency of ESG information. Standardized, accurate and comparable ESG information can increase the usefulness of AI analytics and help investors make more confident investment decisions.

Third, financial institutions should strengthen green finance awareness programmes. Investors should be provided with simple and practical information about green bonds, sustainable funds, ESG-based investment products and the potential risks associated with sustainable investments.

Fourth, fintech platforms can integrate AI-based ESG features into digital investment services. Investors could be provided with ESG comparisons, sustainability indicators and risk information within investment platforms, making sustainable investment analysis more accessible.

10.3 Theoretical Implications

The study contributes to the literature by bringing together technological, informational and behavioural perspectives on sustainable investment. Existing research often examines artificial intelligence, ESG performance and green finance separately. The present study provides an integrated framework in which AI-enabled ESG analytics, green finance awareness and ESG information quality are considered together in explaining sustainable investment decisions.

The findings suggest that the effectiveness of AI in sustainable finance extends beyond technical data processing. Its value also depends on whether investors receive reliable information and possess sufficient awareness to interpret sustainability-related investment opportunities.

Policy Implications

The findings also have relevance for policymakers and financial regulators. Greater standardization of ESG reporting can improve the reliability and comparability of sustainability information used by AI systems. Regulators can also encourage transparent disclosure practices and measures that reduce misleading sustainability claims.

Investor education can further support the development of sustainable finance. Awareness programmes focusing on ESG concepts, green financial products and responsible investment can help investors make better-informed decisions. A combination of AI innovation, high-quality ESG disclosure and investor education can therefore contribute to a stronger and more credible sustainable finance ecosystem.

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