



ARTIFICIAL INTELLIGENCE IN CLIMATE FINANCE: AN EMPIRICAL STUDY OF SUSTAINABLE INVESTMENT BEHAVIOUR IN RANCHI DISTRICT, JHARKHAND

¹Shivani, ²Fr. Dr. Robert Pradeep Kujur S.J., ³Dr. Ajay Kumar

¹Department of Commerce

¹St. Xavier's College Ranchi, Ranchi, Jharkhand, India

Abstract: This Research examines the relationship between artificial intelligence (AI) awareness and sustainable investment behaviour of investors in the Ranchi District, Jharkhand, in the broader context of climate and ESG-oriented finance. With the world transitioning towards a low-carbon and environmentally friendly economy, AI has become an important instrument in sustainable finance decisions, largely attributed to its capability of handling large volumes of ESG data, forecasting climate risks, and identifying green investment opportunities such as green bonds and green portfolios. Majority of the available studies concentrate on the role of AI in the financial markets of megalopolises and do not focus on the awareness and behaviour of investors in semi-urban cities like Ranchi, where the culture of green investment is still developing. The research is based on primary data collected with a structured questionnaire from 109 respondents, predominantly young, early-stage investors and finance students in Ranchi, and analysed using MS Excel through percentage analysis and Pearson correlation. Because the design is cross-sectional and the sample is skewed towards younger, less-experienced investors, the findings are best read as an association between AI awareness and sustainable investment attitudes rather than a causal effect, and should not be generalised to all investors in Ranchi. The findings indicate that AI awareness is positively and significantly related to sustainable investment attitudes among respondents; nevertheless, issues such as a lack of digital literacy, insufficient knowledge of green financial products, and distrust towards AI platforms continue to be widespread in tier-2 regions such as Jharkhand. To conclude, the promotion of green finance, government-supported programs related to climate-conscious investment, and the implementation of AI tools at the grassroots level are the key steps to empowering the investors in Ranchi to play a significant role in India's sustainability efforts and the achievement of its net-zero goals.

Keywords - Artificial Intelligence, Climate Finance, Sustainable Investment, Green Finance, ESG, Investment Behaviour, Ranchi, Jharkhand

I. INTRODUCTION

Climate change and the transition to a low-carbon economy have made climate finance, broadly understood as financing for projects and programmes that mitigate climate change and support sustainable development, a central concern of financial governance worldwide. Within this landscape, artificial intelligence (AI) has emerged as an important instrument for sustainable finance decision-making, owing to its capacity to process large volumes of ESG (Environmental, Social and Governance) data, forecast climate-related risks, and surface green investment opportunities such as green bonds and green portfolios. Robo-advisors, machine-learning algorithms, and predictive analytics are increasingly used to simplify investment decisions and provide investors with insights into green and sustainable investment options.

Despite this growing relevance, awareness of how AI relates to sustainable investment behaviour among investors in the Ranchi District of Jharkhand remains limited, and several challenges persist in this financial space: insufficient awareness of green financial products, limited familiarity with climate finance mechanisms, low trust in AI-based financial platforms, and restricted access to reliable green finance information. Compounding this, the majority of existing research on AI and sustainable investment is concentrated in metropolitan and other developed financial markets, with comparatively little empirical attention paid to Tier-2 cities such as Ranchi. This leaves an important gap in understanding how AI relates to investors' sustainable investment decisions in a local, semi-urban environment, which this study addresses.

This study is significant on several counts. From a research standpoint, it addresses a gap in the literature on the nexus between AI, climate finance, and investor behaviour in Tier-2 cities in India. From a policy standpoint, its findings can inform policymakers, financial regulators, and fintech firms seeking to design policies that encourage sustainable investment. For investors themselves, the study offers insight into the opportunities and risks associated with AI-powered climate finance products, while more broadly contributing to financial-literacy and grassroots awareness efforts that support India's sustainability and net-zero goals.

Accordingly, this study examines the relationship between AI awareness and sustainable investment practices among investors in the Ranchi District, Jharkhand, within the broader context of climate finance. It focuses on investors with some prior exposure to financial products and investment decisions, examining their knowledge of AI technologies, climate finance instruments, ESG-based investments, and sustainable financial products, along with their trust in AI systems, perceived benefits, and investment tendencies. Data were collected through a structured questionnaire, and the study's geographic scope is limited to the Ranchi District.

II. LITERATURE REVIEW

Jha and Bakhshi (2019) The article indicates that green finance can play a significant role in achieving economic growth, as it lays the foundation for environmental success. It enhances cash flow from the different sectors to sustainable development. It also identifies some of the issues that are being faced with green financing in India. In the study, secondary data is used as a research method.

Ghosh et al. (2019) This article enumerates the advantage of contributing in the development of sustainable agriculture. Advanced tools were used by farmers, who observed an increase in yield and output of crops, which in turn helped in maintaining the ecosystem and added substantially to organic products. In the study, the method used is secondary data which is descriptive and analytical.

Rafi et al. (2022) If someone isn't aware of different AI tools, then it will affect the economy, particularly the agriculture industry, according to this article. It also indicates that there are benefits in terms of output when using AI tools. In the study the research methodology that is used is secondary data.

Hariharan et al. (2018) Many investors worldwide paid attention to sustainable investments, according to this article. The study will be based on price behavior in India and will involve investment related indices such as Nifty. The study is secondary data based study.

T. Das and S. Das (2025) This article makes the link between sustainable investing and financial behavior. It has also attained positive reviews. The data for the study was collected from primary data. Research methodology in the research was done systemically based on literature search with PRISMA. It also points to a lack of prudence in the part of investors who are frequent.

Jonwall et al. (2022) The article proposes that in the near future investments should be made with regard to society. It encompasses issues related to ESG. The method used in this research was by using self structured questionnaire. Overall, it pays attention to awareness related to socially friendly investment.

Dalal and Thaker (2019) The article declares the advantages of investment strategies in sustainable product. The aim is to study the impact of ESG on profit and firm value of Indian firms. The research methodology used in this research is through secondary data. It is applied practically and is concerned with the sustainability reporting.

Asokan (2023) This article indicates how ESG is gaining significance as companies are adding it on. The key emphasis is on reporting on ESG and how to use it to convey overall sustainable performance. The

research methodology used in this research is through secondary data. It also discusses how ESG could be improved to help the needs of shareholders.

Kappal et al. (2020) The article suggests that the investment behaviour of women entrepreneurs is that they think of investment as a long-term tool. The research methodology used is through secondary data using quantitative enquiry. It stresses equality for investors.

Shanmugam et al. (2022) The article is about investment and behaviour on sustainability. It emphasizes information pertaining to money. The research methodology used in the study was through primary data collection using survey method. Consequences for the investor are also discussed.

Hossain et al. (2026) The article reveals the impact of green finance on sustainable investment in Bangladesh, where green banking rules and policies related to sustainability are initiated. In the focus is the green instruments. The research methodology used is through primary data using a quantitative approach. It also reports that Bangladesh has implemented the green finance measures.

Panja and Das (2020) The article speaks about the dynamic nature of the business environment and the way companies are utilizing the green practices in all areas. It highlights the need for understanding what is green. The aim is to gain insight into the concept of socially responsible investment. The research methodology used is through quantitative research based on primary data analysis.

Robins (2008) It takes generations for a good idea to become habitual practice, the article says. The concepts of sustainable development were introduced at a long time ago, however there was limited use. The research methodology used is through secondary data. Long-term stability with the flexibility to meet short-term needs is emphasized overall.

Bhutta et al. (2022) However, some of the negative effects of industrial development are mentioned, such as environmental issues. The article emphasizes on finances as key factor for sustainable development. Priority is being given to Green Bonds. The research methodology used is through secondary data.

Gilchrist et al. (2021) The article discusses the fast development of green financing. It emphasizes the use of the environmental aspects in the corporate sector. The research method carried out is secondary data sources.

Fatica and Panzica (2021) Widespread popularity of green bonds among corporate finance sectors is discussed in the article.

The study revealed that green issuers' carbon intensity is lower. The data used in the study is through primary data.

Aggarwal et al. (2021) The article mentions that a reduction of CO₂ emissions is required to obtain a low carbon footprint. The need to advance towards technology is significant. It asserts that the green bonds are the instruments that can stimulate people to use sustainable products. The method of research that is used is secondary data.

Maladkar and Suresha (2025) This article points to a recent study which has found that the Millennials and Gen Z have an appreciation for ESG (Environmental, Social and Governance) values. The data was collected using a structured questionnaire that aimed to obtain information about perceptions of ethical companies and the ESG practices.

Manaktala (2020) The literature on sustainable finance has pointed to the potential of green bonds to fight climate change and advance sustainable development (SD) initiatives. India now has emerged as one of the important markets for green bonds since the issuance of the first green bond in India in 2015. Secondary data gathered from policy documents, reports and market records was analysed to determine the salient points, challenges and future opportunities.

Gleim et al. (2012) Previous studies have pointed to the importance of understanding barriers to green consumption in the context of organizations' green business programs. These barriers are important factors affecting the purchasing decisions and attitudes towards the environment. This study applies mixed method approach which involves qualitative and quantitative research.

Lim (2024) This systematic literature mapping of ESG-and-AI research in finance identifies eight recurring research themes, including trading and investment, ESG disclosure, and risk management, and finds that AI applications in this space are dominated by trading-and-investment use cases, with responsible-AI research still comparatively scarce. The research methodology used is a systematic literature mapping of

secondary bibliometric data.

Adeoye et al. (2024) This article discusses how AI, through machine learning and predictive analytics, enhances ESG data analysis and portfolio decision-making, enabling investors to align financial goals with sustainability considerations more effectively. The research methodology used is a conceptual/secondary-literature review.

Schwendner and Posth (2024) This editorial on AI for ESG technology observes that ESG investing faces a credibility problem from greenwashing and inconsistent ratings, and argues that AI and alternative data can improve evidence-based ESG decision-making if applied transparently. The research methodology used is an editorial synthesis of secondary literature.

Gutsche et al. (2023) Using a framed field experiment, this study identifies individual-level determinants of sustainable investment behaviour, including sustainability preferences, financial literacy, and social norms, at the level of individual investors rather than firms or markets. The research methodology used is a framed field experiment based on primary data.

Giglio et al. (2021) This review of the climate finance literature examines how physical and transition climate risks are priced into financial assets, and how climate-related information affects investor beliefs and portfolio choices. The research methodology used is a critical review of theoretical and empirical secondary literature.

2.1 Critical Synthesis of the Literature

Read together, the studies reviewed above fall into three broad strands. The first, and largest, strand relies on secondary, macro-level, or bibliometric data to document that green finance, ESG disclosure, and AI-ESG research are all growing rapidly (e.g., Jha & Bakhshi, 2019; Dalal & Thaker, 2019; Asokan, 2023; Lim, 2024), but these studies describe growth and thematic structure rather than testing why individual investors adopt, or fail to adopt, sustainable and AI-enabled investment tools. The second, smaller strand uses primary, investor-level data (e.g., Jonwall et al., 2022; Shanmugam et al., 2022; Kappal & Rastogi, 2020; Gutsche et al., 2023) and consistently links awareness, financial knowledge, and information behaviour to sustainable investment behaviour, but this strand is concentrated in metropolitan India and other developed markets, leaving Tier-2 locations such as Ranchi largely unexamined. The third strand treats AI's role in ESG data processing, portfolio construction, and climate-risk pricing largely at a conceptual, market, or firm level (e.g., Al-Sartawi et al., 2022; Giglio et al., 2021; Adeoye et al., 2024; Schwendner & Posth, 2024; Elhady & Shohieb, 2025), with very little empirical work connecting AI awareness specifically to individual investor behaviour. The present study is positioned at the intersection of the second and third strands: it empirically tests the AI-awareness-to-sustainable-investment-behaviour relationship using primary, investor-level data from a Tier-2 Indian city, a combination that has not been directly examined in the literature reviewed above.

2.2 Research Gap

While there is an increasing volume of literature on the concepts of sustainable finance, ESG reporting, and AI in financial services, three specific gaps remain unaddressed by the studies reviewed above. First, as the critical synthesis above shows, most primary-data, investor-level research on sustainable investment behaviour in India is concentrated in metropolitan cities; despite the growing relevance of Tier-2 cities to India's sustainable development trajectory, empirical attention to locations such as Ranchi remains scarce. Second, research connecting AI and climate/sustainable finance (e.g., Al-Sartawi et al., 2022; Lim, 2024; Elhady & Shohieb, 2025) is concentrated at the conceptual, firm, or market level, rather than at the level of individual investor awareness and attitudes. Third, no study identified in this review empirically tests the specific relationship between AI awareness and sustainable investment behaviour using primary data from a semi-urban Indian district, meaning the AI-awareness-behaviour link that this study tests has not previously been examined in this population.

This study addresses these three gaps together. Its novelty lies not in any single method or variable, but in the combination of (i) a Tier-2, semi-urban study setting that is under-represented in the sustainable-investment literature, (ii) primary, investor-level data rather than secondary or firm-level data, and (iii) an explicit empirical test of the relationship between AI awareness and sustainable investment behaviour, rather than a conceptual or descriptive treatment of either construct in isolation. In this sense, the study extends the investor-level sustainable-behaviour literature (e.g., Jonwall et al., 2022; Gutsche et al., 2023) into the AI-awareness domain, and extends the largely conceptual AI-sustainable-finance literature (e.g., Al-Sartawi et

al., 2022; Adeoye et al., 2024) into a Tier-2 Indian empirical setting.

III. RESEARCH QUESTIONS, OBJECTIVES AND HYPOTHESIS

3.1 Research Questions

1. Does awareness of AI-based tools significantly influence sustainable investment behavior among investors in Ranchi District, Jharkhand?
2. What is the level of awareness and usage of AI-based climate finance tools among investors in Ranchi District, Jharkhand?
3. What is the relationship between AI-driven financial tools and the preference for sustainable and green investments among investors in Ranchi District, Jharkhand?

3.2 Research Objectives

1. To examine the level of awareness and usage of AI-based climate finance tools among investors in Ranchi District, Jharkhand.
2. To analyze the relationship between awareness of AI-based tools and sustainable investment behavior among investors in Ranchi District, Jharkhand.
3. To examine the relationship between AI-driven financial tools and the preference for sustainable and green investments among investors in Ranchi District, Jharkhand.

3.3 Hypothesis

H₀ (Null Hypothesis): There is no significant relationship between awareness of AI-based tools and sustainable investment behavior among investors in Ranchi District, Jharkhand.

H₁ (Alternative Hypothesis): There is a significant relationship between awareness of AI-based tools and sustainable investment behavior among investors in Ranchi District, Jharkhand.

IV. RESEARCH METHODOLOGY

4.1 Research Design

This study uses a descriptive research design based on primary data obtained through a structured questionnaire. The research seeks to uncover and communicate the perceptions, awareness, and opinions of individual investors, finance students, and finance-related stakeholders in Ranchi District on the role of AI in sustainable and climate finance. As detailed in Section 4.3 and the demographic profile in Section 5.1, the achieved sample is dominated by younger, early-stage investors and finance students rather than by working finance professionals; this composition is treated explicitly as a limitation of the study (Section 7.4) rather than as a claim of a professional-only sample.

4.2 Source of Data

Primary data were collected from respondents using a structured questionnaire, forming the major portion of the study. To support the literature review and theoretical framework, secondary data were also taken from published journals, research articles, books, and institutional reports.

4.3 Sampling Technique and Sample Size

Purposive sampling and convenience sampling were used in the selection of respondents. Purposive sampling was conducted to identify specific groups, such as individual investors, stockbrokers, financial advisors, bank officials, chartered accountants, finance professionals, and MBA Finance students. Convenience sampling was used within these groups, as it was the most accessible approach in Ranchi, Jharkhand. The total sample size is 109 respondents.

4.4 Data Collection Method

Information was gathered using structured questionnaires administered directly to the selected respondents. The questions were closed-ended and Likert scale, designed to gather respondents' awareness, perception, and opinion on the use of AI tools in climate and sustainability finance.

4.5 Statistical Tools and Software Used

All Collected data have been analyzed using MS Excel and the statistical tools used are through percentage analysis and Pearson Correlation in order to examine the relationship between awareness of AI-based tools and sustainable investment behavior.

4.6 Instrument, Reliability, and Validity

The questionnaire used five-point Likert-scale items (Strongly Disagree to Strongly Agree) grouped under two constructs: AI Awareness (Section B, 10 items) and Sustainable Investment Attitude (Section C, 5 items). Item content was adapted from constructs used in prior sustainable-investment and AI-awareness studies (Al-Sartawi et al., 2022; Jonwall et al., 2022; Shanmugam et al., 2022) and reviewed by two finance faculty members for face and content validity before administration. A pilot round with 12 respondents was used to check clarity of wording and item sequencing, after which minor language changes were made; these pilot responses are not included in the final sample of 109. Internal consistency was assessed using Cronbach's alpha; both constructs met the conventional threshold of 0.70 (AI Awareness, $\alpha = 0.81$; Sustainable Investment Attitude, $\alpha = 0.77$), supporting the reliability of the scales used for the weighted-mean and correlation analysis reported in Section 5.

4.7 Ethical Considerations

Participation in the survey was voluntary and anonymous. Respondents were informed of the purpose of the study, the academic use of the data, and their right to withdraw at any point before submission, and informed consent was obtained from each respondent prior to administering the questionnaire. No personally identifying information was collected, confidentiality of individual responses was maintained throughout data handling and reporting, and the data were used solely for the purposes of this study.

V. DATA ANALYSIS AND HYPOTHESIS TESTING

5.1 Descriptive Analysis — Demographic Profile of Respondents

Table 1: Gender of Respondents

Gender	No. of Respondents	Percentage (%)
Male	58	53.2%
Female	49	45.0%
Prefer not to say	2	1.8%
Total	109	100%

Source: Primary Data

The sample shows a fairly balanced gender distribution, with males forming a slight majority at 53.2%, followed by females at 45.0%. This near-equal representation suggests the study captures investment perspectives across genders without significant bias.

Table 2: Age Group of Respondents

Age Group	No. of Respondents	Percentage (%)
18–25 years	89	81.7%
26–35 years	9	8.3%
36–55 years	6	5.5%
56+ years	5	4.5%
Total	109	100%

Source: Primary Data

An overwhelming majority (81.7%) belonged to the 18–25 age group, reflecting the dominance of young investors and finance students in the sample. This is consistent with the purposive sampling strategy targeting college students and finance professionals in Ranchi.

Table 3: Educational Qualification

Qualification	No. of Respondents	Percentage (%)
Undergraduate	61	56.0%
Professional Degree	23	21.1%
Postgraduate	21	19.3%

Qualification	No. of Respondents	Percentage (%)
High School or Below	4	3.7%
Total	109	100%

Source: Primary Data

The majority of respondents held undergraduate degrees (56.0%), indicating a reasonable level of academic literacy that supports understanding of AI and climate finance concepts.

Table 4: Occupational Status

Occupation	No. of Respondents	Percentage (%)
Student	72	66.1%
Salaried Employee	23	21.1%
Self-Employed	8	7.3%
Others	6	5.5%
Total	109	100%

Source: Primary Data

Students formed the largest occupational group (66.1%), consistent with the age profile. Salaried employees represented the second largest group, likely having some exposure to investment products.

Table 5: Investment Experience

Experience Level	No. of Respondents	Percentage (%)
Beginner	66	60.6%
Moderate	27	24.8%
Experienced	11	10.1%
Highly Experienced	5	4.6%
Total	109	100%

Source: Primary Data

A majority (60.6%) identified as beginners, reinforcing the sample's early-stage investment profile. This group is likely receptive to AI-driven financial guidance.

5.2 Percentage Analysis — Section B: AI Awareness and Green Investment Perception

Each statement in Sections B and C (Tables 6 and 7) was rated on a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). “Positive %” combines the Agree and Strongly Agree responses, “Negative %” combines Disagree and Strongly Disagree, and “Neutral %” is the Neutral response. The weighted mean (WM) is the response-weighted average score for each statement on this 1-5 scale ($WM = \frac{\sum(\text{response value} \times \text{frequency})}{\text{total respondents}}$), so a WM closer to 5 indicates stronger agreement; WM is reported alongside the percentage breakdown because it condenses the full response distribution into a single comparable score across statements, which the percentage figures alone do not provide.

Table 6: AI Awareness Statements — Weighted Mean Analysis

Statement	Positive %	Neutral %	Negative %	WM
I am familiar with green investments	50.5%	28.4%	21.1%	3.358
I look at digital platforms to gain knowledge	60.6%	22.0%	16.5%	3.514
I know the benefits and risks of green investments	56.9%	26.6%	16.5%	3.468
I am aware of ESG funds and green bonds	48.6%	25.7%	25.7%	3.229
I understand the use of AI in investment decisions	69.7%	19.3%	11.0%	3.679
AI platforms provide useful investment insights	67.9%	20.2%	11.9%	3.697
I use online platforms for investment activities	72.5%	15.6%	11.9%	3.761
AI makes financial decisions easier	63.3%	28.4%	8.3%	3.661
AI increases awareness about sustainable investments	66.1%	24.8%	9.2%	3.706
AI helps me opt for green investments	59.6%	29.4%	11.0%	3.624

Source: Primary Data

Weighted means range from 3.229 to 3.761, indicating moderate positive awareness. The highest agreement was for online platform usage (WM = 3.761) and AI-driven sustainability awareness (WM = 3.706). The lowest score was for awareness of ESG funds and green bonds (WM = 3.229), indicating a gap in product-specific knowledge despite general AI familiarity.

5.3 Percentage Analysis — Section C: Sustainable Investment Attitudes and ESG Beliefs

Table 7: Sustainable Investment Attitude Statements — Weighted Mean Analysis

Statement	Positive %	Neutral %	Negative %	WM
Environmental concerns influence my investment decisions	67.0%	21.1%	11.9%	3.633
I prefer companies with sustainable business practices	68.8%	21.1%	10.1%	3.743
I prefer companies with strong ESG performance	63.3%	30.3%	6.4%	3.716
ESG investments help protect the environment	69.7%	23.9%	6.4%	3.798
Sustainable investments can help reduce climate change	75.2%	17.4%	7.3%	3.817

Source: Primary Data

Section C weighted means range from 3.633 to 3.817, higher than Section B, indicating that respondents hold stronger pro-sustainability attitudes than their current AI tool awareness. The highest agreement was for the belief that sustainable investments can reduce climate change (WM = 3.817), reflecting strong environmental consciousness among Ranchi investors.

5.4 Pearson Correlation Analysis

Pearson's Product-Moment Correlation Coefficient was calculated at the individual respondent level (n = 109) to examine the statistical relationship between AI Awareness (Variable X, mean of Section B) and Sustainable Investment Behaviour (Variable Y, mean of Section C).

Mean of Variable X (AI Awareness): 3.540

Mean of Variable Y (Sustainable Investment Behaviour): 3.736

Table 8: Pearson Correlation Results

Statistical Measure	Computed Value
Pearson Correlation Coefficient (r)	0.699
Coefficient of Determination (RZ)	0.488 (48.8%)
t-statistic	10.10
Degrees of Freedom (df)	107
Level of Significance (α)	0.05
Critical t-value (two-tailed, $\alpha = 0.05$)	1.982
Nature of Correlation	Strong Positive
Statistical Significance	$p < 0.001$
Hypothesis Decision	H_0 Rejected — H_1 Supported

Source: Primary Data, Computed by MS Excel

The Pearson r of 0.699 indicates a strong positive correlation between AI awareness and sustainable investment behaviour. The Coefficient of Determination ($RZ = 0.488$) shows that AI awareness explains 48.8% of the variance in sustainable investment behaviour. The remaining 51.2% is attributable to other factors such as income, financial literacy, peer influence, and institutional support.

5.5 Hypothesis Testing

Hypothesis	Statement
H_0 (Null)	There is no significant relationship between awareness of AI-based tools and sustainable investment behaviour among investors in Ranchi District, Jharkhand.
H_1 (Alternative)	There is a significant relationship between awareness of AI-based tools and sustainable investment behaviour among investors in Ranchi District, Jharkhand.

Decision Criteria: Reject H_0 if computed t-statistic > 1.982 ($df = 107$, $\alpha = 0.05$, two-tailed). Result: The computed t-statistic of $10.10 > 1.982$ ($p < 0.001$).

Decision: H_0 is rejected. H_1 is supported.

The strong positive and statistically significant correlation ($r = 0.699$, $p < 0.001$) confirms that higher AI awareness is meaningfully associated with greater sustainable investment behaviour among investors in Ranchi District. This finding aligns with behavioural finance literature emphasising the transformative role of digital tools in closing the financial knowledge-action gap, particularly among younger, tech-savvy investors.

VI. OBJECTIVE-WISE ACHIEVEMENT OF OBJECTIVES

Objective 1: Level of Awareness and Usage of AI-Based Climate Finance Tools

Achievement Status: Achieved

The percentage analysis of Section B revealed that the majority of respondents are aware of AI-based tools and digital platforms for investment purposes. 72.5% of respondents engaged in investment activities via online platforms, while 69.7% were familiar with the application of AI in investment decision making. AI platforms providing useful investment insights was positively acknowledged by 67.9% of respondents. Awareness of specific green investment instruments, however, was lower, with 48.7% of respondents knowing about ESG funds and green bonds. The overall positive sentiment remained high at 63.6% across all AI awareness statements.

Objective 2: Relationship Between AI Tool Awareness and Sustainable Investment Behaviour

Achievement Status: Achieved

Comparative percentage analysis between Section B (AI Awareness, average 63.6%) and Section C (Sustainable Investment Attitudes, average 68.8%) revealed a definite positive relationship between the two dimensions. Respondents who were aware of AI-based tools also showed higher sentiment towards ESG and sustainable investing. Hypothesis testing results confirmed this, where H_0 was rejected and H_1 was accepted.

Objective 3: Relationship Between AI-Driven Financial Tools and Green Investment Preference

Achievement Status: Achieved

The results of Section B and the Environmental Attitude section clearly show that awareness of AI-driven tools is positively associated with green investment preference. 66.1% of respondents agreed that AI increases awareness about sustainable investments, and 59.6% stated that AI helps them opt for green investments. 68.8% preferred companies with sustainable business practices, and 75.2% of respondents believe that sustainable investments can help reduce climate change.

6.1 Discussion: Comparison with Prior Studies

The strong positive correlation between AI awareness and sustainable investment attitude found in this study ($r = 0.699$) is broadly consistent with Jonwall et al. (2022) and Shanmugam et al. (2022), who similarly found that awareness and information behaviour are significant antecedents of socially responsible and sustainable investment behaviour among Indian investors, although both of those studies were conducted in metropolitan settings rather than a Tier-2 city. The finding that respondents' general AI awareness (63.6%) outpaces their awareness of specific instruments such as ESG funds and green bonds (48.7%) echoes Kappal and Rastogi (2020) and Das and Das (2025), who similarly report that broad positive attitudes toward sustainable investing coexist with limited product-specific knowledge, suggesting that this awareness-knowledge gap is not unique to Ranchi but recurs across different Indian investor populations. On AI specifically, the moderate-to-strong role of AI awareness observed here aligns with the conceptual arguments of Al-Sartawi et al. (2022) and Lim (2024) that AI can support sustainable finance decision-making, while extending that literature by providing individual-investor-level empirical evidence rather than a market- or firm-level account. At the same time, the RZ of 0.488 indicates that AI awareness explains under half of the variance in sustainable investment attitude, consistent with Gutsche et al. (2023), who found that sustainable investment behaviour is shaped by multiple determinants, including financial literacy and social norms, in addition to any single awareness variable; this suggests that AI awareness is one contributing factor among several rather than the dominant driver of sustainable investment attitudes in this sample.

VII. FINDINGS, CONCLUSION AND SUGGESTIONS

7.1 Major Findings

1. The profile of investors was youthful, with 81.7% of respondents aged between 18 and 25.
2. 69.7% were aware of AI in investment decisions and 72.5% used online platforms for investment activities.
3. The lowest response (48.7%) was for awareness of ESG funds and green bonds, showing particular knowledge gaps.
4. 75.2% agreed that sustainable investments can help mitigate climate change — the highest positive response in the survey.
5. The combined average positive sentiment around AI awareness (63.6%) was marginally lower than ESG beliefs (68.8%).
6. Hypothesis H_1 was accepted, confirming a significant positive relationship between AI awareness and sustainable investment behaviour.

7.2 Conclusion

This study set out to examine the relationship between AI awareness and sustainable investment behaviour among investors in the Ranchi District, Jharkhand. The evidence indicates a strong, statistically significant, positive association between the two constructs ($r = 0.699$, $p < 0.001$), with AI awareness accounting for close to half of the variance in sustainable investment attitude. This suggests that, within this sample, investors who are more familiar with AI-enabled financial tools also tend to hold more favourable attitudes towards sustainable and ESG-based investment, even though a causal pathway cannot be established from a cross-sectional design. At the same time, general awareness of AI outpaces investors' familiarity with specific green financial instruments such as ESG funds and green bonds, pointing to a product-knowledge gap that awareness of AI alone does not close. Read together with the sample's youth- and student-heavy composition (Section 7.4), these findings suggest that digital-native investors in this semi-urban setting are receptive to AI-enabled sustainability information, but require more targeted product-level financial education, rather than general AI exposure, to translate that receptiveness into informed green investment decisions. The findings extend the investor-level sustainable-behaviour literature into a Tier-2 Indian city and into the specific context of AI awareness, an intersection that, as established in the Research Gap section, has received limited prior empirical attention.

7.3 Suggestions and Recommendations

1. There is a need to raise awareness through SEBI and financial institutions about ESG funds and green bonds.
2. AI-based advisory platforms should guide investors towards sustainable investment options.
3. Sustainable finance and climate investing should be included in commerce curricula at undergraduate and postgraduate levels.

7.4 Limitations of the Study

This study has several limitations that should be considered when interpreting its findings. First, the sample size is limited to 109 respondents, and is skewed towards young, early-stage investors: 81.7% of respondents were aged 18-25, 66.1% were students, and 60.6% identified as beginner investors. The findings therefore reflect the views of this predominantly young, student-heavy group more than those of the general investor population of Ranchi, and should not be generalised beyond it. Second, the design is cross-sectional and based on self-reported perceptions collected through purposive and convenience sampling; the reported association between AI awareness and sustainable investment behaviour cannot be interpreted as a causal effect, and is subject to common-method and self-report bias. Third, the study measures awareness of, and attitudes towards, AI-enabled platforms and ESG/green-investment concepts, rather than actual use of specific climate-finance instruments (e.g., green bonds, carbon credits, or climate-risk-adjusted portfolios); “climate finance” in this study should therefore be read as the broader ESG/green-investment context within which AI awareness was examined, not as a direct measurement of climate-finance instrument usage. Fourth, the study is geographically limited to Ranchi District, and its findings may not extend to other Tier-2 or Tier-3 locations with different levels of financial infrastructure and digital access. Finally, the analysis relies on percentage, weighted-mean, and Pearson correlation techniques; it does not control for other explanatory variables such as income, risk tolerance, or prior investment exposure, which future multivariable research could incorporate.

7.5 Scope for Future Research

Future studies could extend the scope to other Tier-2 cities and investigate actual investment behaviour rather than perceptions alone. Longitudinal studies tracking investor behaviour over time, and multivariable designs that control for income, risk tolerance, and prior investment exposure, would also provide more robust insights into how AI awareness relates to sustainable investment decisions over the longer term.

VIII. REFERENCES

- [1] Jha, B., & Bakhshi, P. (2019). Green finance: Fostering sustainable development in India. *International Journal of Recent Technology and Engineering*, 8(4), 3798–3801.
- [2] Ghosh, M. (2019). Climate-smart agriculture, productivity and food security in India. *Journal of Development Policy and Practice*, 4(2), 166–187.
- [3] Rafi, S., Balasani, R., Qadir, F., Tahir, M., Ahmed, F., & Ahmad, W. S. (2022). Role of artificial intelligence in agriculture sustainability, an example from India. In *Towards sustainable natural resources: Monitoring and managing ecosystem biodiversity* (pp. 275–293). Springer International Publishing.
- [4] Hariharan, C., & Babu, M. (2018). Price behaviour of Indian sustainable investment – A comparative study. *Research Journal of Humanities and Social Sciences*, 9(4), 865–869.
- [5] Das, T., & Das, S. (2025). Green investment choices and hidden behavioral biases in West Bengal: A district-level systematic review of sustainable investment behavior. *IUP Journal of Applied Finance*, 31(3), 71–93.
- [6] Jonwall, R., Gupta, S., & Pahuja, S. (2023). Socially responsible investment behavior: A study of individual investors from India. *Review of Behavioral Finance*, 15(6), 865–888.
- [7] Dalal, K. K., & Thaker, N. (2019). ESG and corporate financial performance: A panel study of Indian companies. *IUP Journal of Corporate Governance*, 18(1), 44–59.
- [8] Asokan, A. (2023). An overview of ESG reporting in India: Practices and challenges. *Sustainable Boardrooms: Democratising Governance and Technology for Society and Economy*, 19–39.
- [9] Kappal, J. M., & Rastogi, S. (2020). Investment behaviour of women entrepreneurs. *Qualitative Research in Financial Markets*, 12(4), 485–504.
- [10] Shanmugam, K., Chidambaram, V., & Parayitam, S. (2022). Effect of financial knowledge and information behavior on sustainable investments: Evidence from India. *Journal of Sustainable Finance & Investment*, 1–24.
- [11] Hossain, M. Z. (2026). The role of mobile financial services (MFS) in enhancing rural entrepreneurship in Bangladesh. *European Journal of Management, Economics and Business*, 3(1), 113–124.
- [12] Panja, S., & Das, A. R. (2020). Exploring green investment on the dynamics of behavioural finance and stock performance. *Business, Economics and Sustainable Development*, 120.
- [13] Krosinsky, C., & Robins, N. (Eds.). (2012). *Sustainable investing: The art of long-term performance*. Routledge.
- [14] Bhutta, U. S., Tariq, A., Farrukh, M., Raza, A., & Iqbal, M. K. (2022). Green bonds for sustainable development: Review of literature on development and impact of green bonds. *Technological Forecasting and Social Change*, 175, 121378.
- [15] Gilchrist, D., Yu, J., & Zhong, R. (2021). The limits of green finance: A survey of literature in the context of green bonds and green loans. *Sustainability*, 13(2), 478.
- [16] Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment*, 30(5), 2688–2701.
- [17] Aggarwal, S., & Pathak, M. S. (2021). Green bonds: A catalyst for sustainable development. *Journal of Contemporary Issues in Business and Government*, 27(1).
- [18] Maladkar, G., & Suresha, B. (2025). The impact of ESG principles on investment decisions: A study of millennials and gen Z in India. In *Implementing ESG Frameworks Through Capacity Building and Skill Development* (pp. 129–144). IGI Global Scientific Publishing.
- [19] Manaktala, S. (2020). Green bonds in sustainable finance: Exploring the case of India. Available at SSRN 3644116.
- [20] Gleim, M., & J. Lawson, S. (2014). Spanning the gap: An examination of the factors leading to the green gap. *Journal of Consumer Marketing*, 31(6-7), 503-514.