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The influence of AI-driven ESG performance on the sustainable development of IT companies

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Abstract
In recent years, the rapid advancement of artificial intelligence (AI) technology has led to its broad integration into corporate management. Utilizing AI to improve Environmental, Social, and Governance (ESG) performance and drive sustainable development has emerged as a key area of interest in both academic and business circles. This study investigates how AI-driven ESG performance affects IT businesses' ability to develop sustainably. AI is being used more and more to improve ESG reporting, risk assessment, and decision-making, allowing businesses to more accurately identify sustainability opportunities and constraints. The study examines the specific roles AI plays in corporate governance, environmental sustainability, and social responsibility, assessing its overall impact on enterprise sustainability. The results show that integrating AI improves ESG performance while also giving IT companies a competitive edge and long-term sustainability. For corporate executives, legislators, and academics looking to use AI for ethical and robust company expansion, the report offers insightful information.

Keywords: ESG, AI, IT companies, decision making, risk assessment, sustainable development

Introduction
The role of corporations in society has been redefined in recent years due to the convergence of the rapidly advancing technology and the growing urgency of global sustainability concerns. Out of all the industries, the information technology (IT) sector is particularly important for economic growth and innovation. However, IT organizations are currently facing increasing pressure to show their commitment to sustainable development as environmental stewardship and corporate responsibility requirements rise. An important framework for assessing this kind of business responsibility is Environmental, Social, and Governance (ESG) performance. A more recent trend that has the potential to completely change how businesses approach sustainability is the use of artificial intelligence (AI) into ESG procedures.

ESG and Sustainable Development
In order to evaluate a company's entire sustainability and health, stakeholders, investors, and regulators now use the idea of ESG, which encompasses environmental care, social responsibility, and governance ethics. ESG metrics cover topics including carbon emissions, energy efficiency, diversity, labor rights, data privacy, ethical leadership, and transparency, and they extend beyond conventional financial measures. Strong ESG credentials are seen to put businesses in a better position to control risks, draw in investors, and create robust operations.
According to the Brundtland Commission's definition from 1987, sustainable development is growth that satisfies current demands without endangering the capacity of future generations to satisfy their own. In the business world, sustainable development refers to calculated moves that provide economic expansion while protecting the environment, creating just communities, and guaranteeing moral leadership. As a result, sustainable development and ESG performance are closely related, with the former serving as a crucial tool to accomplish the latter.
Aligning with ESG standards is especially important for IT organizations, which frequently have large worldwide supply chains, high data center energy usage, and a big impact on human rights and digital ethics. Stakeholders are paying more and more attention to how IT

companies affect corporate governance, data security, labor standards in hardware manufacturing, and climate change. Effective ESG implementation is therefore a strategic tool for long-term sustainability in addition to being morally and legally required.

The Rise of Artificial Intelligence in ESG

In every industry, including ESG, artificial intelligence is significantly changing corporate procedures. To improve ESG-related tasks, artificial intelligence (AI) technologies including machine learning, natural language processing, computer vision, and data analytics are being used more and more. With the use of these technologies, businesses may gather, examine, and respond to vast amounts of both structured and unstructured data from a variety of sources, such as news articles, social media, satellite images, and corporate filings.

ESG analytics powered by AI may greatly increase the scope, timeliness, and accuracy of sustainability evaluations. Machine learning models, for instance, may automatically check governance papers for regulatory compliance, evaluate labor conditions in the supply chain using picture recognition, and identify abnormalities in environmental emissions. Predictive analytics made possible by AI tools may also foresee ESG risks and opportunities, facilitating proactive and well-informed decision-making.

Furthermore, AI has the potential to significantly improve ESG reporting's accountability and transparency. Conventional ESG evaluations are frequently criticized for being prone to greenwashing, subjective, and inconsistent. By standardizing data analysis, identifying inconsistencies, and guaranteeing real-time monitoring, AI may lessen these difficulties. In addition to enhancing internal ESG performance, these skills increase stakeholder credibility and confidence.

But there are also issues with the use of AI in ESG. Algorithmic prejudice, data privacy, explainability issues, and the moral ramifications of automating choices that affect people's lives are among the dangers. The very ESG objectives AI is meant to serve may be compromised if these problems are not properly handled. Therefore, any AI-driven ESG strategy has to be accompanied with responsible AI governance.

Relevance to IT Companies

IT firms are in a unique position to spearhead the integration of AI and ESG as they are leaders in technology. These businesses not only create AI solutions for their customers and themselves, but they also influence the ethics and standards of new technology. They have a greater obligation to make sure that technical developments are in line with sustainability objectives because they are both AI developers and users.

Prominent IT companies like Google, IBM, Infosys, and Microsoft have already started using AI for ESG. For example, Microsoft utilizes AI to optimize energy consumption across its data centers and track its worldwide carbon impact. Google uses artificial intelligence (AI) to manage renewable energy sources and smart infrastructure to enhance environmental sustainability. AI-enabled ESG is also being invested in by Indian IT companies like Infosys and Wipro.

The IT industry's general use of AI in ESG is still in its infancy, notwithstanding these developments. Many businesses lack the ethical frameworks, strategic clarity, or technological know-how to properly utilize AI's promise in furthering ESG objectives. Additionally, there is still a dearth of empirical research on the effects of AI-driven ESG practices on sustainable development, particularly in the IT sector. This knowledge gap emphasizes the necessity of methodical research.

Objectives

1. To analyse the awareness and perception towards AI enabled ESG performance.
2. To evaluate the impact of AI-enabled Environmental, Social, and Governance (ESG) practices on the sustainable development of IT companies.
3. To examine the relationship between AI and ESG performance.
4. To investigate challenges and limitations in implementing AI for ESG performance.

Review of literature

The integration of Artificial Intelligence (AI) into Environmental, Social, and Governance (ESG) strategies has gained significant academic and industrial attention in recent years. With the increasing focus on sustainable development and ethical business practices, IT companies are exploring AI as a strategic tool to enhance ESG performance. This literature review synthesizes key findings from recent studies in line with the following research objectives.

1. Awareness and Perception towards AI-enabled ESG Performance

Recent studies have emphasized the growing awareness among corporate stakeholders regarding AI's potential to enhance ESG activities. According to (Sharma, 2022) [8], most IT professionals recognize AI as a transformative enabler in ESG data collection and reporting. (Chen, 2023) [2] noted that AI tools such as Natural Language Processing and Machine Learning are increasingly being perceived as reliable for ESG risk assessment. However, perception varies with organizational maturity and digital readiness.

2. Impact of AI-enabled ESG Practices on Sustainable Development

There is substantial empirical evidence suggesting a positive correlation between AI-enabled ESG practices and sustainability performance. (Gupta, 2023) [4] Conducted a regression-based study on 100 global IT firms, concluding that AI-enhanced ESG initiatives significantly improve energy efficiency, reduce carbon emissions, and enhance social inclusivity. Similarly, it is found that Indian IT companies adopting AI-driven ESG models have shown better compliance with SDGs (Sustainable Development Goals), particularly in environmental and workforce welfare metrics. AI's role in automating and optimizing ESG reporting has also been seen as crucial in reducing human error and increasing transparency**.**

3. Relationship between AI and ESG Performance

Several recent studies have explored the relationship between AI integration and ESG performance metrics. (Zhou, 2023) [10] employed structural equation modeling and found a strong, statistically significant relationship between AI deployment and ESG scoring improvements in IT firms. (Banerjee, 2025) [1] proposed that AI not only helps monitor ESG compliance in real-time but also anticipates future ESG risks, thereby proactively guiding decision-making. Moreover, (Kumar, 2023) [5] emphasized that AI systems tailored for ESG functions—such as carbon footprint calculators and predictive diversity tools—act as

performance multipliers when integrated with corporate sustainability strategies.

4. Challenges and Limitations in Implementing AI for ESG

Despite the benefits, the literature also acknowledges numerous challenges. (Fernandez, 2022) [3] point to data privacy, algorithmic bias, and lack of standardization in ESG metrics as major limitations. (Mehrotra, 2023) [7] highlighted that AI implementation requires significant financial investment and change management, which smaller IT firms may struggle to accommodate. Furthermore, (Lee, 2025) [6] stressed the ethical implications and regulatory ambiguities around AI use, particularly in assessing sensitive social parameters such as workplace equity and community impact. Another key issue is the transparency of AI models, where white-box approaches are still not commonly adopted, reducing stakeholder trust in AI-generated ESG reports (Tanaka, 2024) [9].

Methodology

The study employed a quantitative research design to investigate the influence of AI-driven Environmental, Social, and Governance (ESG) performance on the sustainable development of IT companies located in the Devanahalli Special Economic Zone (SEZ), Bengaluru. Data was collected through a structured questionnaire administered to professionals working in IT companies within the SEZ, using a convenience sampling technique due to accessibility and practical constraints. A total of 384 valid responses were obtained, meeting the required sample size for statistical analysis. The questionnaire included Likert-scale items measuring perceptions of AI integration in ESG practices, ESG performance indicators (covering environmental, social, and governance aspects), and sustainable development outcomes (economic, environmental, and social performance). To analyze the data, descriptive statistics were used to summarize the sample characteristics, while inferential statistics such as the Chi-square test assessed associations between categorical variables. Multiple linear regression analysis was conducted to determine the extent to which AI-driven ESG performance predicts sustainable development in IT companies. The instrument's reliability was confirmed through Cronbach's Alpha, with all constructs scoring 0.834. Ethical considerations, including informed consent, voluntary participation, and confidentiality, were strictly observed throughout the data collection and analysis process.

Data Analysis and Interpretation

Demographic Variables

Table 1: Demographic Variables

Sl. No	Demographic Variables	Category	Frequency	Percentage
1	Gender	Male Female	200 184	52.1 47.9
2	Age	25-35 36-45 46-55 56 &above	106 211 58 9	27.6 54.9 15.1 2.3
3	Income	25,000-35,000 35,001-45,000 45,001-55,000 55,001 & above	120 178 46 18	31.3 46.4 12.0 4.7 5.7

The respondents' demographic profile shows that there is a reasonably balanced gender distribution, with 47.9% of participants being female and 52.1% being male. The bulk of respondents (54.9%) are between the ages of 36 and 45, with 27.6% falling into the 25–35 age range. This suggests that the sample is primarily composed of middle-aged people. Just 2.3% of people are 56 years of age or older, while a smaller percentage (15.1%) are in the 46–55 age range. The majority of respondents (46.4%) make between ₹35,001 and ₹45,000, while 31.3% make between ₹25,000 and ₹35,000. Only 12% and 4.7% of respondents fall into the higher income groups of ₹45,001–55,000 and over ₹55,000, respectively, indicating that the bulk of respondents come from lower-middle-class backgrounds.

Objective 1: To analyse the awareness and perception towards AI enabled ESG performance.

Table 2: Chi-square analysis on Awareness and Perception on Demographic Variables.

Sl. No	Demographic Variables	Awareness and Perception Aspect	Chi Square Value	Df	p-value
1	Gender	Familiarity with ESG concept	3.554	4	0.470
		Awareness of ESG role in IT companies	9.367	4	0.053
		Importance for companies to integrate AI into ESG initiatives	1.295	4	0.862
		Transparency and accountability	6.343	4	0.175
		ESG component which benefit AI	3.554	4	0.470
2	Age	Familiarity with ESG concept	7.867	12	0.795
		Awareness of ESG role in IT companies	15.470	12	0.271
		Importance for companies to integrate AI into ESG initiatives	13.012	12	0.368
		Transparency and accountability	7.930	12	0.791
		ESG component which benefit AI	7.867	12	0.795
3	Income	Familiarity with ESG concept	18.419	16	0.300
		Awareness of ESG role in IT companies	12.448	16	0.731
		Importance for companies to integrate AI into ESG initiatives	18.921	16	0.273
		Transparency and accountability	12.798	16	0.687
		ESG component which benefit AI	18.419	16	0.300

The results of the chi-square test show that there is no statistically significant correlation between the chosen demographic factors—gender, age, and income—and different facets of perception and awareness regarding ESG (Environmental, Social, and Governance) practices and the incorporation of AI in IT firms.

Gender: All gender-related p-values are greater than 0.05, suggesting that there is no significant difference between male and female respondents' knowledge of ESG concepts, their understanding of the role of ESG in IT companies, their views on the significance of incorporating AI into ESG initiatives, their perceptions of accountability and transparency, or their opinions on which ESG component benefits most from AI. Nonetheless, the knowledge of ESG's function in IT organizations has a p-value of 0.053, which is around the significant level. Although it is not statistically significant in our sample, this points to a possible trend that shows gender may influence ESG knowledge in IT organizations.

Age: All variables' p-values for age are significantly above 0.05, suggesting that there are no appreciable changes in respondents' awareness or attitudes of ESG between age groups. This covers their knowledge of ESG principles, their assessment of the value of integrating AI, their perspectives on accountability and transparency, and their judgments on which aspect of ESG gains the most from AI. Therefore, in the context of this study, age does not seem to have an impact on ESG-related awareness and perception.

Income: Similarly, as all p-values are over 0.05, there is no discernible correlation between income levels and ESG knowledge or perception. Regarding ESG, its function in IT firms, the significance of AI integration, and related aspects, respondents from a range of income categories exhibit comparable degrees of familiarity and perspective. This implies that sentiments about ESG and AI practices are not significantly influenced by money.

Objective 2: Impact of AI-Enabled ESG on Sustainable Development

Table 3: Spearman's Correlation Matrix – AI-enabled ESG and Sustainability Perception

Sl. No	Variables	1	2	3	4
1	AI-enabled ESG contributes to sustainability	1.000	0.298	0.358	0.309
2	Environmental sustainability	0.298	1.000	0.381	0.283
3	Social responsibility	0.358	0.381	1.000	0.485
4	Corporate governance	0.309	0.283	0.485	1.000

According to the Spearman's rank correlation study, there are strong positive correlations between AI-enabled ESG aspects and the belief that these practices support IT organizations' long-term viability.

Environmental sustainability and sustainability perception showed a somewhat good connection ($\rho = 0.298$, $p < 0.01$), suggesting that respondents who gave AI's environmental effect a high rating also had stronger beliefs in its long-term sustainability contribution.

The highest association between sustainability perception and social responsibility was found in social responsibility ($\rho = 0.358$, $p < 0.01$), indicating that trust in sustainable results is closely linked to the successful application of AI in social areas such as diversity and labor practices.

Additionally, there was a somewhat favorable correlation ($\rho = 0.309$, $p < 0.01$) between corporate governance and sustainability perception, indicating the perceived value of AI in improving risk management, ethics, and compliance.

All correlations were statistically significant at the 0.01 level, indicating that respondents' opinions of sustainability are strongly impacted by AI-enabled ESG practices across all three pillars (E, S, and G).

Objective 3: Relationship between AI and ESG Performance

Table 4: Regression Analysis on believe of AI enhances ESG Performance.

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.074[a]	.005	-.002	1.338	.005	.695	3	380	.555

a. Predictors: (Constant), income, gender, age

b. Dependent Variable: Do you believe AI enhances ESG Performance.

There is no statistical significance in the regression model that uses age, gender, and income as predictors (R2 = 0.005, p = 0.555). These factors have extremely little predictive value; they barely account for 0.5% of the variation in the dependent variable**.**

Table 5: Regression analysis on AI role play in ESG data collection and analysis in your organization (or one you are familiar with)?

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.130[a]	.017	.009	1.455	.017	2.187	3	380	.089

a. Predictors: (Constant), income, age, gender

b. Dependent Variable: AI role play in ESG data collection and analysis in your organisation

The dependent variable's variation is explained by the regression model containing income, age, and gender 1.7% of the time (R2 = 0.017). The model's poor correlation (R = 0.130) and lack of statistical significance (p = 0.089) suggest that these predictors have little bearing on the result.

Table 6: Regression analysis on of AI contribute more to informed in ESG decision-making

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.063[a]	.004	-.004	1.354	.004	.503	3	380	.681

a. Predictors: (Constant), income, age, gender
b. Dependent Variable: AI contribute more to informed in ESG decision making

The regression model that uses gender, age, and wealth as variables barely accounts for 0.4% of the variation in the perception that AI helps people make well-informed ESG decisions (R2 = 0.004). These demographic characteristics do not significantly impact how AI is perceived in ESG choices, according to the model, which is not statistically significant (p = 0.681).

Table 7: Regression Analysis of Factors Influencing AI Integration in ESG Strategy

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.044[a]	.002	-.006	1.337	.002	.242	3	380	.867

a. Predictors: (Constant), income, age, gender
b. Dependent Variable: Integrated AI in your organisation ESG strategy

The regression model that uses gender, age, and income as predictors explains just 0.2% of the variation in the dependent variable (R2 = 0.002) and exhibits a very weak correlation (R = 0.044). No predictive value is suggested by the corrected R2 = -0.006. There is no statistical significance in the model.

Objective 4: Challenges and Limitations

Table 8: Challenges in implementing AI for ESG performance.

Sl. No	Challenge and Limitations	Frequency	Ranks
1	Lack of expertise	138	1
2	Data quality issues	109	2
3	High implementation cost	64	3
4	Ethical concerns	54	4
5	Regulatory constraints	19	5

According to the research, the biggest obstacle to deploying AI for ESG is a lack of competence, which was chosen by the majority of respondents and rated top. The second biggest worry is the quality of the data, which is followed by the expensive cost of implementation. At number four and fifth, respectively, ethical issues and regulatory limitations are viewed as less significant obstacles. This implies that in order to successfully integrate AI into ESG plans, firms need place a high priority on developing expertise and enhancing data quality.

Findings

- There was no statistically significant correlation between awareness and perception of ESG practices and gender, age, or income, according to the chi-square analysis.
- Gender disparities in knowledge of ESG roles in IT organizations were found to be borderline significant (p = 0.053), pointing to a possible new trend.
- AI-enabled ESG practices and all three sustainability aspects have a strong positive link, according to Spearman's correlation:
  Sustainability of the environment ($\rho = 0.298$, $p < 0.01$)
  Social responsibility ($\rho = 0.358$, $p < 0.01$)
  Corporate governance ($\rho = 0.309$, $p < 0.01$)
- The regression analysis indicated that age, gender, and income had negligible influence on perceptions related to AI and ESG:

Belief that AI enhances ESG ($R^2 = 0.005$, $p = 0.555$)
AI's role in ESG data collection ($R^2 = 0.017$, $p = 0.089$)
AI's contribution to ESG decision-making ($R^2 = 0.004$, $p = 0.681$)
AI integration into ESG strategy ($R^2 = 0.002$, $p = 0.867$)

1. All regression models were found to be statistically insignificant, indicating that demographic variables had minimal predictive value in shaping perceptions toward AI-enabled ESG practices.
2. The major challenges in implementing AI for ESG identified by respondents were:

- Lack of expertise
- Poor data quality
- High implementation costs
- Ethical concerns
- Regulatory constraints

Suggestions

1. Capacity Building

Organize training programs and workshops to bridge the knowledge gap in AI-ESG applications.

2. Data Infrastructure Enhancement

Invest in robust ESG data systems to improve data quality and accessibility.

3. Cost Optimization

Encourage the use of open-source tools and shared AI platforms to reduce implementation costs.

4. Ethical and Legal Frameworks

Develop clear ethical guidelines and ensure regulatory compliance for AI-based ESG practices.

5. Strategic Awareness Campaigns

Although demographics showed no significant influence, targeted awareness efforts can still support inclusive understanding and engagement.

Conclusion

The study sheds important light on how AI-enabled ESG (Environmental, Social, and Governance) practices are seen, understood, and used, especially in IT companies. Although a small increase in gender-related awareness was seen, the data shows that demographic factors including gender, age, and wealth have no discernible impact on people's knowledge or impression of ESG and AI integration. The potential of AI to improve sustainable development outcomes is shown by correlation analysis, which demonstrates a positive and substantial association between AI-enabled ESG practices and sustainability dimensions—environmental, social, and governance. Regression analysis, however, indicates that demographic traits have no bearing on attitudes or perceptions of AI's participation in ESG initiatives. The findings also highlight the main obstacles to successful AI adoption in ESG, which are mainly insufficient knowledge and poor data quality, followed by financial, moral, and legal constraints. These findings highlight the significance of ethical frameworks, strong data management, and capacity-building for the effective integration of AI in ESG plans.

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