www.ijprems.com
editor@ijprems.com

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 10, October 2025, pp : 646-652

e-ISSN : 2583-1062
Impact Factor : 7.001

IMPACT OF AI-DRIVEN GREEN BUSINESS PRACTICES ON SUSTAINABLE PERFORMANCE OF ORGANISATIONS IN INDIA

Praveen K Harkawat[1]

[1]Head Quality - BU, L&T Technology Services Limited, L&T Knowledge City, Special Economic Zone (IT/ITES), West Block – II, NH No. 8, Village Ankhol, Vadodara, Gujarat 390019, India.

pkharkawat@gmail.com; praveen.harkawat@ltts.com

DOI: https://www.doi.org/10.58257/IJPREMS44262

ABSTRACT

This paper explores the pivotal role of Artificial Intelligence (AI) in advancing sustainable business practices and enhancing environmental management. It specifically examines how AI technologies/practices/tools are reshaping approaches to sustainability by offering innovative and eco-friendly solutions to environmental challenges within the context of India's emerging economy.

The paper highlights AI's significant contribution to optimizing energy consumption and improving waste management. By processing vast datasets, AI enables organizations to adopt resource-efficient strategies and minimize environmental impact through intelligent & better decision-making and green business practices.

However, the paper also addresses key challenges in AI adoption, including data integration issues, resistance to technological change, and limited awareness or understanding of AI capabilities. Despite these obstacles, the study underscores AI's potential as a powerful enabler of environmental sustainability.

Looking ahead, future research will delve into emerging applications of AI in sustainability and assess its long-term environmental implications. The paper concludes by advocating for the proactive and responsible use of AI tools to foster a greener, more sustainable future.

Keywords: AI, ML,Sustainability, Green Business.

1. INTRODUCTION

The integration of Artificial Intelligence (AI) into sustainable business practices marks a significant shift in how organizations manage environmental responsibilities and enhance operational efficiency. In recent years, AI and Machine Learning (ML) have revolutionized various sectors, including healthcare, finance, transportation, education, and entertainment, by improving precision and productivity. This technological evolution has gained momentum, particularly in the wake of global challenges such as the COVID-19 pandemic and the growing urgency to address environmental concerns.

As Goralski & Tan (2020) observed, the application of AI in business and environmental management has expanded due to increased awareness of sustainability issues and the demand for smarter, more efficient solutions. In India, this trend is especially evident as companies strive to adopt more responsible and sustainable practices, driven by both technological advancements and societal expectations. Traditional business models are being reshaped by AI, which is now recognized as a key driver of global technological progress.

Rahman et al. (2025) highlight AI's role in monitoring environmental changes, promoting corporate social responsibility, and enhancing organizational governance. For instance, AI-powered sensors and data analytics enable real-time tracking of air quality, water levels, and carbon emissions, allowing companies to identify and address environmental issues promptly and effectively.

However, conventional ML algorithms often require substantial data and computational resources, leading to increased energy consumption, water usage for cooling data centers, and higher greenhouse gas (GHG) emissions. In response, Bolón-Canedo et al. (2024) introduced the concept of "Green AI," which focuses on minimizing environmental impact by optimizing algorithms, improving hardware efficiency, and adopting sustainable data management practices.

AI tools also play a crucial role in analyzing energy usage, identifying inefficiencies, and enabling real-time adjustments, thereby reducing energy consumption and carbon emissions. To fully leverage AI's potential, organizations must invest in the right support systems, including skilled personnel and robust infrastructure. The relationship between AI effectiveness and sustainability outcomes is multifaceted and context-dependent. Ali et al.

(2024) emphasize that AI can significantly enhance organizational performance by streamlining processes, enabling intelligent data analysis, and fostering innovation.

This paper aims to demonstrate that AI is a powerful and valuable tool for supporting sustainable business practices in India. By integrating AI across various business functions, companies can optimize resource utilization, reduce environmental footprints, and contribute to building a greener, more sustainable future.

2. LITERATURE REVIEW

The rapid pace of industrialization and increased material consumption worldwide has significantly contributed to environmental degradation. In response to resource limitations and growing consumer awareness of ecological issues, many companies particularly in India are now integrating environmental considerations into their core business strategies. This shift reflects a broader global movement, where policymakers and industry leaders are prioritizing carbon emission reductions to combat climate change.

Adanma & Ogunbiyi (2024) emphasize that the integration of Artificial Intelligence (AI) into green management and digital lean methodologies represents a transformative step toward enhancing sustainability and operational efficiency across Indian industries. Green business practices aim to embed environmental consciousness into decision-making processes, focusing on minimizing waste and conserving resources throughout the value chain.

Wu et al. (2024) assert that AI is a disruptive technology poised to redefine green management. Its ability to process vast datasets, identify patterns, and generate predictive insights empowers businesses to optimize energy usage, reduce waste, and streamline production processes—yielding benefits for both the environment and the economy. AI-driven tools such as machine learning and data analytics facilitate environmental monitoring, resource forecasting, and automation of energy-saving operations.

Rehan (2021) found that AI enables organizations to monitor and adjust energy consumption in real time, thereby reducing waste and operational costs. Furthermore, AI enhances production efficiency by identifying and resolving process inefficiencies, contributing to more sustainable business operations. Green management, in essence, seeks to reduce emissions, preserve biodiversity, and foster a long-term, eco-friendly relationship between businesses and nature.

Advanced AI technologies support precise monitoring and control of production systems, improving both quality and efficiency. Predictive maintenance algorithms, for example, can forecast equipment failures, minimizing downtime and waste. Similarly, Internet of Things (IoT) devices enable real-time tracking of material flows, promoting resource efficiency and waste reduction in manufacturing.

AI's diverse capabilities, including machine learning, data analytics, and neural networks—offer powerful tools for informed decision-making and sustainable resource management. Chen et al. (2023) highlight AI's role in intelligent waste management, where AI-powered systems can sort recyclable materials more accurately and efficiently than manual methods, reducing human error and improving reliability.

Recent data highlights AI's growing importance in India's sustainability journey. According to IBM's State of Sustainability Readiness Report 2024, 98% of Indian business leaders plan to increase IT investments to support sustainability initiatives, and 96% believe AI will be instrumental in achieving their environmental goals. This reflects a strong commitment to leveraging AI for ecological responsibility.

Indian companies are actively deploying AI to address environmental challenges. The same report reveals that 81% of Indian leaders are working toward climate resilience, and 79% have implemented robust data systems to monitor sustainability progress.

Qatawneh (2025) notes that AI tools such as natural language processing and machine learning are enhancing the accuracy of sustainability reporting and automating financial data analysis, thereby improving transparency and accountability.

AI is also transforming customer engagement in financial institutions through personalized interactions, AI-driven chatbots, and virtual assistants that provide 24/7 support. Additionally, AI-powered fraud detection systems enhance security, fostering trust in digital transactions.

In India, AI is increasingly being adopted to streamline operations and address contemporary challenges, with sustainability emerging as a central concern. The commitment to IT investment driven by the need for innovative solutions to manage water resources, reduce carbon emissions, and build climate resilience is shaping the future of Indian business strategy.

The report further indicates that 82% of Indian businesses are actively pursuing climate resilience, and 78% have adopted advanced tools to measure sustainability performance. This emphasis on transparency and accountability is setting a global benchmark for responsible business practices. Companies that embrace these capabilities early are likely to gain a competitive edge in the evolving sustainability landscape.

AI's potential for innovation extends beyond individual industries, influencing the broader economy by fostering cross-sector collaboration and data integration. Srihith (2022) explores the convergence of AI, IoT, and 5G technologies in the development of smart cities, where data-driven solutions enhance urban living while generating economic value. AI also facilitates the integration of renewable energy sources into power grids by predicting fluctuations in solar and wind output, ensuring stable and efficient energy supply.

Moreover, AI contributes to reducing transportation-related pollution. Autonomous vehicles powered by AI can alleviate traffic congestion and improve fuel efficiency. Real-time traffic management systems further optimize flow, saving time and reducing emissions. The concept of a circular economy—where materials are reused, recycled, and repurposed, offers a sustainable alternative to traditional linear models. AI plays a crucial role in enabling this transition by supporting intelligent resource management and fostering innovation across industries.

Onyeaka et al. (2023) highlights that Artificial Intelligence (AI) plays a crucial role in enhancing supply chain efficiency, minimizing waste, and promoting effective material reuse. AI enables organizations to assess the environmental impact of materials during the early stages of product design, allowing for more sustainable choices from the outset. For example, brands like Adidas are leveraging AI to design footwear using recycled materials, an approach that supports environmental goals while appealing to eco-conscious consumers.

Toyota utilizes an AI-powered "just-in-time" inventory system to monitor parts in real time, reducing production delays by up to 30%. Similarly, Unilever employs AI to prioritize low-carbon suppliers by tracking lifecycle carbon emissions, while Maersk uses AI to optimize shipping routes and speeds, resulting in a 12% reduction in carbon emissions per vessel and fostering greener supply chains.

AI is also reshaping global trade by overcoming traditional barriers such as language and geography. For instance, Infosys, an Indian IT firm, has improved legal document processing efficiency by 40% using AI-powered translation tools. In the healthcare sector, Butterfly Network deploys portable AI-enabled ultrasound devices that transmit diagnostic images to doctors in India, facilitating remote medical services in underserved regions across Africa and Southeast Asia.

In agriculture, AI is being used to predict crop yields and enable precision farming, enhancing productivity and sustainability. Shaik et al. (2024) argue that with strategic adoption, AI can unlock new opportunities for small and medium-sized enterprises (SMEs), driving growth and long-term sustainability.

India is rapidly building a strong foundation in AI and semiconductor technologies to support its digital economy. In 2024, the Government of India launched the India AI Mission, allocating ₹10,300 crore over five years to strengthen AI capabilities. According to Inavolu (2024), AI-powered autonomous agents are helping businesses deliver personalized customer experiences and streamline operations.

A report by Salesforce reveals that 78% of Indian SMEs integrating AI into their operations experienced revenue growth, while 93% reported improved earnings, demonstrating AI's contribution to sustainable organizational performance. India's regulatory approach to AI emphasizes innovation and accountability, focusing on safety mechanisms and supporting academic institutions like IITs to address challenges such as deepfakes, privacy concerns, and cybersecurity threats.

AI is also transforming financial services by automating data analysis and enhancing customer engagement. AI-driven chatbots and virtual assistants provide round-the-clock support, while fraud detection systems improve transaction security and customer trust.

India's commitment to AI-driven sustainability is evident in its strategic investments and policy direction. With 82% of businesses actively working on climate resilience and 78% implementing advanced tools to monitor sustainability progress, the country is setting a global benchmark for responsible business practices. Early adopters of AI are likely to gain a competitive edge, as this transformation is essential for building a resilient and sustainable future.

AI's influence extends beyond individual sectors, fostering cross-industry collaboration and enabling the development of interconnected ecosystems. Srihith (2022) notes that the convergence of AI, IoT, and 5G is driving the emergence of smart cities, where data-driven solutions enhance urban living and economic value. AI also supports the integration of

renewable energy sources into power grids by predicting fluctuations in solar and wind output, ensuring stable and efficient energy supply.

In transportation, AI-powered autonomous vehicles and traffic management systems reduce congestion and fuel consumption, contributing to lower emissions. Moreover, AI facilitates the transition to a circular economy, where materials are reused, recycled, and repurposed, offering a sustainable alternative to traditional linear models.

Objectives of the Study

- To explore the key factors influencing the role of Artificial Intelligence in green business practices.
- To assess the impact of AI-driven sustainable practices on organizational performance and long-term sustainability.

3. METHODOLOGY

As the study aimed to explore the factors influencing the role and impact of AI-driven green business practices on organizational sustainable performance, the researcher decided to focus on the secondary sources of data and trends.

4. KEY FINDINGS

4.1 Key Findings 1: The key factors influencing the role of Artificial Intelligence in green business practices.

The key factors that influence the role of Artificial Intelligence (AI) in green business practices involves understanding how AI technologies contribute to sustainability and what conditions enable or hinder their effective use. Following are the most critical factors:

Technological Infrastructure

- Data Availability & Quality: AI relies heavily on large volumes of accurate and relevant data. Poor data quality or lack of access can limit AI's effectiveness in sustainability applications.
- Computational Resources: High-performance computing systems are needed to run complex AI models, especially in areas like predictive analytics and real-time monitoring.
- Integration with IoT & Smart Devices: AI works best when integrated with sensors and IoT devices that provide real-time environmental data (e.g., air quality, energy usage, waste levels).

Organizational Readiness

- Leadership Commitment: Senior management must prioritize sustainability and support AI adoption as a strategic initiative.
- Skilled Workforce: Employees need training in AI tools and sustainability practices to implement and manage AI-driven solutions effectively.
- Change Management: Resistance to new technologies can slow down adoption. A culture that embraces innovation is essential.

Regulatory and Policy Environment

- Government Incentives: Policies that promote green technologies and AI adoption (e.g., subsidies, tax benefits) can accelerate implementation.
- AI Governance & Ethics: Clear guidelines on data privacy, algorithmic transparency, and environmental impact are crucial to ensure responsible use.
- Sustainability Standards: Compliance with environmental regulations and sustainability reporting frameworks (e.g., ESG metrics) encourages AI integration.

Economic and Market Drivers

- Cost Efficiency: AI can reduce operational costs by optimizing energy use, minimizing waste, and improving supply chain logistics.
- Consumer Demand: Growing awareness among consumers about sustainability pushes companies to adopt AI for greener products and services.
- Competitive Advantage: Early adopters of AI in sustainability can differentiate themselves and gain market leadership.

Innovation and Research

- R&D Investment: Continuous research into AI applications for sustainability (e.g., Green AI, circular economy models) drives progress.

- Collaborations: Partnerships between academia, industry, and government can foster innovation and knowledge sharing.

Environmental Impact Awareness

- Carbon Footprint of AI: While AI can help reduce emissions, its own energy consumption (especially in training large models) must be managed.
- Lifecycle Analysis: AI tools can help assess the environmental impact of products and processes from design to disposal.

4.2 Key Findings 2: Assessment the impact of AI-driven sustainable practices on organizational performance and long-term sustainability

Operational Efficiency

AI enhances productivity by automating routine tasks, optimizing resource allocation, and improving supply chain management. For example:

- Predictive maintenance reduces downtime and extends equipment life.
- Smart energy management systems lower energy consumption and operational costs.
- AI-based logistics improve delivery timelines and reduce fuel usage.

It would result in: Increased efficiency leads to cost savings, better resource utilization, and reduced environmental footprint.

Enhanced Decision-Making

AI enables data-driven decisions by analyzing large volumes of structured and unstructured data.

- Real-time analytics help monitor sustainability metrics like carbon emissions and water usage.
- Scenario modeling supports strategic planning for climate resilience and risk mitigation.

Using AI, Organizations can make informed choices that align with both business goals and sustainability targets.

Innovation and Product Development

AI fosters innovation by enabling:

- Eco-friendly product design through lifecycle analysis.
- Material optimization to reduce waste and improve recyclability.
- Customer-centric solutions that meet sustainability preferences.

It would result in: Competitive advantage through sustainable innovation and increased market appeal.

Regulatory Compliance and Reporting

AI simplifies compliance with environmental regulations and sustainability standards.

- Automated reporting tools ensure accurate and timely ESG disclosures.
- AI-powered audits detect inefficiencies and non-compliance risks.

It would result in: Reduced legal risks and improved transparency in sustainability performance.

Stakeholder Engagement and Brand Reputation

AI enhances customer and stakeholder engagement through:

- Personalized communication about sustainability efforts.
- AI-driven platforms that showcase environmental impact and progress.

It would result in: Strengthened brand loyalty, investor confidence, and public trust.

Long-Term Sustainability

AI supports long-term sustainability by:

- Enabling circular economy models (e.g., recycling, reuse, remanufacturing).
- Integrating renewable energy sources into operations.
- Forecasting environmental risks and adapting strategies accordingly.

It would result in: Future-proofing the organization against climate-related disruptions and aligning with global sustainability goals.

5. CONCLUSION

India's rapid advancement in Artificial Intelligence, backed by robust government initiatives, has positioned the country among the global leaders in AI innovation. Despite facing infrastructural and policy challenges, India is actively building an inclusive and forward-looking AI ecosystem. This includes expanding AI computing capabilities, developing indigenous AI models, strengthening digital public infrastructure, and investing in skill development across sectors.

Svetlana (2022) observed that the integration of AI into business processes marks a transformative moment for economies, enterprises, and society at large. While AI offers immense potential for growth, innovation, and sustainability, it also presents complex challenges that require thoughtful policy frameworks, ethical considerations, and international collaboration.

Chatterjee (2020) highlighted India's proactive stance, noting that 97% of Indian business leaders plan to increase AI investments to achieve sustainability goals within the coming year. These investments are directed toward deploying innovative solutions to address pressing environmental challenges such as water resource management, carbon footprint reduction, and climate resilience.

AI is revolutionizing business operations by enabling predictive analytics, generating actionable insights, and supporting data-driven strategies that enhance sustainability efforts. Organizations are increasingly using AI to monitor resource consumption, optimize supply chains, and design environmentally friendly products.

The findings identified several key roles of AI in promoting sustainability:

- Energy Optimization: AI systems help monitor and reduce energy consumption in real time.
- Carbon Footprint Monitoring: AI tools track emissions across operations, enabling targeted reduction strategies.
- Green Supply Chains: AI enhances logistics and supplier selection to minimize environmental impact.
- Use of Eco-Friendly Materials: AI supports sustainable product design by evaluating material choices during early development stages.

The paper concludes that AI-driven green business practices have a significant positive impact on organizational performance and long-term sustainability. By integrating AI into core operations, businesses can achieve greater efficiency, reduce environmental harm, and align with global sustainability standards—ultimately contributing to a resilient and eco-conscious future.

6. REFERENCES

[1] Goralski, M. A., & Tan, T. K. (2020). Artificial intelligence and sustainable development. The International Journal of Management Education, 18(1), 100330.

[2] Rahman, S. M., Hossain, M. A., Miah, M. S., Alom, M. M., & Islam, M. (2025). Artificial Intelligence (AI) in revolutionising sustainable recruitment: A framework for inclusivity and efficiency. International Research Journal of Multidisciplinary Scope, 6(1), 1128-1141.

[3] Bolón-Canedo, V., Morán-Fernández, L., Cancela, B., & Alonso-Betanzos, A. (2024). A review of green artificial intelligence: Towards a more sustainable future. Neurocomputing, 599, 128096.

[4] Ali, M., Khan, T. I., Khattak, M. N., & Şener, İ. (2024). Synergising AI and business: Maximising innovation, creativity, decision precision, and operational efficiency in hightech enterprises. Journal of Open Innovation: Technology, Market, and Complexity, 10(3), 100352.

[5] Adanma, U. M., & Ogunbiyi, E. O. (2024). Artificial intelligence in environmental conservation: evaluating cyber risks and opportunities for sustainable practices. Computer Science & IT Research Journal, 5(5), 1178-1209.

[6] Wu, H., Liu, J., & Liang, B. (2024). AI-driven supply chain transformation in Industry 5.0: Enhancing resilience and sustainability. Journal of the Knowledge Economy, 1-43.

[7] Rehan, H. (2021). Energy efficiency in smart factories: leveraging IoT, AI, and cloud computing for sustainable manufacturing. Journal of Computational Intelligence and Robotics, 1(1), 18.

[8] Chen, Y., Biswas, M. I., & Talukder, M. S. (2023). The role of artificial intelligence in effective business operations during COVID-19. International Journal of Emerging Markets, 18(12), 6368-6387.

[9] Qatawneh, A. M. (2025). The role of artificial intelligence in auditing and fraud detection in accounting information systems: moderating role of natural language processing. International Journal of Organisational Analysis, 33(6), 1391-1409.

[10] Srihith, I. V. D., Kumar, I. V. S., Varaprasad, R., Mohan, Y. R., Srinivas, T. A. S., & Sravanthi, Y. (2022). Future of smart cities: The role of machine learning and artificial intelligence. South Asian Research Journal of Engineering and Technology, 4(5), 110119.

[11] Onyeaka, H., Tamasiga, P., Nwauzoma, U. M., Miri, T., Juliet, U. C., Nwaiwu, O., & Akinsemolu, A. A. (2023). Using artificial intelligence to tackle food waste and enhance the circular economy: Maximising resource efficiency and minimising environmental impact: A review. Sustainability, 15(13), 10482.

[12] Shaik, A. S., Alshibani, S. M., Jain, G., Gupta, B., & Mehrotra, A. (2024). Artificial intelligence (AI)-driven strategic business model innovations in small-and medium-sized enterprises. Insights on technological and strategic enablers for carbon-neutral businesses. Business Strategy and the Environment, 33(4), 2731-2751.

[13] Inavolu, S. M. (2024). Exploring AI-driven customer service: Evolution, architectures, opportunities, challenges and future directions. International Journal of Engineering and Advanced Technology, 13(3), 156-163.

[14] Svetlana, N., Anna, N., Svetlana, M., Tatiana, G., & Olga, M. (2022). Artificial intelligence as a driver of business process transformation. Procedia Computer Science, 213, 276-284.

[15] Chatterjee, S. (2020). AI strategy of India: policy framework, adoption challenges and actions for government. Transforming Government: People, Process and Policy, 14(5), 757-775.