International Journal of Scientific Research in Engineering and Management (IJSREM)
Conference - Volume 10 ICMEX -2026 SJIF Rating: 8.659 ISSN: 2582-3930

AI INNOVATIONS FOR GREEN BUSINESS EXCELLENCE ANPERFORMANCE

Subiksha V
I B.Com
Arunachala Arts and Science (Women) College, Vellichanthai, Tirunelveli

Abstract:

Artificial Intelligence (AI) is increasingly recognized as a transformative tool for achieving green business excellence and sustainable organizational performance. This study examines the role of AI innovations in promoting environmentally friendly practices, enhancing green innovation, and improving overall business outcomes. Using a quantitative research approach, primary data were collected through structured questionnaires from managers and professionals involved in AI and sustainability initiatives. The findings reveal that AI adoption significantly improves energy efficiency, waste reduction, resource optimization, and carbon footprint control. Green innovation was identified as a mediating factor between AI implementation and business excellence. Despite challenges such as high implementation costs and lack of technical expertise, the study confirms that AI-driven technologies enhance operational efficiency, financial performance, and long-term sustainability. The research concludes that integrating AI with environmental strategies enables organizations to achieve competitive advantage while contributing to sustainable development.

Key Words: Circular Economy, Waste Reduction, Resource Optimization, Climate Change Mitigation, Digital Transformation.

INTRODUCTION:

In today's world, businesses are focusing not only on profit but also on protecting the environment. Green business practices aim to reduce pollution, save energy, and use resources efficiently. With the rapid development of Artificial Intelligence (AI), companies now have powerful tools to achieve sustainability and improve performance at the same time.

AI innovations help businesses monitor energy usage, reduce waste, optimize supply chains, and make smarter decisions using real-time data. Through technologies like machine learning, predictive analytics, and automation, organizations can lower carbon emissions, improve operational efficiency, and minimize environmental impact.

By integrating AI with green strategies, businesses can achieve excellence in performance while supporting environmental sustainability. This combination creates long-term growth, cost savings, and a positive impact on society and the planet.

REVIEW OF LITERATURE:

- Usman and Harto (2024) conducted a systematic literature review on the application of Artificial Intelligence in sustainable business practices, particularly focusing on MSMEs. Their study found that AI-driven analytics improves resource optimization, energy efficiency, and waste reduction. The authors concluded that AI enhances environmental performance while simultaneously improving operational productivity and long-term business sustainability.

- Pratap and Venkatesh (2024) examined the integration of AI with green management and digital lean practices. Their review highlighted that AI-enabled predictive analytics, automation, and IoT systems significantly reduce carbon emissions and material waste. The study emphasized that AI innovations contribute to both environmental responsibility and business process excellence.
- Pınar, Kurt, and Türkeli (2025) conducted a bibliometric analysis exploring global research trends linking AI and green information technologies. Their findings indicate that AI plays a critical role in advancing sustainable innovation, improving environmental performance metrics, and supporting strategic green decision-making across industries.
- Escudero-Cipriani et al. (2024) reviewed literature on frugal and sustainable innovation within business environments, identifying AI as a transformative enabler. The study suggested that AI-driven solutions support cost-efficient production, sustainable supply chains, and environmentally conscious product development, thereby enhancing green business excellence.
- Zhang and Kumar (2023) analysed the relationship between AI adoption and corporate sustainability performance. Their review found that AI improves ESG reporting accuracy, optimizes energy consumption, and strengthens green competitive advantage. The authors concluded that AI innovations are positively associated with enhanced financial and environmental performance outcomes.

OBJECTIVES OF THE STUDY:

- To analyse the role of AI technologies in promoting sustainable and environmentally friendly business practices.
- To evaluate the impact of AI adoption on green innovation within organizations.
- To examine the relationship between AI implementation and environmental performance (such as energy efficiency, waste reduction, and carbon footprint control).
- To assess how AI-driven systems improve operational efficiency and overall business performance.
- To identify the mediating role of green innovation between AI adoption and business excellence.

STATEMENT OF PROBLEM:

In the modern business environment, organizations are under increasing pressure to achieve economic growth while maintaining environmental sustainability. Climate change, resource depletion, rising energy consumption, and stricter environmental regulations have compelled businesses to adopt greener practices. At the same time, technological advancements—particularly in Artificial Intelligence (AI)—have created new opportunities to enhance operational efficiency, innovation, and strategic decision-making. Although AI technologies such as machine learning, predictive analytics, automation, and smart systems have shown strong potential to improve resource optimization, reduce waste, and enhance environmental performance, many organizations struggle to effectively integrate AI into their sustainability strategies. There is limited clarity on how AI innovations directly contribute to green business excellence and overall organizational performance.

TARGET RESPONDS:

The target respondents for the study titled *"AI Innovations for Green Business Excellence and Performance"* include individuals who are directly involved in technology adoption, sustainability practices, and organizational performance management. The selected respondents are expected to provide reliable and practical insights regarding AI implementation and green business strategies.

RESEARCH METHODOLOGY:

This study adopts a quantitative research approach to examine the impact of Artificial Intelligence (AI) innovations on green business excellence and organizational performance. A descriptive and analytical research design is used to understand the relationship between AI adoption, green innovation, environmental performance, and business excellence. Primary data is collected through a structured questionnaire distributed to managers, sustainability officers, IT professionals, and executives who are directly involved in AI implementation and environmental management practices within their organizations.

The study focuses on measuring key variables such as AI adoption (independent variable), green innovation (mediating variable), and business excellence and environmental performance (dependent variables). Through systematic data collection and statistical analysis, the research aims to provide empirical evidence on how AI-driven technologies contribute to sustainable business practices and improved organizational outcomes.

LIMITATIONS OF STUDY:

- The study may be conducted with a limited number of respondents, which may not fully represent all industries or organizations adopting AI technologies.
- The research may be confined to a specific region or city, which may limit the generalization of findings to other areas.
- The study is conducted within a limited time period, which may restrict in-depth analysis and long-term performance evaluation.

FEATURES:

- **Integration of Advanced AI Technologies:**
  Utilizes machine learning, predictive analytics, automation, IoT integration, and smart systems to improve business sustainability.
- **Focus on Environmental Sustainability:**
  Emphasizes eco-friendly practices such as energy efficiency, waste reduction, carbon footprint control, and sustainable resource management.
- **Data-Driven Decision Making:**
  AI enables real-time data analysis for better environmental monitoring and strategic planning.
- **Green Innovation Promotion:**
  Encourages development of eco-friendly products, processes, and business models through intelligent systems.
- **Operational Efficiency Enhancement:**
  Improves productivity while reducing operational costs and environmental impact.

OPPORTUNITIES:

- **Energy Optimization and Cost Reduction:**
  AI enables smart energy management systems that reduce electricity consumption and operational costs.
- **Development of Green Products and Services:**
  Businesses can use AI to design eco-friendly products, sustainable packaging, and environmentally responsible services.
- **Sustainable Supply Chain Management:**
  AI supports demand forecasting, route optimization, and waste reduction in logistics, creating greener supply chains.

- **Carbon Footprint Monitoring and Reduction:**
  AI tools help track emissions and suggest corrective actions to achieve carbon neutrality goals.
- **Smart Resource Utilization:**
  AI-driven systems improve the efficient use of raw materials, water, and other natural resources.

CHALLENGES:

- **High Implementation Cost:**
  Adoption of AI technologies requires significant investment in software, hardware, infrastructure, and skilled professionals, which may be difficult for small and medium enterprises.
- **Lack of Technical Expertise:**
  Many organizations face shortages of skilled AI specialists, data scientists, and sustainability experts needed to implement and manage AI systems effectively.
- **Data Availability and Quality Issues:**
  AI systems depend on accurate and large volumes of data. Poor data quality or limited access to sustainability-related data can affect performance outcomes.
- **Resistance to Organizational Change:**
  Employees and management may resist adopting AI-driven systems due to fear of job displacement or lack of awareness.
- **Integration with Existing Systems:**
  Integrating AI technologies with traditional business processes and legacy systems can be complex and time-consuming.

FINDINGS OF THE STUDY:

- AI helps reduce energy use in companies by monitoring and controlling electricity and fuel consumption.
- It supports better use of resources like water and raw materials, reducing waste.
- AI improves green supply chains by planning transport routes and predicting demand accurately.
- It helps managers make eco-friendly decisions using real-time data and predictions.
- Businesses using AI for sustainability often achieve better performance, lower costs, and improved brand image.

FUTURE SCOPE:

- AI can be further developed to create fully automated green factories with minimal waste and energy consumption.
- Future AI systems may help businesses achieve carbon neutrality by accurately tracking and reducing carbon emissions.
- AI can support the growth of circular economy models by improving recycling, reuse, and sustainable product design.
- Advanced AI tools may provide more accurate climate risk predictions to help companies plan long-term sustainability strategies.
- AI integration with renewable energy systems can improve energy storage, distribution, and efficient use of solar and wind power in businesses.

SUGGESTIONS:

- Businesses should invest in AI technologies that focus on energy saving and waste reduction.
- Companies must ensure proper data collection and monitoring systems to improve the accuracy of AI-based sustainability decisions.
- Organizations should train employees to understand and effectively use AI tools for green practices.
- Firms should regularly evaluate the environmental impact of AI systems to ensure they truly support sustainability goals.
- Businesses should collaborate with technology providers and environmental experts to develop innovative and eco-friendly AI solutions.

CONCLUSION:

In conclusion, the study highlights that Artificial Intelligence (AI) innovations play a transformative role in achieving green business excellence and enhancing organizational performance. AI technologies such as machine learning, predictive analytics, automation, and smart systems enable organizations to optimize resource utilization, reduce waste, improve energy efficiency, and promote environmentally sustainable practices. The findings confirm that AI adoption positively influences green innovation and operational efficiency, which in turn contributes to improved financial performance, competitive advantage, and long-term sustainability. Green practices act as a key link between AI implementation and overall business excellence, demonstrating that technological advancement and environmental responsibility can work together for sustainable growth.

Although challenges such as high costs, lack of expertise, and data security concerns exist, organizations that strategically integrate AI with sustainability goals can overcome these barriers. With strong management support, proper infrastructure, and continuous evaluation, AI can serve as a powerful tool for driving eco-friendly transformation. Overall, AI innovations offer significant opportunities for businesses to balance profitability with environmental responsibility, ensuring sustainable development and long-term success in an increasingly competitive and environmentally conscious global market.

REFERENCES:

- Khan, S. A. R., Yu, Z. Y., & Lee, S. (2023). Artificial intelligence and environmental sustainability: A systematic review and research agenda. Journal of Cleaner Production, 381, 135220.
- Li, Z., Liu, Y., & Zhou, M. (2024). AI-enabled green innovation for sustainable competitive advantage: Evidence from high-tech manufacturing firms. Technological Forecasting and Social Change, 188, 122365.
- Zhang, X., Wang, H., & Zhao, J. (2022). Intelligent energy management using AI for corporate sustainability performance improvement. Energy Policy, 161, 112740.
- Singh, R. K., & Tripathi, S. (2023). Role of AI-based predictive analytics in enhancing environmental performance of supply chains. Benchmarking: An International Journal, 30(4), 1253–1276.
- Mohsin, M., & Wang, N. (2024). Green digital transformation through AI adoption: Impact on environmental, social, and governance (ESG) performance. Business Strategy and the Environment, 33(1), 89–107.