Harnessing Artificial Intelligence to Avert Corporate Greenwashing in Pakistan

Dr. Muhammad Haroon Rasheed
Lecturer (Commerce) at Malik Firoz Khan Noon Business School, University of Sargodha

Corporate greenwashing is one of the management vices that aims at deceptively informing stakeholders about the environmental implications of company operations *(Forliano et al., 2025)*. This phenomenon is an important issue, because it negatively affects the reporting practices, market relations, and sustainability performance of ESG-compliant organizations (*Poiriazi et al., 2025)*. Existing literature has empirically validated that corporate greenwashing practices have a negative impact on the image of the organization, its performance in the market, and the trust of stakeholders (*Dempere et al., 2024)*. Therefore, the negative consequences of greenwashing imply that these actions need to be prevented and tackled in a timely manner. This avenue has been especially important in the environment of a developing economy like Pakistan, which is one of the most susceptible economies to climate change and faces severe consequences of global climate events every year.

Pakistan is particularly vulnerable to corporate greenwashing due to its weak economic health, corporate governance, and increasing exposure to natural calamities. Even though traditional corporate governance tools are widely adopted and utilized among corporates in Pakistan, the effectiveness of these tools remains questionable, which can be further extended to the effectiveness of existing climate and ESG reforms. Corporate greenwashing is therefore an important threat to sustainable economic development in this country.

Innovation of technologies and their subsequent implementation is a key entry point in ensuring that corporate greenwashing is effectively prevented *(John et al., 2025)*. Empirical studies indicate that technology improves economic, social, and environmental aspects of organizational sustainability and efficiency, which reduces greenwashing practices *(Islam, 2025)*. The new opportunities from the recent proliferation of artificial intelligence (AI) technologies have led to broader opportunities to improve and optimize organizational outcomes *(Bahoo et al., 2023)*.

AI provides substantial opportunities to address the issue of greenwashing, as it can help produce more transparent and factual information while monitoring it in real time. These capabilities can help firms, regulators, and investors validate organizational claims to determine whether they reflect genuine sustainability programs or fraudulent statements. Greenwashing also undermines trust in the sustainability of corporations and impedes the achievement of national and international environmental outcomes. AI can thus be very instrumental in improving the transparency of corporate sustainability activities. Multinational corporations around the globe are now criticized for exaggerating environmental commitments for the sake of investment and good publicity. One possible solution to this issue is the utilization of AI-integrated tools, which can offer more accurate reporting, monitoring, and verification of environmental claims.

Developed global economies are already leading the way in using AI-based solutions to address greenwashing and ensure strong ESG adherence. The application of artificial intelligence to analyze sustainability reports by corporations has been recognized as a framework for ensuring accuracy and consistency in reporting. At the same time, companies use machine-learning models to predict environmental impacts, thus opening up new avenues to improve ESG performance. These international precedents serve as useful models that may guide Pakistan toward the right path in climate financing and ESG reforms. Therefore, it can be concluded that the role of AI in supporting climate finance and ESG projects in Pakistan, especially in preventing corporate greenwashing, can be central. Machine learning, natural-language processing, and blockchain are just a few technologies that comprise AI-enabled solutions with high potential to enhance ESG reporting and provide stakeholders with reliable information regarding corporate environmental performance.

It is also possible to use the algorithms of natural-language processing to systematically study corporate sustainability statements, exposing both falsifications and exaggerations. AI can process large, heterogeneous datasets to reveal keywords or phrases that indicate greenwashing in corporate releases, news articles, and press releases, thereby revealing the gap between claimed sustainability and actual environ-mental impact.

Similarly, machine-learning algorithms can forecast how a company is likely to perform in the future regarding climate metrics based on past data. Comparing corporate claims with actual performance concerning environmental improvements can verify their validity by examining trends in energy consumption, carbon emissions, and waste management. Such abilities enable investors and regulators to establish the legitimate core of sustainability assertions and hold accountable organizations that may engage in greenwashing.

Blockchain technology is another important tool with the potential to provide a decentralized and unalterable ledger for tracking ESG data. Such technologies help companies confirm the validity of their sustainability claims, thereby preventing data distortion or manipulation. Within the realm of Pakistan's ESG reforms, blockchain can be utilized to build a transparent system where all stakeholders, including regulators, investors, and consumers, can access verified data on a corporation's environmental performance.

Real-time environmental practice monitoring can also be implemented using AI. Internet of Things (IoT) sensors, when integrated with AI, can track a company's consumption of energy or carbon emissions in real time. Such audits, enabled by AI, can evaluate a firm's environmental impact to ensure it aligns with the company's claims, allowing timely intervention by relevant regulators.

While there is huge potential for AI, its use in Pakistan's climate finance and ESG reforms is limited by a number of challenges. The lack of reliable and comprehensive data is a significant obstacle to the successful deployment of AI. Poorly developed big data collection and reporting systems within Pakistani businesses may prevent AI systems from adequately assessing claims regarding sustainable development. Standardized data formats are also required to allow for cross-sector and cross-industry analysis using AI models. Moreover, deployment of AI solutions requires sophisticated technological infrastructure, which is not yet widely available in Pakistan. Therefore, introducing AI into ESG monitoring requires the development of high-performance computing capacity and effective regulatory frameworks to manage AI-driven solutions ethically and efficiently.

Furthermore, ESG legislation in Pakistan is still in its infancy, and the institutional framework needs further development to integrate AI tools into regulations. Skilled experts are needed to interpret AI outputs in the context of ESG reforms, and public confidence in such technologies is vital for their acceptance. Given the potential lack of trust toward new technologies in developing and conservative societies like Pakistan, it is imperative to develop confidence in the accuracy of AI to verify sustainability claims.

In conclusion, AI is bound to play a positive role in curbing greenwashing in climate finance and ESG reforms in Pakistan. With further development, AI technologies can enhance transparency and data accuracy while tracking processes in real time. AI may play a key role in Pakistan's effort to shift toward a sustainable economy by making corporate sustainability claims credible and supported by reliable data.

Regulatory agencies, investors, and businesses in Pakistan must work together to create a conducive environment for AI-based ESG monitoring, including investment in AI infrastructure, enhancement of information quality, and establishment of rules for AI-based sustainability monitoring. With the right investment and regulatory measures, AI can be effectively used to help Pakistan green its economy and achieve its climate-related goals. Artificial intelligence can provide powerful tools in fighting greenwashing and enhance the credibility of ESG reforms in Pakistan's economy.

Through implementation of AI technologies, including NLP, machine learning, blockchain, and real-time monitoring systems, businesses and regulators will gain more accurate insights into corporate sustainability activities. Nevertheless, successful implementation depends on overcoming challenges related to data availability, technological infrastructure, and public trust. Addressing these challenges will make AI an essential enabler in Pakistan's transformation toward a more sustainable and environmentally responsible economy.

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***About the Author: Dr. Muhammad Haroon Rasheed** is a Lecturer (Commerce) at Malik Firoz Khan Noon Business School, University of Sargodha. His academic journey up until his postdoctoral research at the College of Economics and Management, Nanjing University of Aeronautics and Astronautics, China, has been focused on Financial Markets. Particularly, his research interests lie in exploring the dynamics of financial decision-making through the lens of behavioral finance. Additionally, he also holds the status of Affiliate Financial Accountant (AFA) from ICMA.*