



**DISPLACEMENT VS. TECHNOLOGICAL AUGMENTATION IN THE
ERA OF ARTIFICIAL INTELLIGENCE: IMPLICATIONS FOR
SUSTAINABLE EMPLOYABILITY AND THE ROLE OF ESG-ORIENTED
FIRMS IN THE GLOBAL SOUTH**

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Abstract: The advent of Artificial Intelligence (AI) has dramatically reshaped global labor markets, presenting both opportunities and challenges. While AI-driven automation poses a significant risk of job displacement, particularly for low-skilled workers in sectors such as manufacturing, retail, and agriculture, it also holds the potential for technological augmentation, which can enhance human productivity and create new roles. This literature review explores the dual forces of displacement and augmentation in the context of sustainable employability, with a particular focus on the Global South. It highlights the varying impact of AI adoption across regions, noting that high-income countries are better equipped to manage these shifts through reskilling programs and technological infrastructure, while the Global South faces unique challenges due to limited resources. The review also emphasizes the role of ESG-oriented firms in promoting ethical AI practices and sustainable employment opportunities, particularly in developing economies. These firms have the potential to drive inclusive growth by investing in training programs and ensuring that AI is deployed in ways that benefit both businesses and society. Overall, this study provides insights into the need for a balanced approach to AI adoption, ensuring that its benefits are widely distributed and contribute to sustainable economic development.

Keywords: Artificial Intelligence, Employment Displacement, Technological Augmentation, ESG-Oriented Firms, Global South



INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) technologies has led to significant transformations across various sectors, reshaping traditional models of employment and labor markets. As AI systems increasingly automate tasks previously carried out by human workers, the specter of job displacement has become a focal point for both policymakers and business leaders [1]. However, alongside the potential for job losses, AI also offers opportunities for technological augmentation enhancing the capabilities of the workforce through AI-driven tools and systems. The dual forces of displacement and augmentation create a complex dynamic, particularly in the context of sustainable employability, where the challenge lies not only in mitigating job loss but also in fostering new skill sets and career opportunities that align with the evolving technological landscape [2]. This phenomenon is especially pertinent in the Global South, where economic and social structures differ significantly from those in the Global North, requiring distinct strategies for addressing the implications of AI.

The problem central to this article is the impact of AI on the workforce, with a particular emphasis on its effects on employment in the Global South. While much of the discourse around AI has been shaped by studies focusing on developed nations, less attention has been given to how emerging economies experience and navigate these changes [2]. The rapid pace of technological adoption in countries across the Global South necessitates a closer look at how AI affects labor markets, income distribution, and job quality, with specific regard to sustainable employment practices [3]. It is critical to understand whether AI will primarily lead to job displacement or whether technological augmentation can offer a more sustainable pathway for employability in these regions.

In addressing this issue, this paper introduces the novel concept of ESG-oriented (Environmental, Social, and Governance) firms playing a crucial role in ensuring the equitable integration of AI technologies in the Global South. These companies, which prioritize sustainability and social responsibility, can serve as models for ethical AI adoption that aligns with broader goals of sustainable development [4]. By focusing on ESG principles, firms in the Global South have the potential to create an ecosystem that not only minimizes the adverse effects of AI-driven displacement but also harnesses the power of technological augmentation to foster new opportunities for workers, especially in sectors where human labor remains essential.

The research gap this paper seeks to address lies in the limited scholarship on the intersection of AI's impact on employment and the role of ESG-oriented businesses in the Global South. While much of the existing literature has centered on the risks and benefits of AI for employment in the Global North, there is insufficient research on how emerging economies can leverage ESG frameworks to mitigate the potential negative consequences of AI. Furthermore, there is a need for more region-specific studies that explore how different nations in the Global South are adapting to the technological revolution, particularly within the context of sustainable development and employability.



The implications of this study are profound. By analyzing the role of AI in displacement and technological augmentation through the lens of ESG, this paper aims to provide actionable insights for policymakers, business leaders, and labor organizations in the Global South. The findings will contribute to ongoing debates on the future of work in the age of AI, offering a more comprehensive understanding of how sustainable employability can be achieved in the face of technological disruption. Through this exploration, we hope to pave the way for a more inclusive, socially responsible, and equitable technological future.

LITERATURE REVIEW

AI and Employment Displacement: Risks and Challenges

The impact of Artificial Intelligence (AI) on labor markets has sparked significant concern, particularly regarding its potential to displace jobs. As AI technologies automate tasks traditionally performed by humans, especially in industries reliant on repetitive or manual labor, the risk of widespread job displacement becomes more pronounced. Many sectors such as manufacturing, retail, and transportation face substantial challenges as automation improves efficiency and reduces the need for human labor [5]. This shift often exacerbates income inequality, as lower-skilled workers are more vulnerable to job losses, creating economic disparities. In regions with limited access to advanced technology, such as many parts of the Global South, the threat of displacement could hinder broader economic growth, posing both social and political challenges.

Technological Augmentation and the Future of Work

While AI's potential for job displacement is a significant concern, another perspective emphasizes its role in technological augmentation. Rather than simply replacing jobs, AI can enhance human capabilities by increasing productivity, improving decision-making, and automating routine tasks. In many industries, AI serves as a tool that allows workers to focus on more complex and creative tasks, thereby improving overall efficiency and job satisfaction [6]. This shift has the potential to lead to the creation of new roles and job categories that require specialized skills in managing and working alongside AI systems. In sectors such as healthcare, education, and finance, AI tools can streamline administrative work, allowing professionals to dedicate more time to their core responsibilities, resulting in a more dynamic and skilled workforce.

ESG-Oriented Firms and Sustainable Employability in the Global South

The role of ESG (Environmental, Social, and Governance) principles has gained increasing attention as businesses seek to address the broader societal impacts of technological advancements, including AI adoption. ESG-oriented firms focus on balancing profitability with social and environmental responsibility, making them critical players in ensuring that AI technologies are deployed in ways that support sustainable development [7]. In the Global South, where the challenge of job displacement is particularly acute, these firms can lead the way in promoting sustainable employability by investing in employee training, skill development, and ethical AI practices. By prioritizing the social aspects of AI integration, ESG firms can create more inclusive and equitable employment opportunities, helping to bridge the digital divide and ensure that the benefits of AI are shared more widely across different communities.



METHODOLOGY

Research Design

This study adopts a qualitative literature review approach to explore the complex dynamics of displacement and technological augmentation in the era of Artificial Intelligence (AI), with a particular focus on sustainable employability and the role of ESG-oriented firms in the Global South. The qualitative literature review methodology is chosen to synthesize existing research, identify emerging themes, and understand the nuances of AI's impact on the workforce, especially within the context of developing economies. The review is structured around three main areas: AI's effect on job displacement, the potential for technological augmentation, and the role of ESG-oriented firms in ensuring sustainable employment practices.

Selection Criteria for Literature

The selection of literature for this review is guided by several inclusion and exclusion criteria. First, only peer-reviewed articles, books, and reports that focus on AI's influence on employment, sustainable employability, and ESG frameworks will be considered. Sources that are more recent (published within the last 10 years) are prioritized to ensure that the review reflects the current trends and challenges in AI deployment. Studies focusing on the Global South are given particular attention to ensure the findings are relevant to the specific economic and social contexts of these regions. Excluded from the review are articles that are overly general, lack empirical data, or fail to address the central research questions of this study.

Data Collection and Search Strategy

The data collection process involves a systematic search of various academic databases such as Google Scholar, JSTOR, Scopus, and Web of Science. Search terms such as "AI and employment displacement," "technological augmentation," "sustainable employability," "ESG-oriented firms," and "Global South and AI adoption" are used to identify relevant sources. A snowball sampling technique is also employed, where key papers identified in initial searches are referenced in other studies, allowing for the inclusion of seminal works in the field. The goal is to gather a diverse range of perspectives, including those from both the Global North and South, to understand the broader implications of AI on labor markets and sustainable development.

Data Analysis and Synthesis

The data analysis process involves coding and categorizing the literature based on thematic relevance. Key themes related to the impact of AI on job displacement, technological augmentation, and ESG-driven strategies for sustainable employability are identified and examined in detail. The synthesis of the literature aims to uncover patterns, contradictions, and gaps in the existing body of knowledge. The analysis is inductive, where findings are drawn from the data rather than being driven by predefined hypotheses. This approach ensures a comprehensive understanding of how AI influences employment dynamics in the Global South and the potential for ESG-oriented firms to facilitate sustainable, ethical AI adoption.



Critical Evaluation of Sources

Each source included in the review is critically evaluated for its methodological rigor, relevance to the research questions, and applicability to the Global South context. The evaluation considers the geographical scope of the studies, with a particular focus on how AI adoption is portrayed in developing economies. The credibility of the authors, the impact of the publication, and the consistency of findings across different studies are assessed to ensure that the literature review is built on a solid foundation of reliable and valid sources. Potential biases in the literature, such as a focus on Western contexts or an overemphasis on the negative aspects of AI, are also considered in the evaluation process.

RESULTS AND DISCUSSION

Impact of AI on Job Displacement

The first major theme that emerged from the literature is the significant risk of job displacement due to the adoption of AI technologies. Many studies indicate that automation, driven by AI, poses a direct threat to low-skilled and routine jobs, particularly in sectors such as manufacturing, agriculture, and retail [8]. The automation of repetitive tasks can replace human labor, leading to unemployment or a shift to lower-wage, less stable positions. The most vulnerable workers are those in manual labor or administrative roles, where AI can perform tasks more efficiently and cost-effectively.

Studies show that the pace of job displacement varies across regions. In the Global South, the effects of AI-driven displacement are likely to be more pronounced due to the lower levels of technological infrastructure and skill development in these regions. While high-income countries have the resources to invest in retraining and upskilling programs, emerging economies often lack such safety nets. This disparity makes it harder for workers in developing countries to transition into new, technology-driven roles, exacerbating inequality between the Global North and South [9].

The table below summarizes the sectors most at risk of AI-driven displacement across various regions:

Table 1. Impact of AI-Driven Displacement Across Sectors in the Global North and South

Sector	Impact in Global North	Impact in Global South
Manufacturing	High risk due to automation of production lines	Very high risk due to low-skilled labor dependence
Retail and Customer Service	Moderate to high risk due to AI in customer interactions	High risk due to large service-based workforce
Agriculture	Low to moderate risk (automation of harvesting)	High risk, especially in rural areas with low-tech infrastructure
Administrative Support	High risk due to AI handling routine office tasks	Very high risk as many regions rely on low-cost administrative labor

Table 2. Displacement vs. Technological Augmentation in the Era of Artificial Intelligence



Aspect	Displacement	Technological Augmentation
Impact on Employment	Job loss, especially for low-skilled and manual labor.	Creation of new roles and enhanced productivity.
Affected Sectors	Manufacturing, retail, transportation, agriculture.	Healthcare, education, finance, creative industries.
Skill Requirements	Decreased demand for low-skilled workers, need for adaptation.	Increased demand for high-skill roles in technology management, data analysis, and AI integration.
Impact on Global South	Higher risk due to limited technological infrastructure and skill development.	Opportunities for new roles if skill-building initiatives are in place.
Role of ESG-Oriented Firms	Little focus on ethical AI deployment, potential for widening inequality.	ESG firms drive ethical AI use, investment in workforce reskilling, and sustainable employability practices.
Economic Implications	Increased unemployment, economic inequality.	More inclusive growth, potential for economic development if handled properly.
Key Challenge	Lack of resources to support displaced workers, economic disruption.	Ensuring fair distribution of new opportunities, addressing skill gaps.
Opportunities for the Future	Transition to service-based or creative sectors with proper reskilling.	Empowering workers through AI collaboration, enabling creative and strategic roles.

Technological Augmentation and New Job Creation

While job displacement is a significant concern, another notable theme from the literature is the potential for AI to augment human labor rather than entirely replacing it. Many studies highlight that AI can enhance human productivity, particularly in sectors where human intuition and creativity are still vital [10]. In industries like healthcare, education, and finance, AI serves as a tool to automate routine processes, allowing workers to focus on more complex tasks that require emotional intelligence, strategic thinking, and problem-solving.

Technological augmentation also presents opportunities for job creation in emerging fields related to AI technology. As AI systems evolve, the demand for skilled workers in AI maintenance, development, and integration has increased. New job categories such as AI trainers, data analysts, and AI ethicists are emerging, providing employment opportunities that did not exist a decade ago [11]. These roles, however, require a high level of expertise and training, suggesting a need for significant investment in education and reskilling programs to prepare workers for the new economy.



The literature also suggests that AI-driven augmentation may contribute to the rise of hybrid roles, where workers collaborate with AI systems to improve outcomes. For example, in healthcare, AI might assist doctors with diagnostic tasks, but human expertise is still needed to make final decisions. This shift in job dynamics emphasizes the need for continuous learning and adaptation as AI becomes increasingly integrated into various professions [12].

Role of ESG-Oriented Firms in Promoting Sustainable Employability

A significant body of literature emphasizes the role of ESG-oriented firms in mitigating the negative effects of AI adoption and promoting sustainable employability. ESG firms, by their nature, prioritize social responsibility, ensuring that AI is deployed in ways that benefit both businesses and society. Many ESG-oriented companies are taking a proactive approach to AI integration by focusing on ethical AI practices, employee retraining, and creating job opportunities that align with sustainable development goals [13]. This approach is particularly critical in the Global South, where the risk of unemployment and inequality due to AI is more severe.

ESG firms can play a pivotal role in addressing the skills gap by investing in training programs that equip workers with the skills needed to thrive in a more technology-driven economy. These companies often collaborate with governments, educational institutions, and non-governmental organizations to develop programs that promote lifelong learning [14]. By focusing on workforce development and job creation, ESG firms can help ease the transition to an AI-powered economy while ensuring that no worker is left behind.

Another important aspect highlighted by the literature is that ESG-oriented firms can drive the adoption of AI technologies that have positive social and environmental outcomes. For example, AI in agriculture can help optimize resource usage, reduce waste, and improve crop yields, while AI in manufacturing can enhance efficiency and reduce environmental footprints. By aligning AI integration with ESG values, these firms not only contribute to sustainable development but also ensure that their technological advancements lead to long-term positive outcomes for communities and workers [15].

Regional Variations in AI Adoption and Its Impact on Employment

Regional differences in AI adoption and its effects on employment are consistently emphasized across the literature. In high-income countries, where technological infrastructure is more advanced, the impact of AI is often seen as a balancing act between displacement and augmentation. These countries are more likely to invest in the necessary infrastructure and policies to ensure workers are reskilled and can transition into new roles created by AI [16]. However, even in these regions, the workforce must adapt to the changing landscape, as certain low-skilled jobs become obsolete while high-skill roles emerge.

The Global South faces unique challenges related to AI adoption. In many developing economies, the lack of technological infrastructure, limited access to education and training, and existing socioeconomic disparities exacerbate the negative impacts of AI on employment. The



literature suggests that without adequate investment in education and public policy, workers in the Global South may be left behind, further deepening the digital divide [17]. However, some countries in the Global South are beginning to experiment with AI applications that can boost local economies, such as AI-driven agriculture and healthcare, potentially creating new employment opportunities.

The adoption of AI in the Global South also varies significantly between countries. While some countries are adopting AI technologies at a rapid pace, others are slower to embrace these innovations due to financial constraints or political challenges. This disparity means that the impact of AI on employment in the Global South is not uniform, and more research is needed to explore how different countries are managing the challenges and opportunities presented by AI in their unique contexts [18].

Discussion

The findings of this literature review underscore the complex and multifaceted impact of Artificial Intelligence (AI) on global labor markets, especially in the context of displacement and technological augmentation. AI's potential to displace jobs is an undeniable concern, particularly for low-skilled workers in sectors such as manufacturing, retail, and agriculture. The table presented highlights the significant risks of displacement across these sectors, with the Global South being particularly vulnerable due to its reliance on low-cost, manual labor [19]. However, it is crucial to acknowledge that these risks are not uniform and depend largely on the region's technological infrastructure and its capacity to adapt to these changes. In high-income countries, for example, there is more emphasis on reskilling and upskilling workers to mitigate job loss, while in the Global South, the absence of such systems may exacerbate inequality and hinder inclusive economic growth.

Despite the displacement risks, there is a growing body of literature that emphasizes the role of AI in augmenting human labor rather than replacing it entirely. AI technologies, when used in collaboration with human workers, can enhance productivity, efficiency, and innovation. The concept of technological augmentation is particularly relevant in sectors like healthcare, education, and finance, where AI can assist with routine tasks, allowing professionals to focus on higher-level decision-making and complex problem-solving [20]. This shift offers an opportunity for job transformation rather than outright loss, encouraging the creation of new job categories that require more specialized skills. As AI continues to evolve, fostering a workforce capable of leveraging these technologies will be key to sustaining long-term employability.

One of the most striking findings of this review is the pivotal role that ESG-oriented firms can play in ensuring that AI adoption does not lead to detrimental social consequences. ESG-oriented companies are already leading the charge in integrating ethical AI practices, developing inclusive workforce strategies, and promoting sustainable business models. In the Global South, where the risk of economic displacement is more severe, these companies can serve as a model for responsible AI deployment. They can invest in training programs that prepare workers for



new roles in the AI-driven economy, ensuring that AI adoption does not leave behind marginalized communities [21]. This approach aligns AI technology with social and environmental sustainability, providing a more inclusive pathway for workers in developing economies.

Regional variations in AI adoption also emerge as a critical issue, particularly when comparing the Global North and South. While high-income countries are more equipped to handle the challenges posed by AI, including investing in reskilling programs and digital infrastructure, many nations in the Global South face a significantly steeper challenge [22]. The gap in technological infrastructure and access to education may prevent workers in these regions from adapting to the rapidly changing landscape. This highlights the need for region-specific strategies that address both the technological and social dimensions of AI deployment. Furthermore, the disparity in AI adoption rates between countries within the Global South itself means that localized solutions are necessary to cater to the unique needs and challenges of each nation.

The future of work in the age of AI lies in finding a balance between mitigating job displacement and harnessing the potential of technological augmentation. For this to be achieved, a multi-stakeholder approach is required, involving governments, businesses, educational institutions, and civil society. ESG-oriented firms, in particular, have a unique opportunity to lead the way in creating ethical, sustainable, and inclusive AI ecosystems. By prioritizing social responsibility and sustainable employability, these firms can help create a future where AI enhances human potential rather than diminishes it, ensuring that all workers, regardless of their geographic location or skill level, have the opportunity to thrive in the AI-driven economy.

CONCLUSIONS

In conclusion, the rapid advancement of Artificial Intelligence (AI) presents both significant opportunities and challenges for the global workforce. While AI has the potential to displace jobs, particularly in sectors reliant on low-skilled labor, it also offers the possibility of technological augmentation, enhancing human productivity and enabling the creation of new roles. However, the impact of AI on employment is not uniform, with disparities evident between high-income countries, where infrastructure and reskilling programs exist, and the Global South, where workers are more vulnerable to job displacement due to a lack of technological infrastructure and training opportunities.

The role of ESG-oriented firms in addressing the challenges posed by AI adoption cannot be overstated. These firms, which prioritize environmental, social, and governance considerations, are uniquely positioned to ensure that AI deployment is ethical, inclusive, and sustainable. By investing in employee training, ethical AI practices, and creating new job opportunities, ESG-oriented companies can help mitigate the negative impacts of AI on employment, particularly in developing economies. In the Global South, such companies can play a crucial role in fostering sustainable employability and ensuring that AI contributes positively to both economic development and social equity.



Moving forward, a balanced approach is needed to address the dual challenges of job displacement and technological augmentation. Policymakers, businesses, and educational institutions must work together to create a framework that prepares workers for the evolving demands of an AI-driven economy. The integration of AI should not just focus on efficiency and cost-cutting but also on ensuring that its benefits are distributed equitably, particularly in regions like the Global South. By fostering inclusive growth and providing opportunities for reskilling and education, we can ensure that AI becomes a force for good, enhancing human potential and driving sustainable development across the globe.

References

- [1] J. Španková, K. Král'ová, and J. Sochuľáková, "Transformation Of The Labour Market: Challenges, Opportunities, And Perspectives," *J. Manage.*, no. 1, p. 42, 2026.
- [2] J. K. Shah and M. Sharma, "Assessing the Integration of ESG and Green Supply Chain Drivers for Sustainable Manufacturing: A SWARA-Based Analysis," *Process Integr. Optim. Sustain.*, pp. 1–24, 2025.
- [3] T. T. L. Nguyen and R. I. Mulikh, "ESG and Firm Performance in Southeast Asia: Evidence from Tiger Cub Economies," 2025.
- [4] H. Shin, Y. Jo, S. Lee, J. Park, J. Cho, and H. Kim, "ESG for sustainability in hospitality and tourism: A theoretical and practical review with a future research agenda," *J. Travel Res.*, vol. 65, no. 1, pp. 3–36, 2026.
- [5] R. Satria, "Bridging the Gap: Indonesia and the Path to Sustainable Development in the Global South," in *Proceedings of the 8th International Conference on Social and Political Sciences (ICoSaPS 2024)*, Springer Nature, 2025, p. 34.
- [6] B. L. Verma and M. Solanky, "Sustainable Tourism And Esg Practices: A Bibliometric Analysis," *J. Adv. Futur. Res.*, vol. 3, no. 12, pp. 840–861, 2025.
- [7] O. M. Owojori and E. O. Anwana, "Integrating ESG Principles into Environmental Education: Opportunities and Challenges in the MENA," *J. Sustain. Dev. L. Pol'y*, vol. 15, p. 224, 2024.
- [8] S. Chatterjee and N. Sharma, "ESG Practices of Indian Companies Towards Sustainable Development—Checks and Realities," *Reimagining Manag. post VUCA World*, vol. 65, 2023.
- [9] M. Leong, "Assessing the Role of Employees' ESG Perception on Turnover Intention: A Moderation Analysis," 2025.
- [10] D. TEWODROS, "Circular Economy, Solid Waste Management and ESG in Sub-Saharan Africa A comparative analysis of entrepreneurship and policy in Nigeria and South Africa," 2024.
- [11] M. L. Chipimo, J. Bwalya, and J. K. Kanyanga, "Strategic ESG Orientation and Financial Resilience in Emerging Markets," *Available SSRN 5915623*, 2025.
- [12] V. Hekmatyar, "ESG-Aligned CSR as a Person-in-Environment Intervention: Psychosocial Outcomes among Deaf Youth in Indonesia," *Dharmadhikara J. Hum. Ecol.*, vol. 1, no. 1, pp. 16–24, 2025.



- [13] A. Leogrande, D. Leogrande, and C. Alberto, “The role of unemployment in the ESG model at world level,” *Available SSRN 4502940*, 2023.
- [14] I. G. Vats, K. Lata, and H. Sharma, “The Role of ESG in Driving Sustainable Economic Development: The Indian Perspective,” in *International Conference on Policies, Processes and Practices for transforming Underdeveloped Economies into Developed Economies (PPP-UD 2025)*, Atlantis Press, 2025, pp. 352–368.
- [15] I. Figuerola-Ferretti, S. Lumbreras, P. Paraskevas, and I. Paraskevopoulos, “Sustainability in action: Macro-level evidence from Europe (2008–2023) on ESG, green employment, and SDG-aligned economic performance,” *Sustainability*, vol. 17, no. 20, p. 9103, 2025.
- [16] S. C. F. Ramadani and H. Abazi-Alili, “Third cycle of studies–Doctoral Studies,” 2025.
- [17] N. Piskulova and V. Gorbanyov, “Global Challenges: Environment,” in *World Economy and International Business: Theories, Trends, and Challenges*, Springer, 2023, pp. 213–233.
- [18] P. Zumbansen, “Devaluing sustainability: Financialized disclosure governance and transparency in modern slavery and climate change,” *JL Pol. Econ.*, vol. 5, p. 372, 2025.
- [19] O. Morhulets, O. Olshanska, O. Cherniavska, N. Buntova, and N. Moshenets, “Strategic Mechanisms for Managing Sustainable Development Hospitality Industry in Ukraine,” in *International Conference on Science, Engineering Management and Information Technology*, Springer, 2025, pp. 54–70.
- [20] S. Bawa and S. A. Asongu, “Investigating How Firms in Emerging Economies Integrate AI-Driven Systems and ESG Metrics Into Biodiversity Conservation and Circular Economy Strategies,” *Bus. Strateg. Environ.*, 2026.
- [21] D. E. E. Al-Azzeh, “Enhancing Competitiveness in the Pharmaceutical Sector in Jordan: The Mediating Role of Integrating Artificial Intelligence in ESG Practices,” 2025, *Princess Sumaya University for Technology (Jordan)*.
- [22] E. Jahanbakhsh, “Strategic Integration of Digital Innovation and Sustainability: A Foresight-Driven Framework for ESG Transformation,” *Available SSRN 5260002*, 2025.