Scientific and Social Research, 2026, Volume 8, Issue 10
https://bbwpublisher.com/journal/SSR
Online ISSN: 2981-9946
Print ISSN: 2661-4332

Research on the Value Logic and Practical Path of Enterprise ESG Empowering Artificial Intelligence Innovation

Jue Wang, Xiaoji Ma

Zhongkai University of Agriculture and Engineering, Guangzhou 510225, Guangdong, China

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Based on the three-dimensional framework of Environment, Social and Governance (ESG), the ESG concept guides artificial intelligence (AI) technology to transform from "technology-first" to "responsible innovation", enabling artificial intelligence better to serve the goals of economic and social sustainable development while realizing commercial value. Enterprise ESG empowering artificial intelligence innovation can not only help enterprises avoid environmental, ethical, and compliance risks brought by the application of AI technologies, but also inject an endogenous driving force into the sound development of the AI industry. Therefore, this paper discusses the internal value logic of ESG empowering artificial intelligence innovation from the three dimensions of environment, society, and governance, sorts out practical problems encountered in practice, and then puts forward operable practical paths. It aims to reconcile the balance between high-speed technological innovation and sustainable-development requirements, and provide theoretical support for the artificial intelligence industry to be truly embedded into the high-quality-development system of the economy and society and realize the coordinated progress of innovative development and sustainable development.

Keywords: Enterprise; ESG empowerment; Artificial intelligence innovation; Value logic; Practical path

Online publication: November 25, 2026

1. Introduction

In the era of the digital economy, artificial intelligence technology has become the core driving force for industrial transformation and reshaping enterprises' core competitiveness. While the large-scale implementation of artificial intelligence technology brings new development opportunities to various fields, it also gives rise to a series of problems that may affect the sustainable development of the industry, such as high energy consumption, algorithmic ethical anomie, and the absence of governance systems. The ESG concept provides new value guidelines and a practical framework for solving these problems [1]. Focusing on the three dimensions of environmental responsibility, social responsibility, and corporate governance, it

integrates sustainable development goals into the whole-process business operation decisions of enterprises, which can exactly make up for the value absence in artificial intelligence innovation. Nevertheless, quite a number of enterprises merely regard ESG as a compliance task for information disclosure and have not established a systematic mechanism for ESG to empower AI innovation. At present, clarifying the value logic of ESG empowering artificial intelligence innovation and constructing implementable practical paths is of great significance for promoting the high-quality and sustainable development of the artificial intelligence industry.

2. Value logic of enterprise ESG empowering artificial intelligence innovation

Enterprise ESG empowering artificial intelligence innovation is not a simple superposition of ESG and artificial intelligence, but forms a two-way empowerment mechanism based on value symbiosis. Its value logic can be summarized in the three dimensions of environment, society, and governance.

2.1. Environmental dimension: Reconstructing the underlying innovation logic of AI technology with green-oriented principles

The traditional development mode evaluates artificial intelligence innovation with model accuracy, inference speed, and computing-power scale as core indicators. This value orientation drives the exponential expansion of large-model parameter scales and, meanwhile, brings rapid growth in computing-power energy consumption [2]. The environmental responsibility requirements put forward by ESG establish evaluation criteria with dual constraints of "efficiency-energy consumption" for artificial intelligence technological innovation, forcing technological research and development to shift from merely pursuing performance improvement toward balancing performance improvement and energy consumption reduction [3]. Enterprise ESG empowering artificial intelligence innovation drives the underlying logic of artificial intelligence development to shift from "performance-orientation pursuing scale expansion" to "green orientation balancing efficiency and cost." It can push the industry to explore innovation directions such as low-parameter, high-efficiency models and green computing-power scheduling, and reduce the environmental cost of artificial intelligence technological development at the source [4].

2.2. Social dimension: Calibrating the value boundary of AI innovation with responsibility anchors

With the deep embedding of technologies such as algorithmic recommendation, automated decision-making, and intelligent risk control into the daily lives of the public, the influence of artificial intelligence is extending from inside enterprises to the public social sphere [5]. While bringing new opportunities for industrial development and great convenience to public life, it also triggers a series of ethically concerning social issues, including algorithmic discrimination, data leakage, privacy infringement, and algorithmic black boxes. Essentially, this stems from the absence of social-value consideration in the process of technological innovation. The ESG system brings elements such as public interests, user rights and interests, and fairness principles to the front end of the whole process of artificial intelligence innovation, draws clear value boundaries for technological research and development, and reduces the negative externalities of technologies through multiple measures. Such a mechanism that embeds social responsibility into innovation procedures can make artificial intelligence technologies truly serve the improvement of overall social well-

being and prevent technological innovation from moving in the direction opposite to public interests [6].

2.3. Governance dimension: Guaranteeing the long-term sustainability of AI innovation through systematic mechanisms

Artificial intelligence technologies feature fast iteration speed and complex application scenarios, and their risk-control demands in innovative development are stronger than those of ordinary technological innovations. If merely relying on traditional R&D governance systems, enterprises often fail to identify, respond to, and dispose of various new-type risks brought by technological application in a timely manner [7–8]. The ESG governance system builds a whole-chain risk-control mechanism covering environmental and social dimensions centering on sustainable-development goals, which is highly consistent with the risk-control demands of AI-technological innovation [9–10]. The integration of ESG governance requirements into AI-innovation management can, on the one hand, establish a multi-level governance mechanism covering the strategic level, management level, and execution level to provide stable institutional guarantees for technological innovation; on the other hand, set up regular risk-identification and dynamic-adjustment mechanisms to eliminate various hidden dangers in the embryonic stage and prevent them from escalating into public incidents threatening enterprise survival and industrial development.

3. Practical dilemmas faced by enterprise ESG empowering artificial intelligence innovation

Although the value symbiosis logic between ESG and artificial intelligence innovation has gradually emerged, their integration still faces multiple obstacles from the perspective of enterprise-practice status. Since mature empowerment mechanisms have not been established, enterprise ESG empowering artificial intelligence innovation needs to resolve practical problems in cognition, factors, and implementation.

3.1. Cognitive dimension: Regarding ESG as a compliance disclosure task

At present, some enterprises still understand ESG only at the level of meeting regulatory information-disclosure requirements, equating ESG work with compiling annual-report contents, and fail to fully realize its empowerment effect on technological innovation. Such cognitive bias prevents enterprises from converting the three-dimensional requirements of ESG into concrete technological innovation objectives in the process of promoting artificial intelligence innovation. In addition, some enterprises regard ESG-related requirements as extra burdens for artificial intelligence innovation. Out of consideration for R&D progress and innovation costs, they tend to avoid constraints such as green-low-carbon standards and ethical review in technological R&D decision-making [11].

3.2. Factor dimension: Lack of adaptive technical tools and talent support

Enterprise ESG-empowering artificial intelligence innovation is highly specialized, systematic work, which requires enterprises to master R&D rules and be familiar with ESG evaluation criteria and sustainable-development-related rules. In fact, ESG-evaluation tools for the whole life cycle of artificial intelligence are quite scarce. Limited by tools, most enterprises cannot convert abstract environmental and social-responsibility requirements into quantifiable and implementable R&D constraints. Moreover, most enterprises are confronted with the contradiction between talent supply and demand, with obvious shortages

of compound-talent reserves, which hinders the implementation of ESG concepts [12].

3.3. Practical dimension: Imperfect implementation mechanism for whole-process integration

From practical conditions, enterprise ESG empowering artificial intelligence innovation is generally confined to post-hoc compliance links after application deployment, with relevant requirements failing to be embedded into the whole life cycle of research and development, testing, and iteration [13]. For instance, at the project-approval stage of AI projects, some enterprises do not integrate ESG-related requirements into the feasibility-assessment indicator system for pre-judgment on project energy-consumption intensity and social impacts. At the model-training and testing stage, standardized ESG-review procedures are not adopted; compliance verification is only carried out theoretically in a perfunctory manner. As a result, hidden risks such as algorithmic discrimination and privacy leakage in model-training data cannot be identified in a timely fashion.

4. Practical paths of enterprise ESG empowering artificial intelligence innovation

Targeting dilemmas in practical links, enterprises can optimize the modes of ESG empowering artificial intelligence innovation from four dimensions: technological research and development, scenario implementation, organizational governance, and ecological collaboration, so as to drive the shift from shallow integration between ESG and technological innovation toward deep-level value symbiosis.

4.1. Oriented by environmental responsibility: Promote the Innovation of green AI technical systems

In the process of artificial intelligence innovation, environmental responsibility requirements shall be embedded into the whole process of technological innovation evaluation and research and development to build a low-energy-consumption, high-efficiency green AI technical system [14]. Specifically, at the underlying computing-power level, priority shall be given to researching and applying low-power-consumption AI chips, and technologies such as computing-power-scheduling optimization and liquid-cooling heat dissipation shall be adopted to reduce extra energy-consumption waste in computing-power deployment and operation. At the model R&D level, energy consumption shall be incorporated into the evaluation indicator system for large models. Technologies including model lightweighting, sparse training and inference optimization shall be adopted to cut energy consumption in training and inference on the premise of guaranteeing model performance. At the infrastructure level, actively explore modes for the procurement and application of green computing power; for example, give priority to green-computing-power supply schemes relying on renewable-energy sources such as wind power, photovoltaic power, and hydropower to reduce carbon emissions generated by AI research and development and application from the energy-supply end. At the industrial-development level, leading enterprises and industrial associations can jointly formulate green-AI technical standards and evaluation systems, clarify energy-consumption baselines for different types of AI projects, guide enterprises to take initiative in adjusting innovation directions, and make green-low-carbon concepts a common consensus across the industry.

4.2. Anchored by social responsibility: Construct responsible AI innovation procedures

ESG social-responsibility requirements shall be brought to the front end of the whole life cycle of artificial intelligence innovation to form an ethical-governance procedure covering all links: demand analysis, data processing, algorithm design, test verification, and post-launch iteration [15]. For example, a whole-life-cycle data-management mechanism can be embedded in the data-processing link, and management procedures shall be standardized in strict accordance with compliance requirements for data collection, storage, utilization, circulation, and destruction to plug risk loopholes of data leakage at the procedural level. At the algorithm-design link, ethical norms such as fairness and justice and public interests shall be followed, and relevant requirements shall be converted into concrete rules that can be embedded into R&D procedures to avoid discriminatory outputs after AI-product launch. At the test-verification link, a third-party ethical-review mechanism independent of the R&D team shall be established. Personnel with professional backgrounds in AI ethics and ESG management shall comprehensively investigate potential risks such as algorithmic black boxes, excessive information collection, and opaque decision-making from the perspective of public interests, so as to prevent AI products that fail to meet social responsibility requirements from entering the market. At the post-launch iteration link, regular channels for collecting and responding to public feedback shall be available to promptly respond to users' doubts and suggestions on ethical issues of AI products and optimize product design in a targeted manner. By adopting the above-mentioned measures anchored in social responsibility to optimize each link in artificial intelligence innovation, enterprises can reduce the negative social impacts of technological innovation at the root and make AI products oriented toward serving the public and benefiting the general public from the design stage.

4.3. Supported by governance system: Improve institutional guarantees for AI innovation

Enterprises shall deeply integrate the ESG governance framework and the artificial intelligence-innovation-management system to form a multi-level responsible-AI governance mechanism. Enterprises need to integrate ESG requirements into long-term development strategies, and stress the restraining and guiding role of sustainable development goals for technological innovation at the strategic decision-making level. For example, set up a special AI ethics and sustainable development committee on the board of directors to evaluate the value of major AI R&D projects. At the management-execution level, establish cross-department collaborative work mechanisms to open communication channels between the ESG management team and the AI R&D team. Both parties shall jointly decompose ESG-related indicators, convert them into concrete, implementable technical requirements for R&D links, and embed such requirements into the whole process of project management. While implementing ESG requirements at the strategic decision-making and management-execution levels, enterprises shall build corresponding talent-team-construction mechanisms. For instance, enterprises can carry out regular training on ESG concepts and responsible innovation for internal R&D staff to raise technical teams' awareness of environmental responsibilities and ethical norms; recruit compound talents with both AI R&D capabilities and ESG-management experience from society to strengthen the governance team; incorporate performance related to responsible innovation into the performance-appraisal system for AI-R&D staff to promote the implementation of ESG-related requirements from the appraisal end.

5. Conclusion

To sum up, against the background of deep integration between the digital economy and sustainable development, the integration of ESG and artificial intelligence innovation is no longer an optional "bonus item" for enterprises, but an inevitable choice for enterprises pursuing sustainable development. Providing a value-coordinate system for artificial intelligence innovation from environmental, social, and governance dimensions, ESG can effectively solve the "emphasizing efficiency while neglecting sustainability" problem of traditional technological-innovation modes and guide artificial intelligence technologies onto a responsible path of benefiting society and boosting green development. Nevertheless, enterprise ESG-empowered artificial intelligence innovation is confronted with dilemmas in the cognition, factor, and implementation dimensions. Starting from practical problems, enterprises need to promote the innovation of green-AI technical systems, construct responsible AI-innovation procedures, and improve institutional guarantees for AI innovation, so as to fully release the empowerment value of ESG for artificial intelligence innovation.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Wang Y, Li MQ, 2025, Artificial Intelligence Application and Enterprise Sustainable Development — A Test Based on Innovation Capability and Absorptive Capacity. Environmental Economic Research, 10(3): 47–72.

[2] Liu MJ, 2025, Artificial intelligence Empowers Manufacturing Enterprises' Green Innovation for "Quality and Quantity Improvement". Modern Industrial Economy and Informationization, 15(9): 221–223 + 235.

[3] Yao L, Xue L, 2025, Research on Artificial Intelligence and ESG Auditing from the Perspective of Supply Chain Spillover Effect. Metallurgical Finance and Accounting, 44(9): 67–70.

[4] Weng YK, 2025, Discussion on Paths for Artificial Intelligence Empowering Marketing Innovation of State-Owned Enterprises — Taking Tobacco Enterprises as an Example. Enterprise Reform and Management, 2025(17): 102–104.

[5] Deng HH, 2025, Research on the Mechanism and Paths of Enterprise ESG Empowering Artificial Intelligence Innovation. Review of Bohai-Ring Economy, 2025(9): 75–78.

[6] Lin L, 2025, Discussion on Innovative Paths of Artificial Intelligence Empowering Enterprise Human-Resource Management. Enterprise Reform and Management, 2025(17): 60–62.

[7] Sun YY, Ji YY, 2025, Core Mechanism and Practical Effects of Artificial Intelligence Empowering Enterprise Business-Model Innovation. Investment and Cooperation, 2025(9): 170–172.

[8] Yue LY, 2025, Exploration on Innovative Development Strategies of Artificial Intelligence Technology Empowering Enterprise Cost Management Control. Market Weekly, 38(27): 33–36.

[9] Wang MK, Li Y, Wang JD, 2025, Artificial Intelligence Application, Executives' Cognitive Level and Corporate ESG Performance. Journal of Beijing Technology and Business University (Social Sciences Edition), 40(5): 46–58.

[10] Zhao LQ, Si Y, How Does Digital Transformation Empower Enterprises' High-Quality Development: Internal Mechanism and Empirical Evidence. Science-Technology and Industry, 25(17): 277–286.

[11] Shi HQ, 2025, Research on Digital-Intelligent Tools Empowering Corporate ESG Management and Economic-

Benefit Improvement. East China Science & Technology, 2025(9): 90–92.

[12] Ning XM, Li L, 2025, Impacts of Artificial Intelligence on Manufacturing Enterprises' ESG Performance — From the Perspective of Financing Constraints and Independent Director Supervision. Finance and Accounting Research, 2025(8): 58–68 + 80.

[13] Yang J, Wu XL, Liu YY, et al., 2025, How Does Artificial Intelligence Empower Enterprises to Achieve Disruptive Innovation — A Research from the Configuration Perspective. Journal of Technology Economics, 44(7): 93–105.

[14] Yu F, Xu DZ, 2025, Research on Theoretical Framework and Practical Paths of ESG Empowering Enterprises' New-Quality Transformation. Journal of Qiqihar University (Philosophy & Social Science Edition), 2025(7): 47–52.

[15] Shi B, Ruan LJ, Hou YX, 2025, How Does "Artificial Intelligence +" Empower Enterprises' High-Quality Development. Journal of Dongbei University of Finance and Economics, 2025(4): 73–84.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.