From Green Innovation to Sustainable Development: The Path and Challenges of Improving Corporate Performance

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Abstract. In the face of ever-growing environmental challenges and resource constraints, a feasible approach to sustainable development is the emerging concept of a green economy, which strives to foster an economically circular and regenerative model that is both eco-friendly and socially equitable. In recent years, the concept of a green economy has been gaining traction. This refers to an economic system centered around sustainable development and the utilization of renewable resources. The idea is to create an economy that is environmentally friendly and socially responsible. Embracing a green economy offers numerous benefits, Among its benefits are the creation of employment opportunities within renewable energy sectors, the enhancement of public health resulting from decreased pollution levels, and an increased capacity to withstand environmental hazards. However, transitioning to a green economy requires concerted efforts from governments, businesses, and individuals alike, including policy reforms, Investments in clean technologies, coupled with alterations in behavioral and consumption patterns, are essential. Educational initiatives and awareness campaigns hold a pivotal role in advancing the adoption of sustainable lifestyles and nurturing an environmentally responsible mindset.

Keywords: Green innovation, sustainable development of enterprises, performance evaluation.

1. Introduction

With the increasingly severe global environmental problems, Conventional development paradigms frequently entail compromising the environment as a necessary expense., which often leads to extremely serious problems. Enterprises are running counter to green development in pursuit of economic benefits, and even gradually drifting away, resulting in excessive resource consumption, ecological environment deterioration, etc. Therefore, the green transformation and development of enterprises are urgent. Green development is not only a necessity for protecting the ecological environment but also an important engine for promoting economic transformation and upgrading. The traditional extensive development model of high energy consumption, high emissions, and low efficiency is no longer sustainable, and green transformation has become the only way for sustained and healthy economic development. By comprehensively promoting green development, China is accelerating the cultivation of green and low-carbon industries, Advancing the transformation and upgrading of traditional industries, while cultivating new economic growth areas, serves to enhance the quality and efficiency of economic development. Furthermore, it offers substantial momentum for the enduring development of both the economy and society. Liu Xuemin and Zhang Shengling pointed out that the Chinese economy must undergo green transformation, and the main body to achieve economic green transformation is enterprises [1]. Green innovation, serving as the cornerstone of enterprises' green transformation, holds immense significance in fostering their sustainable development through achieving economic growth in a resource-efficient and eco-friendly manner. Investigating the correlation between green innovation and corporate performance, while exploring the implementation pathways and obstacles encountered in corporate green innovation endeavors, constitutes a blend of theoretical insights and practical applications. This endeavor offers pivotal support for the green and sustainable progression of Chinese enterprises.

2. The Development Trend of Research on Green Innovation and Sustainable Development of Enterprises

2.1. Interpretation of the Concepts of Green Innovation and Sustainable Development of Enterprises

Green innovation, in simple terms, refers to innovative activities in the economic, social, and environmental fields that achieve efficient resource utilization, reduce environmental pollution, and promote sustainable development through new concepts, methods, technologies, and products. It is not only a technological breakthrough, but also includes innovation in business models, innovation in social systems, and a shift in people's ways of thinking. Enterprise green innovation entails a pathway to sustainable development that underscores the harmonious advancement of product and service quality, environmental concerns, and social responsibility, alongside the pursuit of economic gains. The advancement of green industries and the evolution of green technologies will spearhead the emergence of novel economic growth areas, drive employment, and enhance the competitiveness of enterprises. This innovation is reflected in various industries, such as new energy, energy conservation and emission reduction, circular economy, etc. For example, Within the realm of new energy, green innovation is dedicated to the development and deployment of renewable energy sources, including solar power, wind energy, and geothermal energy, among others, with the aim of substituting traditional fossil fuels and mitigating greenhouse gas emissions. In the field of low-carbon transportation, green innovation focuses on the development of new energy vehicles and public transportation systems to reduce dependence on oil and reduce transportation emissions. In the domain of circular economy, green innovation fosters the repurposing of waste materials and the recycling of resources, thereby minimizing resource consumption and mitigating environmental pollution. In the field of green building, green innovation focuses on the environmental friendliness and energy efficiency of building design and material selection, to reduce the energy consumption of buildings and their negative impact on the environment. The fundamental notion of green innovation revolves around sustainable development, implying the fulfillment of present requirements without undermining the needs of future generations. Sustainable development requires a balance between economic, environmental, and social development, combining economic growth with environmental protection. The notion of "green innovation" has garnered significant prominence in the international marketplace, serving as a pivotal force in propelling enterprise progression. As environmental awareness escalates, green development has attained universal accord, and green innovation, as a modality of enterprise innovation, emerges as a crucial trajectory for spearheading enterprise advancement.

2.2. In-Depth Exploration of Enterprise Green Innovation Strategy and Comprehensive Investigation of its Driving Force

Green innovation has gradually expanded from simple environmental technology innovation to a comprehensive scope that includes management innovation and business model innovation. This evolutionary process provides a broader space for thinking and practice for the sustainable development of enterprises.

Yang invented and explored the process of green technology innovation earlier, laying the foundation for subsequent research [2]. With the deepening of research, Zhang Xiaojun has expanded green innovation to a wider range, including green management innovation and green business model innovation [3]. The research of Chen Zewen and Cao Hongjun points out that implementing a green innovation strategy not only significantly optimizes the performance of enterprises, but also helps them build a positive green brand image and promote the unique development of their core competitiveness [4]. This finding offers substantial motivation for enterprises to embrace green innovation with enthusiasm. Yang Jing and others further explained that to enhance the value of enterprises, green innovation strategies need to rely on key capabilities and resources within the enterprise [5]. Wang Lin and others have constructed a green innovation path for enterprises,

revealing the importance of value chain reconstruction, process reengineering, and lean production in the process of green innovation [6].

Scholars have conducted in-depth discussions on the driving factors of green innovation from both external and internal dimensions. The research of Xi Longsheng and Zhao Hui found that the environmental awareness of executives, whether they are opportunity-oriented or responsibility-oriented, can have a positive driving effect on various green innovations [7]. The study conducted by the two scholars further unveiled the moderating influence of governmental regulatory pressure and media scrutiny on the nexus between executives' environmental consciousness and green innovation, offering a fresh perspective to comprehend the intricate dynamic process underpinning green innovation. Zhang Xiaojun explored various driving factors from a broader perspective, including expected economic benefits, redundancy of resources, and pressure from stakeholders.

So, regulatory standards and government mandates, environmental regulations and standards formulated by the government, as well as mandatory requirements for corporate environmental behavior, are important external drivers for enterprises to carry out green innovation. As a member of society, enterprises bear certain social responsibilities. Through green innovation, enterprises can demonstrate their environmental awareness and sense of responsibility, and enhance their corporate image and brand value, which is an important internal driving force for enterprises to carry out green innovation. At the same time, economic benefits are also an important driving factor. Through green innovation, enterprises can reduce production costs, improve resource utilization efficiency, and thus obtain greater economic benefits.

3. Challenges and Solutions Faced by Green Innovation in Promoting Sustainable Development of Enterprises

Recent years have witnessed substantial advancements in both the theoretical framework and practical implementations concerning green innovation and the sustainable growth of enterprises. In terms of the feasibility and effectiveness of implementing green innovation in Chinese enterprises in the new era, green innovation plays an important role in promoting the sustainable development of enterprises, but its implementation still faces many challenges.

3.1. The Government Should Actively Adopt Policy Guidance and Strengthen the Regulation of Market Mechanisms

Liu Xuemin and Zhang Shengling pointed out that the green transformation of Chinese enterprises faces deep obstacles such as low environmental standards and inconsistent local and central goals [1]. The continuous adjustments and changes in policies by governments around the world in areas such as environmental protection and energy utilization have brought certain uncertainties and risks to green innovation in enterprises. With so many levels of risks and challenges, enterprises need to comprehensively consider multiple factors such as technology, economy, policies, markets, and internal management to formulate appropriate strategies and measures to address these challenges. To achieve sustainable development and adhere to pertinent national statutes and regulations, enterprises must initially establish a series of environmental and societal policies. These policies need to fully consider why companies need to formulate them from the perspective of industry and profitability, while also respecting the needs of the environment, society, and other aspects. Enterprises should attach great importance to the needs of environmental pollution prevention and production safety, and formulate a series of strict environmental and social policies. Compared to the government, the government needs to further improve the green innovation policy system and incentivize enterprises to increase their investment in green innovation through various means such as fiscal subsidies, tax incentives, and green finance. At the same time, market mechanisms will also play an important role in guiding consumers to choose green products and services through measures such as green product certification and green procurement, promoting the formation and development of the green consumption market.

3.2. Enterprises Should Deepen Their Understanding of the Connotation of Green Innovation

Currently, enterprises face challenges in comprehending the full scope of green innovation. Some enterprises only limit their green innovation to the technical level and regard it as a technological improvement or upgrade, such as using more environmentally friendly materials, optimizing production processes, etc. A comprehensive green innovation system has yet to be established, as it has not expanded fully into the realms of management innovation and business model innovation. The connotation of green innovation goes far beyond this. Green innovation is not only a technological innovation, but also a comprehensive transformation that covers economic, social, and ecological benefits. It also includes multiple aspects such as green product design, clean production processes, and circular resource utilization. For example, Kong Lingying and Wang Xiaofei emphasized the limitations of green performance evaluation methods and called for the construction of a more scientific evaluation system [8]. Enterprises should achieve deep integration of green technology, green management, and green business models by integrating internal and external resources. For example, enterprises can carry out reforms from the following aspects.

In terms of strategic integration, incorporate sustainable development goals into the overall strategy of the enterprise, ensuring that all business units and decision-making processes reflect sustainable principles. In terms of risk management, establish a comprehensive risk assessment and management mechanism, identify potential obstacles and challenges in the sustainable development path, and prepare response plans in advance. Strengthen communication and cooperation with stakeholders such as government, consumers, investors, and communities in terms of stakeholder participation, and jointly promote the sustainable agenda. In terms of performance monitoring and reporting, regularly evaluate the effectiveness of sustainable development projects, report progress openly and transparently, accept public supervision, and continuously improve corporate reputation.

3.3. Enterprises Should Vigorously Develop Green Innovation-Related Technologies from Multiple Aspects

The research by Qian Li et al. revealed the technological gap between enterprises in different quality development regions, which may lead to a loss of green innovation efficiency. Another challenge confronted by enterprises lies in bridging the technological divide and enhancing the efficacy of green innovation. Furthermore, the high costs and risks associated with researching and developing green technology pose significant obstacles, and even if advanced green technology is developed, how to effectively transform and apply it to actual production is also a major challenge. Kong Lingying and Wang Xiaofei emphasized the limitations of green performance evaluation methods and called for the construction of a more scientific evaluation system. Therefore, enterprises should promote green technology and industrial upgrading. The continuous breakthroughs and applications of green technology will drive the upgrading of enterprises' industries, forming green industrial chains and clusters. Enterprises should strengthen cooperation with external entities such as universities and research institutions, support enterprises to collaborate with universities, institutions, and high-level talents, actively establish high-end innovation platforms, guide enterprises to carry out green and low-carbon advanced technology and equipment research and development through scientific research projects, achieve full chain innovation from application basic research, key technology breakthrough, achievement transformation to industrial application, encourage enterprises and their alliances to actively spearhead or engage in national green technology R&D initiatives characterized by high risks, extended cycles, and substantial ecological benefits. Together, they should advance the research and deployment of green technologies, thereby elevating the overall green standards of the industry.

3.4. Enterprises and Governments Should Flexibly Control the Cost of Green Innovation Technologies to Improve Their Feasibility

Promoting the advancement of the green economy encounters significant hurdles in terms of the expenses and practicality of technologies and infrastructure, including solar panels and wind turbines,

upon which it relies. Although these technologies and facilities use green energy, their production and installation also require a significant amount of energy and resources, and these costs need to be borne through reasonable policies and market means. At the same time, the feasibility of green energy technologies may also be influenced by factors such as geographical location and climate. In this field, the government can support the development and promotion of green technologies through financial subsidies, tax exemptions, and innovative research. Enterprises need to optimize production processes, improve resource and energy utilization, and use green supply chain and product tracking technology to reduce the cost of green production.

3.5. All Sectors of Society Should Popularize Knowledge and Education on Green Innovation

Promoting the development of a green economy requires the support of talent, and in this regard, it is particularly necessary to continuously strengthen the popularization of knowledge and education. However, there are still shortcomings in the work of various sectors of society in this regard. Firstly, in the field of education, the cultivation of students' innovative ability and thinking, especially in the knowledge and ability of green innovation, has been neglected. The green economy covers a wide range of fields, and the knowledge and skill requirements in related areas are also different. Therefore, education and training around the green economy are needed. For example, it is necessary to strengthen training in areas such as environmental science, energy conservation, emission reduction, and environmental monitoring to enhance the talent level in related fields.

Secondly, the government's social propaganda and education efforts are insufficient, and the policy support and incentive mechanisms for green innovation are also not perfect, resulting in limited public awareness of green innovation and a lack of motivation and enthusiasm for green innovation among enterprises. So the government can improve the quality of talent by formulating relevant talent training, skill certification, and knowledge popularization plans. Relevant policies and regulations should also be formulated and improved to encourage enterprises to increase investment in green innovation, improve resource utilization efficiency, and reduce environmental pollution. Provide incentives such as tax incentives and funding subsidies to encourage enterprises to engage in green technology research and product innovation.

For enterprises, some focus too much on immediate economic benefits and lack a long-term vision and awareness of green innovation. They may believe that green innovation will increase costs and reduce efficiency, thereby harming the economic interests of the enterprise. Some enterprises have insufficient investment in green technology research and development, product innovation, and market promotion, resulting in limited green innovation achievements. Therefore, enterprises should strengthen their investment in green technology innovation decision-making and R&D investment, while establishing a green first corporate spirit, carefully cultivating green consumer markets, and enhancing their green marketing innovation capabilities. Finally, by creating a strong green development organizational culture, dynamically monitoring the performance of the enterprise's ecological innovation environment, and comprehensively enhancing the enterprise's organizational ecological innovation capability.

In recent years, while the notions of environmental protection and sustainable development have progressively gained traction, the comprehension of green innovation among the populace remains constrained. Many people lack a deep understanding of the concept, significance, and practical methods of green innovation, which makes it difficult to effectively implement the concept of green innovation in real life. So the development of a green economy requires extensive participation and joint efforts from all sectors of society, but currently, the public's understanding and comprehension of the green economy is not deep enough, and environmental protection awareness and green consumption concepts need to be improved. Hence, fostering environmental education, enhancing societal awareness regarding environmental conservation, and nurturing habits of green consumption are pivotal in advancing green innovation and development.

4. Conclusion

Green innovation, as a new type of innovation model, integrates the concepts of environmental protection and sustainable development into its theoretical framework based on traditional innovation theory. This framework aims to guide enterprises and organizations to achieve synergistic improvement of economic, social, and ecological benefits through technological, managerial, and institutional innovation when facing resource and environmental constraints.

Green innovation has made significant progress globally. In practical terms, many domestic and foreign enterprises and institutions have attained mutual benefits in both economic and environmental realms through the implementation of green innovation. For example, Apple has always been committed to greening the product lifecycle. Its products demonstrate significant environmental characteristics in material selection, production processes, packaging, and recycling. The iPhone series adopts a shell made of recycled materials and reduces the use of plastic in packaging. Apple has also promoted green production among suppliers, ensuring that the entire supply chain meets its strict environmental standards.

Amidst escalating global environmental challenges and the entrenchment of the sustainable development paradigm, green innovation will emerge as a crucial pathway for enterprises to attain sustainable growth. Consequently, enterprises will progressively augment their investments in green innovation, fostering a harmonious evolution encompassing technological, management, and business model innovations. At the same time, actively respond to various challenges and problems, and continuously improve one's green innovation ability and sustainable development level. With the concerted efforts and advocacy of society at large, green innovation will open up broader horizons for enterprise development and present more promising prospects.

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