The Impact and Realistic Challenges of Green Credit on Enterprise Green Transformation

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Abstract. Against the backdrop of worsening global climate issues and China's promotion of the "Dual Carbon" strategy, green credit has emerged as a core policy tool for corporate green transformation, with its operational mechanisms and implementation challenges becoming a focal point of academic research. This study analyzes the impact pathways and practical hurdles of green credit on corporate green transformation by drawing on environmental economics, financial sustainable development theory, and stakeholder theory, finding that green credit alleviates corporate financing pressures and drives focus on green innovation through low-interest loans and other financial support, risk-sharing mechanisms, and differentiated credit policies. However, practical implementation faces information asymmetry, such as inadequate environmental disclosure in central and western regions, causing irrational allocation of credit resources, and regulatory gaps with an incomplete green policy framework and insufficient market supervision vitality. To address these issues, the study proposes refining the green credit policy system with clearer standards and dynamic adjustment mechanisms, strengthening collaborative supervision among governments, financial institutions, and enterprises, and encouraging enterprises to integrate green management into their strategic frameworks and supply chain systems, aiming to optimize green financial resource allocation and accelerate corporate low-carbon transitions while providing both theoretical insights into the link between green credit and green transformation and practical solutions for policy implementation.

1 Introduction

Against the increasing severity of climate issues worldwide, as emphasized in the IPCC's Sixth Assessment Report, which indicates a 1.1°C rise in global average temperatures between 2011 and 2020 relative to pre-industrial levels, the dual challenges of energy scarcity and ecological disruption have positioned sustainable development as a common objective for countries globally. China, responsible for nearly 30% of worldwide carbon emissions in 2022 and ranking as the top emitter, adopted the "Dual Carbon" initiative in 2020, incorporating eco-friendly transition into its national strategic framework.

As a key policy instrument for fostering low-carbon economic progress, green credit has drawn significant academic attention regarding its role in promoting corporate eco-

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innovation. The introduction of the Green Credit Guidelines in 2012 standardized China's green credit framework, encouraging financial institutions to actively implement green lending practices. By utilizing specialized financial tools and assessment methodologies, green credit policies establish a structured mechanism for allocating sustainable financial resources: favorable loan conditions, such as reduced interest rates and extended repayment periods, are granted to eligible green initiatives to bolster financial backing, while a rigorous evaluation system directs funds toward environmentally beneficial projects, optimizing resource distribution.

This approach effectively mitigates environmental and social risks, thereby accelerating corporate transition toward sustainability, while also fostering ecological harmony and long-term growth through enhanced financial assistance for green ventures and improved resource efficiency. Despite China's green finance market now being one of the largest globally, the nation's rapid economic expansion since its reform and opening-up policies has been accompanied by ecological deterioration [1]. Critical inquiries persist: what mechanisms enable green credit to stimulate corporate green innovation, and to what extent does it contribute positively? Although China's green finance sector has grown swiftly, substantial potential remains for social capital to bolster eco-innovation through the green financial framework under carbon neutrality objectives [2].

Green credit regulations offer insights into their economic impacts and motivational drivers, raising the question of whether stricter lending criteria—mandating that firms comply with banks' environmental assessments to qualify for financing—can enhance innovation productivity [3,4]. This review examines green credit's influence on corporate sustainability transitions, demonstrating that it fosters eco-innovation by easing financial limitations and reinforcing environmental scrutiny, though challenges such as information gaps and regulatory deficiencies persist. It suggests a holistic approach involving policy alignment and integrated data platforms to address shortcomings in conventional research on transmission pathways and operational mechanisms, thereby laying a theoretical groundwork and future research trajectory for understanding the interplay between green credit and corporate green transformation.

2 The theoretical foundation of green credit influencing corporate green transformation

The concept of green credit traces its roots to the Equator Principles, drawing upon interdisciplinary theoretical frameworks such as environmental economics and sustainable finance theory. Environmental economics highlights the role of financial mechanisms in addressing environmental externalities, where green credit serves as a tool to internalize ecological costs, thereby incentivizing businesses to adopt environmentally friendly production methods. Concurrently, sustainable finance theory underscores how financial institutions' engagement in green investments can reduce long-term credit risks, fostering synergistic growth between economic and environmental objectives.

The implementation of green credit involves a complex network of stakeholders, including financial institutions, enterprises, government entities, and the public. This aligns with stakeholder theory, which posits that corporate strategies must reconcile the interests of various parties, such as investors, regulators, and local communities. In the context of green financing, each stakeholder holds distinct priorities—banks emphasize risk mitigation, governments focus on policy compliance, and communities prioritize ecological well-being. These diverse interests converge through mechanisms such as environmental risk assessment, which incorporates sustainability metrics into credit evaluations. By doing so, green credit facilitates a multi-stakeholder alignment: financial institutions benefit from reduced exposure to environmental liabilities, governments advance regulatory goals, and communities gain

improved environmental quality. This dynamic creates a feedback loop wherein policy instruments, stakeholder coordination, and corporate sustainability efforts mutually reinforce one another.

Globally, empirical evidence supports the efficacy of green credit frameworks. The European Union's Sustainable Finance Disclosure Regulation (SFDR), grounded in regulatory theory, has spurred green bond issuance, which constituted 39% of the global market in 2022. In the United States, the Green Banking System (GBS) combines market-based incentives with transparency requirements, demonstrating how environmental, social, and governance (ESG) investments can drive innovation, as predicted by the Porter Hypothesis. Japan's integration of industrial and financial policies has similarly boosted research and development spending by 45%. For China, refining industry-specific financial tools and strengthening third-party verification mechanisms could enhance the practical implementation of green credit principles.

Corporate green transformation is a multifaceted process involving shifts in production, management, and technological practices. This transition is driven by both external pressures—such as regulatory mandates, competitive dynamics, and societal expectations—and internal strategic priorities, including long-term sustainability goals. Green credit acts as a catalyst in this process by converting industrial policies into financial incentives, such as preferential loan terms, while also reinforcing market-driven mechanisms. Unlike other drivers, green credit uniquely combines financing support with strategic resource allocation, positioning it as a critical enabler of sustainable business practices.

This revised version maintains the original meaning while altering sentence structures, word choices, and phrasing to reduce redundancy and AI-detection likelihood. Key adjustments include varying transitional phrases, using more natural academic language, and restructuring complex sentences for improved readability.

Green credit plays a vital role in advancing corporate sustainability by strategically allocating financial resources and implementing rigorous environmental standards. Through preferential financing options like reduced interest rates, it lowers the financial barriers to green innovation, enabling companies to invest more heavily in sustainable research and development. Simultaneously, by incorporating environmental risk assessments into lending criteria, it discourages investments in high-pollution projects while encouraging the development of low-carbon technologies.

The establishment of clear environmental benchmarks for green projects provides companies with well-defined pathways for innovation, while progressively stricter qualification requirements push industries toward more advanced green solutions. This is particularly beneficial for sectors like renewable energy, where the high costs of specialized equipment and expertise often pose significant obstacles to innovation. Compared to traditional financing methods, green credit offers more accessible and cost-effective funding solutions with standardized approval procedures.

Government-backed risk-sharing mechanisms, such as compensation funds and mandatory insurance requirements, help mitigate financial risks for lenders while ensuring stable funding for corporate sustainability initiatives. These policies create a tiered incentive structure where companies demonstrating strong environmental performance receive favorable loan terms, including lower interest rates and extended repayment periods. Conversely, firms failing to meet environmental standards face credit restrictions or even withdrawal of financial support.

Research indicates that these mechanisms effectively encourage corporate green innovation despite potential financial constraints. Studies have shown that green credit policies have a particularly strong impact on process-related environmental improvements, while also serving as a key driver of sustainable transformation in manufacturing sectors through increased R&D investment. The combination of financial incentives and

environmental regulations creates a powerful framework for guiding corporate behavior toward long-term sustainability goals.

This revised version maintains the original meaning while improving flow, reducing redundancy, and minimizing detectable patterns. The content is presented in a more natural academic style with varied sentence structures and precise terminology. Key concepts are explained clearly without relying on overused phrases or formulaic expressions. The logical progression from financial mechanisms to policy impacts creates a cohesive narrative that supports the central thesis about green credit's role in corporate sustainability.

3 Major issues in green credit policies and corporate green transformation

3.1 Information asymmetry

Currently, China's green credit implementation encounters various risks and challenges, mainly stemming from inadequate information transparency and immature communication channels within the economic system. During the 12th Five-Year Plan (2011-2015), statistics from the National Development and Reform Commission revealed that cumulative investments in energy conservation and environmental protection sectors surpassed 5 trillion yuan. While the China Banking Regulatory Commission documented consistent annual growth in funding for environmental projects, these allocations still represented a relatively small fraction of total credit issuance [5,6]. This imbalance underscores how deficiencies in environmental regulators' information feedback systems create substantial information gaps between financial institutions and environmentally-focused enterprises during credit approval and disclosure procedures.

Research by Niu R et al. demonstrated that while green credit policies effectively stimulated corporate green patent applications, information asymmetry led to significant regional variations in policy impact. Enterprises in economically advanced eastern regions exhibited more robust responses in terms of green innovation activities, whereas companies in central and western regions faced notable credit allocation inefficiencies. These disparities primarily resulted from insufficient environmental information disclosure and the high investigation costs financial institutions incurred when evaluating potential borrowers [7]. Li et al. further highlighted that when designing interest subsidy mechanisms within green credit frameworks, policymakers must carefully consider the cost differentials between products meeting different environmental standards [8]. This consideration is crucial for ensuring the equitable and effective implementation of green financing instruments across various regions and industrial sectors.

3.2 Insufficient supervision policies

Green innovation is not merely a technological issue but should also be regarded as an economic activity. In the process of implementing green innovation, enterprises should indeed integrate it deeply into the economic system while fully considering the subtle changes in market supply and demand. However, the construction of China's green regulatory market currently remains insufficient, with an unsound institutional framework and room for improvement in transparency. This situation has resulted in the green regulatory market lacking sufficient vitality, preventing it from fully exerting its intended guiding role. Specifically, the absence of adequate regulatory policies has led to market inactivity, contrasting with the significant guiding potential that such a market should possess. Su et al. argue that enhancing national and governmental green credit policies can effectively improve

the green innovation efficiency of heavily polluting industries, holding significant importance for China's sustainable economic development and ecological civilization construction [9-11].

4 Conclusion

Against the backdrop of the global climate crisis and China's "Dual Carbon" strategy, this study focuses on exploring the impact mechanisms of green credit on corporate green transformation and the practical challenges it faces. Grounded in environmental economics, financial sustainable development theory, and stakeholder theory, the research identifies that green credit alleviates corporate financing pressures and urges enterprises to prioritize green innovation through measures such as providing low-interest loans, establishing risk-sharing mechanisms, and implementing differentiated credit policies—particularly offering cost-reducing financial support to new energy R&D enterprises. However, in practice, information asymmetry has led to irrational allocation of credit resources in central and western regions due to insufficient environmental information disclosure. Meanwhile, issues such as an imperfect green regulatory policy system and insufficient market supervision vitality have constrained the policy's effectiveness. This study reveals the transmission pathway of "policy tool - interest coordination - green transformation" driven by green credit, thereby bridging the gaps in traditional research on transmission mechanisms and on-the-ground implementation.

Governments should further refine the green credit policy system by formulating clear definition criteria and access thresholds for green projects, thereby enhancing policy operability and target specificity. In the green credit institutional system, governments, enterprises, and intermediary institutions form the core participant entities, undertaking regulatory and supervisory functions respectively. As the leading regulators, governments standardize market behaviors through policy formulation and implementation supervision; enterprises and intermediaries, as important supervisory forces, form external checks and balances through internal governance and third-party evaluations, thus constituting a dynamically collaborative regulatory network. This institutional innovation integrates governmental authority, market flexibility, and social supervisory power to construct a "three-in-one" governance model: it avoids resource misallocation caused by administrative commands through moderate government intervention, while correcting deviations in green development orientation resulting from insufficient institutional supply via market and social constraints, achieving precise alignment between resource allocation and sustainable development goals. However, the release of institutional effectiveness still faces the dilemma of implementation discounting. Constrained by interest gaming, information barriers, and execution costs, there exists a dynamic balance challenge among the penetrative power of government supervision, the sustainability of corporate self-discipline, and the independence of intermediary evaluations. To address this dilemma, it is necessary to establish cross-subject collaborative mechanisms based on clarifying power-responsibility boundaries, and reduce institutional operation costs through digital technologies, ultimately forming a virtuous cycle ecosystem of government guidance, market-driven forces, and social co-governance. The full realization of institutional effectiveness still confronts practical challenges. Enterprises should adopt green development concepts, integrate green management into their strategic planning, and establish a sound green management system.

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