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Corporate Greenwashing-Oriented Pseudo-Innovation: A Literature Review

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Abstract

Against the backdrop of China's dual-carbon goals and the rapid expansion of ESG disclosure requirements, the volume of corporate green innovation has risen sharply. At the same time, more formalistic and strategic forms of innovation have appeared, often taking green patents and R&D expenditure as visible signs of environmental commitment. Drawing on both Chinese- and English-language studies, this review examines greenwashing-oriented pseudo-innovation from four perspectives: conceptual meaning, antecedents, economic consequences, and governance. Particular attention is paid to the boundary between this form of pseudo-innovation and conventional verbal greenwashing or broader forms of pseudo-corporate social responsibility. The review also summarizes theoretical developments and empirical evidence, identifies unresolved issues in conceptualization, identification and measurement, and governance, and outlines directions for future research. Existing studies suggest that greenwashing-oriented pseudo-innovation is an opportunistic strategy in which apparently substantive innovative actions are used as a symbolic vehicle to obtain legitimacy-related benefits. Such behavior can weaken market trust, damage corporate reputation, and distort the allocation of resources intended for genuine green innovation. Further work is therefore needed to sharpen the concept, improve measurement, and develop more targeted governance mechanisms.

Keywords

greenwashing, greenwashing-oriented pseudo-innovation, symbolic corporate environmentalism, pseudo-corporate social responsibility, green innovation

1. Introduction

China's push toward the dual-carbon goals, the broader implementation of ESG disclosure rules, and a dense set of green incentive policies have all encouraged firms to expand their green innovation activities. Yet this growth has also created room for a more concealed form of opportunism. Some firms no longer rely only on promotional claims or verbal environmental commitments. Instead, they undertake visible actions that resemble genuine innovation while using those actions mainly as a strategic façade. This pattern is referred to here as greenwashing-oriented pseudo-innovation. It can dilute the effect of green policies and divert scarce resources away from firms undertaking substantive green innovation. Understanding the logic behind this behavior has therefore become an important issue in environmental economics and corporate governance.

Research on corporate greenwashing is already extensive, but several gaps remain. Most studies still concentrate on textual manipulation in environmental disclosure, promotional slogans, or other

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communication-based forms of greenwashing, while innovation-based forms receive far less attention. In addition, existing reviews usually address pseudo-corporate social responsibility or greenwashing in a broad sense rather than examining this narrower behavior on its own. As a result, greenwashing-oriented pseudo-innovation is often mixed together with verbal greenwashing, symbolic innovation, and related concepts, making it difficult to build a coherent analytical framework.

This article reviews Chinese- and English-language research on greenwashing-oriented pseudo-innovation and organizes the literature around four themes: conceptual meaning, antecedents, economic consequences, and governance. Its contribution is threefold. First, it clarifies the conceptual boundary between greenwashing-oriented pseudo-innovation, conventional verbal greenwashing, and broader pseudo-social responsibility. Second, it brings together findings from a still-fragmented literature and organizes them into a more complete framework. Third, it identifies unresolved problems in conceptual definition, identification, measurement, and differentiated governance, and uses these gaps to suggest directions for future research and policy design.

2. Core Concepts and Theoretical Foundations

2.1 The Meaning of Greenwashing and Its Changing Forms

Greenwashing generally refers to opportunistic corporate behavior that exaggerates environmental investment or performance and presents the public with a misleading image of environmental responsibility. Huang [1] further defines it as behavior through which firms display an environmental-responsibility image in false or inaccurate ways in an attempt to appear environmentally friendly. The concept covers both corporate disclosure and green business activities undertaken by financial institutions. In ESG settings, greenwashing now takes many forms, including a disconnect between decarbonization plans and implementation, irregular carbon-emissions accounting, excessive reliance on carbon offsets, selective disclosure, and the absence of internal or external assurance. Greenwashing has therefore moved well beyond obviously false advertising. It now includes more subtle practices such as manipulation of report narratives, weak verification of disclosed data, and financial products whose environmental labels do not match their actual substance. This broader evolution provides an important conceptual background for understanding greenwashing-oriented pseudo-innovation.

2.2 Theoretical Origins of Greenwashing-Oriented Pseudo-Innovation

The theoretical basis of greenwashing-oriented pseudo-innovation can be traced through three connected strands of research. The first is the literature on pseudo-corporate social responsibility. Xiao and colleagues [2] describe pseudo-social responsibility as a disguised form of responsible behavior. Unlike complete inaction, it involves formalized actions undertaken under external pressure or opportunistic motivation without a genuine aim to create social value. This logic provides a foundation for understanding pseudo-innovation in the environmental domain.

The second strand is the symbolic-substantive distinction. Delmas and Montes-Sancho [3] separate substantive actions, which aim to improve actual environmental performance, from symbolic actions, which are primarily directed toward organizational legitimacy. Firms may combine the two strategically. The third strand is the idea of symbolic corporate environmentalism. Bowen [4] argues that crude slogan-based greenwashing has become less dominant, while symbolic environmental conduct has grown more important. Bowen and Aragon-Correa [5] likewise caution against reducing greenwashing to a simple contrast between 'talk' and 'no action.' Even when firms undertake environmental activities, those activities may still amount to greenwashing if their main function is symbolic performance rather than substantive environmental improvement.

Taken together, these perspectives show that greenwashing does not necessarily mean doing nothing. Symbolic action carried out through innovation can itself serve as a form of greenwashing. This insight provides the theoretical basis for treating greenwashing-oriented pseudo-innovation as a distinct research object.

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2.3 Defining Greenwashing-Oriented Pseudo-Innovation and Distinguishing Related Concepts

Based on the theoretical discussion above, this review defines greenwashing-oriented pseudo-innovation as a narrow form of pseudo-corporate social responsibility within the field of green innovation. A firm may objectively undertake activities such as filing green patents or reporting R&D expenditure, yet those activities are strategically oriented toward obtaining subsidies, improving an ESG image, or satisfying ratings and regulatory expectations rather than generating meaningful environmental or technological benefits.

The main distinction between greenwashing-oriented pseudo-innovation and neighboring concepts lies in two questions: whether an innovation-related action has actually been taken, and what purpose that action serves. Table 1 compares conventional verbal greenwashing, greenwashing-oriented pseudo-innovation, and substantive green innovation in terms of behavioral expression, underlying objective, theoretical position, and typical manifestations.

Table 1: Boundary Distinctions Between Greenwashing-Oriented Pseudo-Innovation and Related Concepts

Dimension	Conventional verbal greenwashing	Greenwashing-oriented pseudo-innovation	Substantive green innovation
Behavioral expression	Green promotion only, with no innovation action	Green patents, R&D expenditure, or similar actions are present, but the actions are instrumentalized	Genuine R&D and innovation aimed at technological improvement
Primary objective	Gain market recognition through publicity	Obtain policy subsidies, improve the ESG image, and respond to ratings and regulation	Improve actual environmental performance and strengthen green technological capability
Theoretical position	Pseudo-corporate social responsibility characterized by complete inaction	A green-innovation form of instrumentalized pseudo-social responsibility (symbolic corporate environmentalism)	Substantive environmental behavior
Typical manifestations	Exaggerated environmental commitments and false green advertising	Strategic patents (e.g., low-quality utility-model patents) and symbolic R&D expenditure	Substantive green patents and verifiable improvements in environmental performance

In short, conventional verbal greenwashing is a 'talk without action' form of pseudo-social responsibility. Greenwashing-oriented pseudo-innovation is better described as 'action without genuine substance': an innovation-related action is present, but the action is instrumentalized for symbolic or strategic purposes. It therefore represents a green-innovation expression of symbolic corporate environmentalism. Substantive green innovation, by contrast, is directed toward real improvements in environmental performance. Distinguishing these three categories is essential for later work on identification, measurement, and governance.

3. Antecedents of Greenwashing-Oriented Pseudo-Innovation

3.1 Research on the Antecedents of Greenwashing-Oriented Pseudo-Innovation

3.1.1 External Drivers

At the institutional and regulatory level, gaps in rules and enforcement can create room for pseudo-innovation. ESG disclosure requirements increase pressure on firms to present environmental performance, but inconsistent standards and weak sanctioning mechanisms may also encourage symbolic responses [6]. Incomplete environmental standards and insufficient supervision can have a similar effect [7]. Green finance and subsidy schemes may likewise create unintended incentives if they reward the visible quantity of

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innovation without adequately distinguishing quality, thereby encouraging firms to pursue formalistic innovation in order to obtain green financing or policy support [1].

Market and social conditions also matter. Strong investor and consumer preferences for green firms give companies an incentive to improve their environmental image, while limited environmental knowledge among consumers lowers the chance that superficial actions will be exposed [7,8]. Pressure from negative discussions on social media may further intensify managerial short-termism. Firms with low market value or weak reputations can then be pushed toward greenwashing-oriented pseudo-innovation as a quick response to a reputational shock rather than investing in substantive environmental improvement [9].

3.1.2 Internal Drivers

A more fundamental driver is the asymmetry between the costs and returns of substantive and pseudo forms of green innovation. Genuine green innovation is expensive, time-consuming, and uncertain, whereas formalistic innovation can be cheaper and generate visible returns more quickly. This imbalance gives profit-oriented firms a reason to use strategic actions to capture benefits attached to green policy [7].

Weak internal governance can make such opportunism easier. Poor internal controls and a weak ethical climate reduce internal constraints on management [1], allowing managers to use formalistic innovation to obtain short-term legitimacy and conceal weaknesses in underlying performance [1,2,8]. Empirical work also suggests that firms with poorer financial fundamentals and weaker governance are more inclined to use low-cost greenwashing strategies to mask operating and governance deficiencies [10]. Green finance reform can create a further unintended incentive. While such reform expands access to green financing, it may also intensify managerial myopia and encourage firms to pursue pseudo-innovation for policy benefits rather than commit resources to longer-term substantive innovation [11].

Overall, the four-part framework proposed by Delmas and Burbano [8]—external institutions, market conditions, organizational characteristics, and individual managerial motives—also provides a useful structure for explaining why greenwashing-oriented pseudo-innovation arises.

4. Economic Consequences of Greenwashing-Oriented Pseudo-Innovation

4.1 Market and Consumer Consequences

The most immediate effect is a weakening of market trust. When environmental action is used mainly as a marketing device and is not matched by substantive improvement, consumers are more likely to become skeptical. Chen and Chang [12] show that greenwashing can increase consumer confusion and perceived risk, and that these two mechanisms undermine green trust. Greenwashing-oriented pseudo-innovation may deepen that problem because it is disguised through activities that appear to be real innovation. The mismatch between visible innovation and actual environmental performance can therefore make it even harder for consumers to judge whether a firm is genuinely green. A systematic review by Santos and colleagues [13] indicates that the effects of greenwashing also extend beyond consumers: it can weaken brand value, damage business-to-business relationships, and undermine environmental cooperation across supply chains.

4.2 Firm-Level and Capital-Market Consequences

Greenwashing can affect corporate reputation, financial performance, and stock-market outcomes [14]. Greenwashing-oriented pseudo-innovation carries similar risks. It may improve a firm's ESG image in the short term, but it also creates the possibility of a sharper reputational loss once the underlying inconsistency becomes visible. The problem is compounded by the current ESG rating environment. Ratings do not always distinguish symbolic green innovation from substantive environmental performance, and may therefore capture firms' apparent environmental profile more readily than their true environmental impact. Investors who rely heavily on high ESG scores can consequently increase their exposure to greenwashing risk without realizing it, allocating capital to firms that look environmentally responsible but may not be so in substance [15].

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4.3 Social and Policy Consequences

At the broader social level, greenwashing-oriented pseudo-innovation competes with genuine green innovation for both policy resources and market resources. It can distort the incentives created by green patents, R&D subsidies, and related instruments, weakening the effectiveness of environmental policy and ESG systems. Cai and colleagues [16] provide empirical evidence that greenwashing by peer firms can crowd out substantive green innovation through both financing and product-market channels. Once symbolic innovation is rewarded alongside genuine innovation, a 'bad money drives out good' dynamic can emerge, damaging the wider green-innovation ecosystem and slowing the overall green transition.

5. Governance of Greenwashing-Related Behavior

Existing governance proposals can broadly be divided into external and internal mechanisms, while recent research has begun to identify more differentiated tools.

Externally, the literature continues to emphasize legislation, consistent disclosure standards, mandatory ESG reporting, independent third-party assurance, and stronger external supervision [1,6]. More recent studies point to additional policy instruments. Technology-enabled supervision by securities regulators can curb greenwashing by strengthening deterrence, reducing agency problems, and improving the quality of environmental disclosure. The effect appears especially pronounced for firms located farther from regulators and for heavily polluting industries [17]. Tax incentives may also matter. Reforms such as VAT credit refunds can reduce financing constraints and increase managers' confidence in long-term development, which in turn can reduce incentives to greenwash. The effect has been found to be stronger in regions with tighter environmental regulation and among firms in pollution-intensive sectors [18].

Internal governance is equally important. Better corporate-governance structures, stronger internal control, and a healthier ethical climate can create internal checks on opportunistic behavior [1,6]. Mixed-ownership reform in state-owned enterprises has also been associated with lower levels of ESG greenwashing, partly through lower agency costs, improved cash holdings, and greater analyst attention. The effect appears stronger in local state-owned firms, firms with less concentrated managerial power, and heavily polluting industries [19]. Other work has explored differentiated governance instruments from the perspectives of digital governance, policy coordination, and ownership structure.

6. Literature Summary and Evaluation

6.1 Summary of Existing Research

Several conclusions can be drawn from the literature reviewed above. First, the concept, classification, and manifestations of greenwashing have been discussed in considerable depth, providing a useful conceptual foundation for the study of greenwashing-oriented pseudo-innovation. Second, theoretical tools such as pseudo-corporate social responsibility, the symbolic-substantive distinction, and symbolic corporate environmentalism are now sufficiently developed to provide a clear theoretical position for this behavior. Third, research has accumulated substantial theoretical and empirical evidence on the antecedents, consequences, and governance of greenwashing, so an analytical chain linking 'drivers-consequences-governance' is already taking shape. The systematic review by Forliano and colleagues [20] likewise identifies four major clusters in greenwashing research: symbolic management and CSR communication; environmental regulation and institutional complexity; performance and sustainable practices; and marketing, perception, and trust. These streams provide a solid field-level foundation for more focused research on greenwashing-oriented pseudo-innovation.

6.2 Limitations of Existing Research

Despite this progress, research devoted specifically to greenwashing-oriented pseudo-innovation remains limited. First, much of the literature still equates greenwashing with a gap between words and deeds or with 'talking without acting.' It pays less attention to firms that do act, but whose innovation activities are strategically hollow. As a result, greenwashing-oriented pseudo-innovation is often conflated with verbal greenwashing or general pseudo-social responsibility, and its conceptual boundary remains insufficiently clear.

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Second, most empirical studies focus on broad ESG greenwashing or textual greenwashing in annual reports. There is much less systematic work on forms of pseudo-innovation carried by green patents and R&D expenditure. Third, no widely accepted identification or quantitative measurement strategy has yet emerged. Distinguishing strategic patents from substantive innovation and developing reliable proxy variables remain major constraints on empirical research. Fourth, governance research is still directed mainly at greenwashing in general. More targeted discussion of governance mechanisms suited to this specific subtype is needed if policy implications are to become more precise.

6.3 Directions for Future Research

Future work could move in four directions. First, the conceptual boundary of greenwashing-oriented pseudo-innovation needs to be sharpened, with clearer criteria distinguishing it from verbal greenwashing, symbolic innovation, and substantive innovation. A more consistent classification framework would reduce the conceptual overlap that currently weakens empirical work.

Second, identification and measurement should be improved. A multidimensional approach could combine the structure of patent types, measures of patent quality, and the efficiency with which R&D inputs are converted into meaningful outputs. Third, research should make fuller use of China's institutional setting, including carbon markets and green-subsidy schemes, to examine when policy incentives encourage or discourage pseudo-innovation. Finally, governance studies should move beyond general anti-greenwashing measures and develop differentiated internal and external mechanisms suited to this behavior, forming a more complete governance chain of identification, sanction, and correction.

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