Review on the study of enterprise "greenwashing" and corporate social responsibility

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Abstract. In recent years, the public and government departments have been paying more and more attention to environmental protection, and there have been more academic studies on corporate greenwashing and corporate social responsibility (CSR) in the supply chain. We summarize the concepts, motives, consequences and governance methods of corporate greenwashing and the input research model of CSR in the supply chain, and point out the development trend of the two and the direction we can focus on in the future, which is of certain reference value in both theory and practice.

Keywords: Greenwashing, Corporate Social Responsibility, Supply Chain.

1. Introduction

In recent years, consumers' environmental awareness and ability to recognise green products have gradually increased. Government departments have also imposed clearer requirements on carbon emissions and other behaviours of enterprises. However, due to information asymmetry, some enterprises claim that their products or services are green with the aim of obtaining a green premium, but fail to take actual action. Such "greenwashing" of products or services not only harms the enterprises themselves, but also affects stakeholders. The research on CSR investment has gradually expanded from individual enterprises to the supply chain in which they are located, and the establishment of many models has enriched the research system of supply chain CSR.

This paper summarises the concepts, motivations, consequences and governance methods of "greenwashing" and CSR investment in supply chains, which theoretically helps to improve the systematic research on "greenwashing" and CSR. In terms of practical significance, it can summarise the current hotspots, promote "greenwashing" to "real green", and help promote the sustainable development of enterprises, supply chains and even economic markets.

2. Overview of research on corporate greenwashing

2.1. Meaning, manifestations, categorisation and measurement of corporate greenwashing

"Greenwashing" refers to the behaviour of companies that, after realising the importance of environmental issues, demonstrate their efforts to protect the environment by means such as issuing untrue environmentally friendly statements.

There are many forms of "greenwashing", and Terra Choice (2009) summarises the "Seven Deadly Sins of Greenwashing" - ambiguity, concealment, irrelevance, lying and deception, and Insufficient, irrelevant, lying, cheating, avoiding the important and worshipping the authentication of the seven forms of "greenwashing".

Li Dayuan et al. (2015) classified the "greenwashing" behaviours of enterprises into two categories: "greenwashing" and "pseudo-greenwashing". Among them, "greenwashing" is a way for enterprises to mislead consumers into thinking that they produce green products through exaggerated publicity and changing concepts; while "pseudo-greening" refers to the fictitious green logo and green certification of enterprises to deceive consumers. Taking the apparel industry as an example, Chen, Kai and Duan, Yongrui (2023) point out that many companies engage in undetectable "greenwashing" by fictionalising or exaggerating their environmental inputs and the degree of greenness of their

products, and by taking advantage of the asymmetry of information in order to save costs and improve their brand image.

Li Mengxuan (2023) concluded that up to now, the measurement of "greenwashing" is mainly measured by five methods: case study, questionnaire survey, simulation experiment, data construction and content analysis. Among them, the content analysis method was developed mainly in consideration of the fact that the accuracy of institutional assessment of ESG levels is not high, and the use of different institutional techniques may lead to contradictory conclusions. Therefore, the content analysis method uses publicly available data to conduct content analysis and constructs indicators to measure corporate "greenwashing" by using methods such as the difference between symbolic and substantive behaviours or ratios.

2.2. Drivers of corporate greenwashing behaviour

2.2.1 Internal drivers of corporate greenwashing behaviour

Drivers within firms include positive motives such as the pursuit of economic benefits, access to environmental subsidies, lower costs of "greenwashing", image enhancement to increase corporate value and thus attract investors, and negative motives such as management's short-sightedness, the firm's desire to be exempt from penalties, and operational pressures.

Within the framework of neoclassical economics, corporate decision-making is usually based on the assessment of costs and benefits in order to maximise utility. Researchers have pointed out that "greenwashing" is actually a manifestation of rational corporate behaviour, and the pursuit of economic profit maximisation is a key factor driving "greenwashing". At present, environmental protection is a key concern for the country's future development, and corresponding policy rules and measures are being implemented, from which environmentally friendly enterprises often receive subsidies.

In addition, lower costs are also a major incentive for "greenwashing". Li Xuejun (2010) found that enterprises often adopt verbal promises and symbolic solutions when implementing "greenwashing" strategies, which have lower costs. Therefore, the low cost and high benefit of "greenwashing" makes more enterprises tend to maximise economic benefits and make the choice of "greenwashing".

In addition to the direct impact on profits, enterprises will also "greenwashing" for the purpose of beautifying corporate image and enhancing corporate value, so as to attract more investors. Li Jiangfeng et al. (2024) point out that firms are motivated to engage in ESG "greenwashing" for the purpose of enhancing their self-image and status in the industry, as well as attracting more investors. Zhu Fumin et al. (2024) conducted an empirical study on 455 heavily polluting enterprises and found that a higher proportion of institutional investors' shareholding would make ESG stay on the surface and reduce the substantive quality of ESG reports, thus exacerbating the occurrence of "greenwashing" behaviour and becoming a facilitator of "greenwashing" by enterprises. The "greenwash" behaviour of enterprises is exacerbated and becomes an enabler of corporate "greenwash".

At the corporate governance level, management's short-sightedness is also a driver of "greenwashing". Qian, Ming, and Ren, Qin (2023) found that in terms of micro-factors, management's short-sightedness increases the probability of corporate "greenwashing". Management's short-sightedness in pursuing short-term benefits at the expense of long-term benefits increases the probability of "greenwashing" as the degree of short-sightedness increases.

In addition to management's short-sightedness, a firm's desire to avoid penalties through "greenwashing" is also a major negative motivation. Based on whether China Railway Construction was subject to administrative penalties in the years before and after ESG disclosure, Mo and Guo (2024) suggest that the most fundamental negative motivation for firms to engage in "greenwashing" is to avoid penalties by misreporting pollution data, so as to further beautify their corporate image and enhance their corporate value.

The operational pressure of enterprises may also prompt them to engage in "greenwashing" behaviour. Li Qiang and Song Jiawei (2022) found that performance expectation gap exacerbates "greenwashing" behaviour, and the duration of the gap is positively related to its impact on "greenwashing".

2.2.2 External drivers of enterprises' greenwashing behaviour

The external drivers of corporate "greenwashing" behaviour include information asymmetry and market competition in the green market, consumer preference for environmentally friendly products, and inadequate regulation by government departments.

Darby (1973) explored the causes and determinants of corporate disinformation in green markets, and found that green markets have significant information asymmetry, as does CSR, and that green products have the attribute of trust goods, and consumers have difficulty in making value judgements about whether a product is environmentally friendly or not, even after consumption. Domestic scholars Huang Hongfu (2020) established a dynamic game model of enterprises and consumers to study false green marketing, and found that there is a "learning effect" when consumers use the products, i.e., the ability of consumers to identify green products will be significantly improved after accumulating certain experience. Liu Yizheng et al. (2022) analysed 158 heavily polluting enterprises and pointed out that a more competitive market will increase the motivation of enterprises to "greenwashing", which is an extremely important external motivation for enterprises to "greenwashing".

At the same time, consumers' awareness of environmental protection is increasing year by year, and the demand for environmentally friendly products continues to grow, so that the demand for environmentally friendly products can remain strong in an economic downturn. Therefore, a company labelled as a green company will gain consumer goodwill and thus a green premium.

As the most direct external deterrent to "greenwashing", the current lack of government regulations and supervision also promotes the choice of "greenwashing". Wang Yugang (2008) found that some enterprises believe that covering up their breach of contract only involves moral issues, while in terms of the legal system, the definition of the relevant concepts in the laws of various countries is still unclear, so some enterprises take the opportunity to exploit the legal loopholes to "greenwashing". Liu et al. (2022) found that under the high competitive pressure in the market, the role of inadequate government regulation in driving the "greenwashing" of enterprises has been increasing. Li Jiangfeng et al. (2024) argue that because China does not have clear and mandatory ESG disclosure and assurance standards, ESG "greenwashing" lacks a clear punishment mechanism and deterrence, which results in a low cost of corporate "greenwashing" and increases the risk of "greenwashing". The lack of a clear penalty mechanism and deterrent for ESG "greenwashing" behaviour makes the cost of non-compliance relatively low, and increases the likelihood of "greenwashing" behaviour occurring.

2.3. Consequences of corporate "greenwashing" behaviour

"Greenwashing" has the potential to reduce corporate reputation. Leonidou et al. (2013) found that when consumers perceive that the company from which they purchase a product is not socially responsible, they will be suspicious of the brand, weakening their satisfaction and loyalty, and negatively affecting corporate reputation.

In addition, "greenwashing" behaviour affects the financial performance of firms, and Wu and Shen (2013) show that there is a positive relationship between a bank's socially responsible behaviour and its financial performance, which can be measured in a number of ways. However, this positive relationship is not found for banks that engage in "greenwashing" but do not actually make environmental investments.

"Greenwashing" affects the stock performance of firms, and Cai and He (2014) argue that while environmental protection often tends to be undervalued by the market due to its imperceptibility, an increase in environmentally responsible behaviour by firms can help to grow stock returns in the long run, resulting in excess returns for firms.

"Greenwashing" behaviours increase the business risk of firms. Zhang Huaiyu (2023) argues that although "greenwashing" may increase market recognition in the short term and lead to higher business performance, it can increase its own business risk. Once "greenwashing" behaviour is publicly disclosed, it may face penalties and damage the reputation of the company.

"Greenwashing" not only affects the company itself, but also the whole economy and society and stakeholders.

Jahdi et al. (2009) found that "greenwashing" behaviours can exacerbate the crisis of consumer trust. Yang Bo (2012) found that "greenwashing" behaviour can lead to the prevalence of "lemon markets", which seriously impedes the sustainable and stable development of the economy. "Even if there is no initial motivation for "greenwashing", some firms may be affected by the "greenwashing" behaviour of competing firms. As Huang Shubing et al. (2020) found through empirical research, with the enhancement of public awareness of environmental protection and the strengthening of government environmental regulation, "greenwashing" behaviour has been adapted by more and more enterprises to learn, and "greenwashing" by enterprises has shown a tendency to mimic the diffusion of the trend. Zhen Mengmeng (2023) points out that "greenwashing" has a negative effect on stakeholders, not only forcing true green enterprises to leave the market, thus exacerbating the "lemon market", but also further affecting consumers' trust in green products, reducing the overall market share, which is not conducive to the market's success. Mu and Lee (2023) argued that "greenwashing" behaviour can reduce employees' identification with the company and further reduce employee loyalty.

2.4. Governance approaches to corporate greenwashing behaviour

2.4.1 Governance methods at the enterprise level

In terms of corporate prevention, governance methods are mainly to promote the diversification of shareholding structure, play the role of small and medium-sized shareholders, and investor's concern and threat of exit.

Huang Shubing (2022) points out that enterprises can avoid the self-interested behaviour of dominant shareholders to promote "greenwashing" by promoting the diversification of the shareholding structure, and at the same time, they can effectively supervise the disclosure of environmental information to promote the fulfilment of corporate social responsibility. In addition, environmental costs can be incorporated into corporate accounting and reconciled with ESG reports to further reduce the space for "greenwashing" behaviour. Shen Yi et al. (2023) used word vector technology to find that although small and medium-sized shareholders lack in organisation and professionalism, their active participation can effectively strengthen the internal supervision of the company and inhibit the occurrence of semantic "greenwashing" by improving corporate governance.

Li, Huirong and Zhao, Xiaoke (2023) found that the higher the level of investor attention to the enterprise, the more it can improve the level of information transparency and the authenticity of the ESG report, which can effectively inhibit the incentives of corporate "greenwashing". Li Qiang et al. (2023) show that the threat of exit by institutional investors can directly and indirectly inhibit corporate "greenwashing". The threat of institutional investors' exit releases information to management and shareholders, promotes internal corporate governance, and reduces the incentives for "greenwashing" caused by management's short-sighted and self-interested behaviour. In addition, the threat of exit by institutional investors can increase media attention, stimulate public scrutiny, and indirectly inhibit the occurrence of "greenwashing".

2.4.2 External governance methods

External governance methods mainly include the government, environmental organisations, third-party certification bodies, the media and technical means.

Scholars generally agree that the government's laws and regulations are the most effective external governance element.

Song Fenghua (2022) argues that the governance of "greenwashing" with the goal of "double carbon" should be based on the government's regulatory leadership, and enhance the diversity of governance participants. At the same time, green finance, green subsidies and other tools can be used to establish a sound regulatory mechanism for environmental information disclosure, so as to further curb "greenwashing" by enhancing information transparency. Sun et al. (2023) point out that the government's role in controlling "greenwashing" is a guarantee for enterprises to truly carry out green innovation. In the article, the government's regulation of "greenwashing" is divided into strong and weak regulation, where weak regulation refers to formal regulation such as issuing guiding documents, while strong regulation means that the government participates in the supervision and management of "greenwashing" with greater inspection and punishment of "greenwashing". The strong regulation refers to the government's involvement in supervision and management with greater inspection efforts to punish enterprises for "greenwashing". Zhang Changjiang et al. (2024) showed that enterprises' "greenwashing" behaviours require the synergistic effect of many parties, and it is difficult to control them through a single factor. Among the many ways of governance, the standardisation and refinement of government regulation can act as an effective external pressure, and can also play a fundamental role in governance due to its mandatory nature. Chen Qi and Li Menghuan (2024) conducted an empirical study on China's A-share listed companies from 2010 to 2021, which proved that there is a U-shaped relationship between corporate "greenwashing" and economic policy uncertainty, and the sample data are mostly in the "U" shape. The sample data are mostly on the left side of the "U" shape. Therefore, the government can control the role of economic policy uncertainty on "greenwashing", avoid the negative effect of frequent adjustments, and effectively inhibit the enterprise "greenwashing" behaviour through appropriate policy change frequency.

In addition, environmental social organisations also have a governance effect. Zhang Ming et al. (2023) constructed a tripartite game model of enterprises, government and environmental social organisations, and found that with the enhancement of the professionalism and credibility of environmental social organisations, enterprises are more inclined to choose green innovation rather than "greenwashing".

As for third-party forensic institutions, Huang Shubing (2021) found that third-party forensics on corporate environmental information disclosure can effectively inhibit the occurrence of "greenwashing" behaviour and help "greenwashing" move towards real green. Gao Ningxin (2023) points out that although some listed companies disclose ESG reports on their own, their information may still be "greenwashing" and of low quality. The establishment of a sound ESG disclosure standard and the promotion of the standardisation and popularity of third-party ESG verification are necessary to alleviate the opportunities for "greenwashing" caused by poor information and promote the healthy development of the green capital market.

Media attention can also weaken the tendency of "greenwashing". Sun et al. (2023) found that the media's coverage of corporate "greenwashing" incidents would reduce the occurrence of corporate "greenwashing", so the exposure of false and deceptive behaviours of enterprises should be increased to increase the level of truthfulness of corporate information.

At the same time, with the continuous development of the information age, there are many technical means that can help to inhibit the occurrence of "greenwashing" behaviour. Pan Xiang (2022) points out that there is "greenwashing" in ESG reports, and through digital transformation, we can improve business processes, increase data processing efficiency, and more efficiently mine and analyse massive ESG data, which can effectively prevent the occurrence of corporate "greenwashing". behaviour. Wang Yaling (2022) found that blockchain technology can give full play to its decentralised characteristics, increase the transparency of information, and improve the monitoring system through the synergy with the government, the public and other nodes, so that the carbon emissions data can be verified and not be tampered with, which is an important means of solving the problem of "greenwashing". Tingting Xie and Qian Zhang (2023) show through empirical research that fintech can use its technical means to monitor and analyse the information of enterprises and alleviate the impact of information asymmetry, which is a major measure to effectively curb

"greenwashing". Chen Ruixuan and Li Shanxian (2024) found that smart blockchain technology can effectively improve information transparency and reduce information asymmetry, thus inhibiting the occurrence of "greenwashing" behaviour in green credit by comparing the game models.

3. Overview of Research on Supply Chain Corporate Social Responsibility

3.1. The concept of supply chain CSR

Chen Yuangao (2015), a scholar in China, first proposed supply chain social responsibility, pointing out that each node member of the supply chain should fulfil ethical mandatory obligations to stakeholders including upstream and downstream enterprises in the supply chain, consumers, the government, society and the environment. Supply chain social responsibility activities contribute to overall synergistic governance, in which core enterprises should play a leading role and assume more social responsibility (CSR).

Cheng and Ding (2021) state that supply chain CSR management involves specific corporate social responsibilities that should be observed by each firm in the supply chain. Supply chain CSR is generally regarded as an extension and expansion of CSR, an innovation in management mode, and while pursuing profit maximisation, supply chains should also pay attention to the interests of other stakeholders and take the initiative to assume certain legal, ecological and ethical responsibilities.

3.2. Research on CSR Investment in Supply Chain

3.2.1 CSR Investment by Enterprises for Themselves

In recent years, domestic and foreign scholars' research on supply chain CSR investment initially focused on suppliers' or manufacturers' CSR investment for themselves under external supervision.

Yang et al. (2018) studied channel selection and emission reduction decisions when considering carbon emission limits.Shi and Shen (2019) analysed the decision-making of corporate R&D investment based on the context of tax incentive policies. Zhang Lu et al. (2022) found that tourism companies should improve CSR decision-making when consumers' low-carbon preference increases. Xia, Dongfang, and Ni, Jing (2022) found that with the increase of CSR, the profits of manufacturers and retailers show a tendency of decreasing and then increasing, and when the CSR investment of manufacturers is greater than a certain threshold, it can increase the profits of both themselves and retailers. Cheng Yanjun (2023) stated that in models where either the retailer or the manufacturer undertakes CSR alone, the profits of both parties increase as the level of CSR implementation increases.

The actual effect of CSR investments made by firms in themselves may be influenced by the supply chain in which they are located, as well as having an effect on the supply chain in which they are located. Zhenzhong Guan and Yiwen Wang (2023) found through empirical research that CSR investment helps to reduce the cost of debt financing and the risk of default, and its effect is negatively related to the degree of supply chain concentration. Zhao Yanfei (2023) combed the literature in recent years and pointed out that CSR, which includes the dimensions of employee responsibility, social responsibility and consumer responsibility, can promote the strength, fairness and durability of supply chain partnerships.

3.2.2 CSR Direct Investment and Co-operation between Upstream and Downstream Enterprises in the Supply Chain

With the increasing consumer preference for CSR compliant products, downstream enterprises begin to participate in supply chain CSR compliance, in which CSR direct investment is manifested in the form of participation in upstream enterprises' CSR investment.

By constructing a game model of a single supplier and a single manufacturer, Zhao Daozhi et al. (2016) pointed out that co-operative abatement can help to increase the profits of both parties and the supply chain system.Shi et al. (2017), in their study of simultaneous CSR investment by a manufacturer and a retailer, found that the manufacturer's CSR investment was larger than the

retailer's in most cases.Yang and Chen (2018) investigated the different choices of retailers regarding benefit, cost-sharing options in a supply chain system consisting of manufacturers and retailers. Zheng Benrong et al. (2018) conducted a study on four CSR investment decisions of manufacturers and retailers in a closed-loop supply chain, and pointed out that the closed-loop supply chain system is most favourable when both of them make CSR investments at the same time.Shi et al. (2020) investigated the investment in environmental protection technologies by retailers and manufacturers. Lan Jianyi et al. (2023) argued that fresh food suppliers and fresh food e-commerce companies jointly undertake CSR and implement a revenue sharing strategy, which can achieve a Pareto improvement in the profits of both parties under certain conditions. Li Lin (2023) constructed a dual-channel supply chain model of manufacturer-retailer-consumer and manufacturer-retailer, and pointed out that in Stackelberg under complete information, the level of CSR inputs and the overall profit of the supply chain were higher in centralised decision-making than in decentralised decision-making. Tang Juan et al. (2023) constructed a model in which the manufacturer makes CSR inputs and entrusts the retailer to recycle the waste products, pointing out that if the manufacturer transfers all the savings from recycling to the retailer, it will maximise CSR, each node of the supply chain, and the overall profit of the supply chain under decentralised decision-making. Peng Chengqi et al. (2023) constructed a Stackelberg game model to show that in a model where the manufacturer takes CSR alone and the retailer shares CSR, the utility of both the manufacturer and the retailer increases as the level of CSR inputs increases. He et al. (2023) found that an increase in the level of CSR inputs from retailers, whether in the retailer recycling model or the third-party recycling model, effectively promotes the reduction of carbon emissions by the manufacturer and improves the profitability of each node member of the supply chain as well as the overall profitability.

3.2.3 Indirect CSR investment among supply chain firms

Supply chain CSR inputs include indirect inputs such as CSR audits in addition to direct CSR investments, such as CSR audits and disclosures by downstream manufacturers to upstream suppliers.

Plambeck and Taylor (2016) study CSR audit inputs and find that when suppliers are likely to use hidden information to pass the buyer's audits, the "backlash" condition holds, and CSR audits that buyers would have invested in to incentivise suppliers to put in more responsible efforts instead reduce supplier social responsibility inputs, which is in line with the conventional wisdom. responsibility, which is contrary to the traditional belief that CSR audits help improve supplier performance.Chen and Lee (2017) investigate supplier CSR risk management and control strategies by comparing multiple audit mechanisms.Cho et al. (2019), based on the issue of child labour, point out that downstream purchasing firms can use audits to drive suppliers to fulfill their social responsibility. social responsibility.

3.2.4 The Role Mechanism between CSR Investment and Government Subsidy Penalty, Consumers and Other Factors

Government Subsidy Penalty, Consumers and Other Factors

In addition to CSR investment by and between enterprises, many scholars have begun to pay attention to the mechanism of CSR investment and government subsidies and penalties, and consumers.

Ding Lei and Zhang Fu'an (2023) point out that compared to the manufacturer recycling model, the recycling rate and the level of CSR investment of manufacturer enterprises will increase more significantly with the increase of government subsidies for CSR investment under the retailer recycling model. Zhu Han et al. (2023) point out that the government can issue policies on CSR violation penalties to force firms to reject CSR violations and shift to compliant operations out of a desire to avoid being penalised. By constructing a supply chain decision-making model with upstream manufacturers, downstream retailers, and end consumers, Li (2024) found that although CSR investment by manufacturing firms reduces their direct economic profits, it has a positive impact on their own overall utility and the profits of downstream retailers. And compared to no subsidy, if the government subsidises energy manufacturing firms with technology, it promotes firms to reduce

carbon emissions per unit of product. Guo Fuli et al. (2024) found that in a manufacturer-led model, the optimal solution of CSR inputs of manufacturers increases with the increase of policy subsidies. Li Feng et al. (2024) found that in the no-government-subsidy model, although the retailer's CSR input reduces its own economic profit, the manufacturer's profit can increase due to the increase in overall market demand. Whereas in the technology subsidy model, the retailer's CSR input can increase the profits of both itself and the manufacturer, achieving a win-win situation.

Yao Fengmin et al. (2023) showed that as consumer CSR sensitivity increases, the level of two-way CSR inputs from the original manufacturer and remanufacturer increases, and helps to increase the recycling rate and price of waste products, increasing the profits of both parties. By constructing an economic model, Xu et al. (2023) found that the most direct motivation for CSR in the supply chain of multinational enterprises (MNEs) is the consumer's perception of the brand's social responsibility, and that the higher the intensity of the perception, the more MNEs are inclined to implement social responsibility to satisfy the customer's expectations.

However, many current studies on CSR focus on one or two aspects, while Li Hongwei et al. (2023) argued that single-variable conditions such as environmental responsibility, governmental responsibility and social donations do not explain CSR inputs well, and investigated the path of CSR realisation of China's listed companies through the fsQCA method.

3.2.5 CSR greenwashing

Lee et al. (2018) point out that despite the regulation of "greenwashing" behaviour, it does not necessarily increase the greenness of the product. When the cost of additional CSR investment is too high or the importance of CSR is low, firms still engage in "greenwashing".Wu et al. (2020) showed that in the case of low information transparency, firms driven by profit maximisation will invest in "greenwashing" behaviours. "behaviour. A sufficiently high level of transparency can further eliminate "greenwashing" and allow companies with social interests in mind to invest in CSR despite the threat of "greenwashing" by companies that only focus on maximising their own interests.

4. Summary

This paper focuses on the literature on corporate "greenwashing" behaviour and supply chain corporate social responsibility (CSR), mainly investigating:

(1) The meaning, manifestation, classification and measurement of corporate "greenwashing".

(2) Drivers of corporate "greenwashing": internal factors - the pursuit of economic benefits, access to environmental subsidies, lower costs of "greenwashing", image enhancement, and attraction of investors, management's short-sightedness. Internal factors - pursuit of economic benefits, environmental subsidies, lower cost of "greenwashing", enhancing corporate value through image enhancement, attracting investors, short-sightedness of management, desire to be exempted from penalties, and operational pressure. External factors - information asymmetry and market competition in the green market, consumer preference for environmentally friendly products, imperfect regulation by government departments.

(3) Consequences of corporate "greenwashing" behaviour: Internally - affecting corporate reputation, financial performance, stock performance, and increasing business risks. Externally - undermine the smooth operation of the overall economy and society, promote the emergence of the "lemon market", and reduce consumer trust.

(4) Governance of corporate "greenwashing" behaviour: Internal - promoting diversification of shareholding structure, playing the role of small and medium-sized shareholders, investor concerns and withdrawal threats. External governance - government laws and regulations, environmental protection organisations, third-party certification bodies, media attention, and technological means to curb "greenwashing".

(5) The concept of supply chain CSR.

(6) Research on supply chain CSR investment: CSR investment by enterprises themselves, CSR direct investment and cooperation between upstream and downstream enterprises in the supply chain, CSR auditing, CSR investment in relation to government and consumers, and CSR "greenwashing".

By studying the research of domestic and foreign scholars on "greenwashing" and supply chain CSR investment in recent years, we can find that the main trends of the current research:

(1) Research on corporate "greenwashing" behaviour has focused more on governance in recent years. In addition to the frequently mentioned government regulation, third-party verification, and media attention, more scholars have begun to study digital transformation, smart blockchain technology, and monitoring tools of financial technology.

(2) Current research on supply chain CSR is more mature in terms of own investment, two-way CSR investment in each node of the supply chain, including consumer and government subsidies, and government fines. Scholars have constructed various models to study the impact of CSR on the profits of node enterprises, the overall efficiency of the supply chain, and consumer surplus, and have analysed how both sides can further achieve the optimal solution through centralised decision-making, cooperation in recycling waste products, and other methods.

However, although the theoretical empirical research on enterprise "greenwashing" and the modelling of supply chain CSR are both relatively mature, there is a lack of domestic research that considers the two together. As early as 2018, some foreign scholars proposed that CSR investment also exists in the phenomenon of "greenwashing", that is, enterprises out of self-interest will originally should be green investment CSR investment for the "greenwashing" situation.

In the future, more models and empirical research should be conducted on "supply chain CSR + greenwashing", and factors such as digitisation and smart blockchain can also be considered to promote "greenwashing" to "real green". The supply chain CSR and"greenwashing" research can also consider adding digitalisation, smart blockchain and other factors.

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