

The Relationship Between Supply Chain Sustainability and Corporate Performance

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Abstract. Many studies argue that supply chain sustainability helps companies meet environmental and social governance requirements while creating long-term value. Cost burdens from greening initiatives in the supply chain, however, lead some to believe it negatively impacts corporate performance. This paper reviews existing research on the relationship between supply chain sustainability and corporate performance, analyzes both short-term and long-term impacts of green supply chains on business operations and economic benefits. The study investigates the mechanisms how green supply chains influence firm performance, considering both short-term operational effects and long-term developmental impacts. It presents compelling evidence illustrating that while sustainable supply chains initially impose cost burdens, they offer long-term advantages such as generating capital market returns or alleviating financing constraints. It also demonstrates that entrepreneurs prioritize long-term returns when establishing sustainable supply chains. This exposition seeks to assist organizations aspiring toward strategies capable of mediating environmental responsibilities in nature alongside imperatives of financial optimization.

Keywords: Supply chain sustainability, Short-term cost burden, Long-term performance

1. Introduction

Facing the intensifying global climate deterioration and the significant reduction of available resources, an increasing number of enterprises are integrating sustainable development principles into supply chain management. Specifically, they are prioritizing emissions reduction, optimizing resource efficiency, and selecting more environmentally responsible suppliers in their operations. A survey by Ernst & Young Global Limited [1] indicates that 52% of consumers trust companies that prioritize disclosing long-term ESG strategies. Given that consumers increasingly pay attention to whether businesses satisfy the benchmark of the sustainable requirement, long-term sustainability can attract more customers to achieve profitability.

Supply chain sustainability refers to the integration of environmental protection and resource efficiency principles throughout all stages of the supply chain [2]. It aims to achieve a win-win outcome of economic benefits and environmental sustainability by reducing carbon emissions, minimizing pollution, and enhancing resource utilization efficiency [3]. Traditional supply chain management typically focuses on the procurement, production, and inventory aspects of all participants to enhance operational efficiency. Sustainable supply chain management, on this basis,

incorporates the goal of maintaining environmental and social values, including addressing global challenges such as climate change, water security, and equal gender pay.

Due to the fact that sustainable supply chains generate positive impacts on long-term value creation, the implementation, however, leads to increased costs in the short-term, particularly the extra expenses incurred to control Scope 3 carbon emissions. Therefore, this paper conducts a review of both the short-term and long-term literature on green supply chains to examine their impacts on corporate performance and sustainable governance.

2. Short-term cost burden of supply chain sustainability

2.1. Explicit upfront investment cost

The greening of supply chains imposes explicit cost burdens in the short term. Esfahbodi et al. [4] took the British automotive industry as a sample and randomly selected 1,000 enterprises holding environmental certifications such as ISO 14000 or ISO 14001 and mainly engaged in the automotive business for a questionnaire survey. The experimental results show [4] that the benefits of supply chain ecological transformation in reducing the environmental impact of products are often offset by the increased costs of obtaining and applying green professional knowledge and related resources. This is because ecological design requires upfront investment, and these explicit costs exceed the benefits brought by energy conservation, emission reduction and waste minimization. In addition, environmentally friendly suppliers usually charge higher fees than traditional suppliers, thereby weakening the profit advantages of green suppliers [5].

2.2. Implicit coordination and transaction costs

The cost burden arising from setting a green supply chain can also be attributed to implicit transaction costs. When enterprises attempt to control carbon emissions in upstream supply chains (such as Scope 3 emissions), the related costs are not always presented in the form of explicit expenditures but often manifest as management burdens that are difficult to quantify and internalize in the short term. Due to a large amount of relevant information within various upstream companies in the supply chain, enterprises must coordinate collaboration among all parties. The information asymmetry generated in this process exacerbates implicit transaction costs, as all parties may misunderstand each other, given the lack of information.

As Hertel and Graf-Fraissler [6] argued, coordinating cooperation among different organizations to implement Scope 3 carbon emissions reporting generates implicit transaction costs. Especially when enterprises establish the organizational structure necessary for coordination to improve the quality of reporting. For instance, they are forming dedicated teams, engaging stakeholders, developing precise data-sharing systems, and clarifying accountability. Admittedly, these measures can reduce information asymmetry, but they simultaneously increase transaction costs. Therefore, Hertel and Graf-Fraissler [6] believe that when enterprises cannot determine that they will obtain obvious financial returns or reputation benefits in the early stage, the high management transaction costs will weaken their willingness to promote scope 3 management. In the short term, the greening of the upstream supply chain is more likely to be regarded by enterprises as an additional cost rather than an investment that can enhance performance.

In summary, the upfront explicit investment costs of supply chain greening in the short term, as well as the implicit transaction costs generated with suppliers or customers for controlling supply chain carbon emissions, may both lead to negative financial impacts.

3. Long-term performance of supply chain sustainability

However, from a long-term perspective, greening supply chains has significant economic implications.

3.1. Financial performance improvement

Simultaneously implementing social and environmental sustainable supply chain management (SSCM) initiatives positively impacts organizational financial performance. Wang and Sarkis [7] examined whether firms' environmental and social supply chain activities are associated with financial performance. This study used a binary (0-1) valuation method to measure the effectiveness of sustainable supply chain management over three years, and selected companies from the Fortune 500 that were included in the Newsweek Green 500 list for empirical analysis. The research results prove that comprehensive sustainable supply chain management (covering both social and environmental perspectives) is positively correlated with a company's financial performance (measured by return on assets (ROA) and return on equity (ROE)), and this positive effect has a lag of at least two years.

Wang and Sarkis [7] thus concluded that from a long-term perspective, simultaneously implementing sustainable supply chain management initiatives in both social and environmental dimensions helps continuously improve a company's financial performance and maintain the positive effect over a longer period.

3.2. Boost in capital market return

Lin et al. [8] provide evidence that supply chain ESG performance generates capital market returns. They constructed an investment portfolio strategy based on the frequency of ESG events in the supply chain. The research found that, after controlling for multiple risk factors, the high-frequency portfolio still achieved a significant annualized alpha return of 4.68%. This finding suggests that strong supply chain ESG is associated with positive abnormal stock returns, reflecting its value relevance in capital markets. Bose and Pal [9] also examined the impact of green supply chain management on stock prices and found that companies implementing global green supply chain plans would trigger significant stock market reactions. Through event study methods, they used carefully selected keywords to search for relevant announcements and adopted a three-day event window (from the day before the announcement to the day after the announcement). The results demonstrated that the implementation of green supply chain practices significantly pushed up the stock prices of enterprises, and the estimated effect was statistically significant. Therefore, there is a strong positive correlation between green supply chains and capital market returns.

3.3. Alleviation of financing constraints

Promoting green supply chains can enhance financial sustainability by alleviating financing constraints. Ma & Gao [10] researched the impact of sustainable supply chains on bank credit relationships. Based on 14,691 firm-year observations, they found that companies with higher supplier concentration obtained more bank financing. When other factors remain unchanged, for every one standard deviation increase in the concentration of suppliers, the loan size will grow by 3.8%, the proportion of long-term loans will increase by 7.5%, and the loan interest rate will drop by 62 basis points. Qiao et al. [11] demonstrate that higher supply chain concentration positively correlates with corporate green innovation by using data from Chinese listed manufacturing firms.

Companies implementing green innovation strategies usually collaborate only with core suppliers. This suggests that sustainability-oriented enterprises are more likely to gain more bank credit support through a stable supplier. Specifically, firms tend to select suppliers satisfying environmental, social, and governance (ESG) standards for targeted cooperation. This not only helps the enterprises achieve their goals of environmental protection and emission reduction but also enhances the transparency of information. From the bank's perspective, improved access to corporate information enables more accurate assessments of firms' risk-mitigation capabilities, thereby enhancing the confidence of banks in lending. This confirms the crucial role of green supply chains in alleviating the financing constraints of enterprises and provides a strong basis for credit institutions to incorporate the greenness of supply chains into their credit decisions.

3.4. Shaping green innovation capabilities

Green innovation is a key factor in translating green supply chain strategies into corporate performance. Chen et al. [12] conducted an empirical study using a sample of Taiwanese manufacturing firms, demonstrating that both green product innovation and green process innovation are significantly and positively correlated with firm competitive advantage, with green process innovation exhibiting a more robust impact. This research proves that enterprises can generate an imitable competitive advantage through process optimization by continuously improving energy conservation, emission reduction, and resource efficiency in the production process.

Furthermore, Green innovation constitutes not a one-time technological upgrade, but rather a dynamic capability necessitating sustained investment and continuous adaptation. In this process, enterprises actively participate in collaboration with suppliers, technology partners, and clients to drive systemic improvements in production processes. This characteristic indicates that the green supply chain provides a critical institutional and organizational foundation for green innovation. Through the accumulation of persistent green innovations, firms can develop new markets, enhance brand image, and secure first-mover advantages.

In addition, research by Chen et al. [12] provides crucial empirical support for understanding how green supply chains enhance corporate performance through innovation. The green supply chain does not directly achieve financial or competitive advantages. Its value is often gradually revealed through continuous progress in green product and process innovation over the medium to long term. It also explains why some studies have failed to observe a significant positive impact of the green supply chain on short-term financial performance, but have generated more lasting performance returns from a long-term perspective.

4. Prospect for future study

The various conclusions in the existing literature regarding the economic impact of supply chain greening can be attributed to the differences in research methods and institutional backgrounds. Although there is an increasing focus on the economic effects of supply chain greening, there is still a gap for further in-depth research in the future.

Firstly, variations in performance measurement criteria play a critical role. Operations management studies typically focus on short-term metrics such as operational costs or efficiency gains, while finance-oriented research prioritizes capital return, risk premiums, and stock market value. For future study, researchers could use a time-varying or threshold regression model to capture the short-term cost burden effect and the long-term performance improvement effect.

Additionally, measurement methods of supply chain sustainability lack standardization, with many studies relying on survey-based perceptions or binary indicators to capture whether firms adopt green supply chain initiatives. This approach fails to reflect variations in the intensity and complexity of different corporate practices, limiting the comparability and external validity of the experiment. For future study, researchers could use textual analysis on public announcements of listed companies or build a comprehensive index for green supply chain development to better standardly the measurement of corporate supply chain sustainability.

Next, institutional inconsistencies exist. In highly regulated or carbon-intensive industries, and in countries with more developed green finance systems, supply chain greening is more readily interpreted by financial markets and lenders as a signal of enhanced corporate risk management and compliance capabilities, leading to more significant financial returns. In contrast, in institutional environments with weak environmental regulation or limited green financial support, green supply chain investments may lead to high costs in the short term, struggling to convert into economic benefits. For future study, researchers could use multi-country panel data to empirically test the heterogeneity effect of institutional environment and financial market characteristics.

5. Conclusion

This paper reviews the relevant literature on supply chains and enterprise performance, analyzing the impact of green supply chains on business operations and sustainable development from both short-term and long-term perspectives, with a focus on their development background and economic consequences. In the initial implementation stage, enterprises often encounter challenges such as rising transaction costs and increased information asymmetry when promoting green procurement and managing upstream carbon emissions. These factors may exert short-term pressure on financial performance and operational efficiency. However, these temporary issues do not negate the overall value of green supply chains. From a long-term perspective, the comprehensive benefits of green supply chains will be highlighted increasingly. Greening supply chains improves financial performance, enhances capital market returns, alleviates financing constraints, and fosters green innovation strategies. Therefore, advancing supply chain greening to gain sustainable competitive advantages and ultimately achieve financial returns is a feasible strategic choice for enterprises.

Overall, green supply chains exhibit characteristics of short-term costs and long-term benefits, and their strategic significance is more reflected in long-term outcomes rather than immediate returns. When evaluating green supply chain decisions, enterprises should not solely rely on short-term financial performance as the single criterion but should comprehensively measure value from long-term dimensions such as innovation capabilities, financing environments, and risk governance.

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