Proceedings of the 2nd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/65/20231632

ESG Integration in China's Sustainable Supply Chain: Feasibility, Impact, and Optimization Strategies

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Abstract: Although more and more companies and investors are beginning to recognize the importance of ESG, its promotion and practice still need to be improved. China's ESG development is still in its infancy compared to ESG applications worldwide. Some leading businesses have already been actively using ESG to enhance the sustainability of their supply chains. This article examines the proactiveness and feasibility of companies adopting ESG development and how to improve their supply chains. The research employs methods such as data regression analysis and correlation analysis, and it also investigates the case of JD.com. The study reveals that while the ESG concept may seem contradictory to a company's short-term business goals or performance, it exhibits a certain degree of positive correlation and can even bring about favorable impacts in both the short and long term. JD.com's ESG application strategy in the supply chain context holds practical significance and scalability, potentially serving as a template for ESG supply chain development in future Chinese companies.

Keywords: ESG, Data analysis, Standardization, Feasibility, Optimization

1. Introduction

In recent years, the ESG (Environmental, Social, and Governance) concept has gradually been introduced and disseminated in China. According to a survey by Leverage Supply Chain, a leading international third-party supply chain management service provider based in Shanghai, ESG has gained significant attention within China's authoritative financial, economic, and corporate management sectors. ESG stands for Environmental, Social, and Governance, representing a holistic approach to evaluating a company's sustainability, environmental responsibility, social impact, and governance principles based on ESG principles [1, 2].

The initial focus of this concept was driven by support and response to global sustainable development initiatives. ESG can be divided into various aspects, including ESG investing, ESG ratings, ESG governance, and more [3-5]. According to Leverage Supply Chain's official website, the earliest ESG investments appeared internationally as far back as 2006, marking the beginning of the ESG movement. The United Nations Environment Programme (UNEP), the United Nations Global Compact (UNGC), and other major international investment institutions jointly released the "Principles for Responsible Investment" (PRI) at the New York Stock Exchange to establish a sustainable, international financial system capable of creating long-term value. During this time, ESG was introduced as a significant consideration in business investments and decision-making.

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Subsequently, the global financial crisis further prompted increased reflection and awareness of ESG principles. Calls against previous profit-driven business practices grew louder, leading more countries and institutions to join the ranks of signatories to the PRI agreement. Initially, there were 63 organizations with a total asset size of approximately $6.5 trillion as the first PRI members globally. However, as of November 2022, over 5,000 national and independent organizations worldwide have signed the PRI agreement, with total assets nearly exceeding half of the global professional asset management total (over $121 trillion). This astonishing figure represents an 18.6-fold increase in asset size within just sixteen years. Thus, globally, ESG is becoming a prominent factor that requires attention in business activities.

However, in contrast, in Asia, especially in China, the ESG concept, particularly its implementation in the supply chain sector, still needs to be developed more. Discussions during the China Second ESG Development Forum on July 27, 2023, pointed out that China initiated its ESG efforts later compared to other regions globally and faced several challenges, but it still holds significant potential. There needs to be more research on integrating ESG into the supply chain sector in China. The current situation indicates that only a few leading companies, such as JD.com and Alibaba, have recognized and implemented ESG measures. Even JD.com, for example, only started disclosing its corporate ESG reports and applying them to improve its supply chain in 2020.

In China, most companies' supply chains still need to implement ESG strategies or prioritize them. The few implementers also need help with the lack of unified rating standards, inconsistent disclosure practices, and concerns about greenwashing and deceptive behaviors.

Given this context, it is important to explore the impact of ESG on the supply chain sector and how ESG can be used to enhance existing supply chains. This research aims to investigate the specific implementation of ESG strategies within Chinese corporate supply chains, study the changes and effects of a few leading companies like JD.com, and explore the potential for supply chain optimization through ESG. Additionally, this paper conducts a regression analysis to examine the correlation between corporate ESG ratings, disclosure data, and financial report data, seeking to uncover a new sustainable supply chain development model incorporating ESG principles.

2. Case Description

In recent years, the ESG (Environmental, Social, and Governance) concept has gradually been introduced and popularized in China. As of now, many scholars and entrepreneurs generally consider China's ESG development to be at a relatively early stage. A specific timeline related to supply chains reveals two significant points: 2017 and 2023. Before 2017, corporate ESG reports in China often focused on disclosing environmental information, such as electricity savings and water resource conservation statistics, among various industries. Starting in 2017, led by several commercial banks like the Industrial and Commercial Bank of China and the Agricultural Bank of China, there was a shift toward disclosing supply chain ESG information. For instance, JD.com's 2022 ESG report includes supply chain-related ESG data such as the number of new energy vehicles, green transportation coverage, and Green Circular Logistics Packaging (DWOP). Since 2023, the disclosure of sustainable supply chain information has gradually gained attention from businesses.

The broader context of ESG development in China originated from the voluntary disclosure of corporate environmental and social responsibility information. This principle was initially reflected in the 2003 report "On the Disclosure of Corporate Environmental Information" by the China National Environmental Protection Agency. Later, the 2018 revised edition of the "Corporate Governance Guidelines for Listed Companies" defined the basic framework for ESG information disclosure by Chinese companies. Regarding ESG reporting rules, China initially modeled them after the "ESG Reporting Guide" from Hong Kong in 2012, which was proposed due to commercial activities between Hong Kong and the UK and exhibited clear UK-style ESG standards. However, ESG

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standards in mainland China need to be more consistent, presenting one of the real challenges addressed in this paper. In 2022, the China ESG Research Institute issued the "Guidelines for Corporate ESG Disclosure" (T/CERDS 2-2022), serving as the first group standard for ESG information disclosure by Chinese companies and marking a significant milestone.

Furthermore, investment scale is an important factor reflecting the development of the ESG landscape. However, statistics worldwide indicate that as of the latest data from Q2 2023, Chinese PRI signatory institutions account for only 2.6% of the global total, significantly lower than the 80% share in Europe and the US. Regarding investment penetration rates, according to GSIA statistics, China's rate is only 1%, far below the levels in Europe (42%) and the US (33%). These figures illustrate China's immaturity in ESG development.

In summary, China's ESG development faces several key challenges. First, there needs to be more emphasis on ESG across the country, with the ESG reporting disclosure rate of Chinese A-share listed companies at only about 30% in 2022. Second, even among companies that disclose information, issues like limited scope, varying data quality, and inconsistent practices persist. Third, China needs a unified and highly credible ESG rating system, resulting in lower overall ESG ratings for Chinese companies by overseas authoritative rating agencies. Finally, "greenwashing" practices are still prevalent, undermining the genuine development of ESG concepts. These challenges underscore the pressing need for sustained efforts to advance ESG practices in China and address these issues to ensure sustainable development.

3. Analysis of the Problem

3.1. The Feasibility of Enterprises Proactively Developing ESG

In the previous introduction, this article mentioned the current international environment for developing ESG in corporate supply chains and trends. However, the article also found that the benefits brought by these ESG principles often appear to have no direct correlation or impact on the company's profitability. Taking the ESG assessment criteria of the Global Reporting Initiative (GRI) as an example, its “Sustainability Reporting Guidelines” (Fourth Edition) focus on environmental indicators such as materials, energy, wastewater, and waste. At the same time, social aspects include labor practices, human rights, and product responsibility, among others [6]. In the usual universal understanding, businesses and capital are profit-driven. The ESG rating criteria seem to contradict this principle, as in most real-world corporate operations, these evaluation indicators are often not the first standards for evaluating the company's performance in terms of its own or shareholder equity. In this contradictory situation, how can we find the possibility of companies proactively investing in ESG construction?

Based on this, this article collected nearly 50 sets of ESG rating data for randomly selected companies in the past three years, along with their corresponding quarterly financial data. The analysis was conducted using Minitab to find the correlation between the two. To ensure the accuracy of the data analysis, the ESG corporate rating standard adopted in this article is similar to the Morgan Stanley MSCI institution in China, which Shanghai Huazheng Index Information Service Co., Ltd provides. This rating method uses 10 primary and 37 secondary indicators and is divided into seven levels: AAA, AA, A, BBB, BB, B, and CCC. Different indicators receive different scores, and the final scores for each aspect of E, S, and G are calculated. The overall ESG rating score of the company is calculated based on the algorithm. The rating is then published based on the relationship between the score and the rating.

China's ESG rating mechanism is still in the exploratory stage and often presents a pattern of diverse development. Therefore, different ESG ratings often produce some differences in results. Based on this, this article chose a similar algorithm to Morgan Stanley's rating because this algorithm

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has the following advantages: First, Morgan Stanley's rating is relatively widely used internationally and has a high degree of recognition. The local adaptation made by HuaZheng is similar to the original standard and is relatively authoritative. Second, this rating method adopts the same publication method as the quarterly financial report. That is, every quarter of the year, the quarterly score and report will be updated once, meeting our quarterly data statistics needs. At the same time, other methods often use longer intervals, such as once a year, which does not meet our data collection needs. Therefore, this article has drawn the following conclusions based on data analysis. At this stage, the data is sourced from Qinglv Data and the quarterly reports of various companies.

After conducting regression analysis, as shown in Figure 1, it can be observed that a positive correlation can be fitted between ESG scores and the total revenue of companies in the corresponding quarter.

Regression Equation

Total Revenue (in billion RMB) = -22617 + 340.8 ESG Score

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-22617	7592	-2.98	0.005	
ESG Score	340.8	96.2	3.54	0.001	1.00

Figure 1: Regression analysis (Photo/Picture credit: Original).

Furthermore, according to the Pareto Efficiency Test (Figure 2), the chart results have crossed the red line at 2.023, indicating statistical significance.

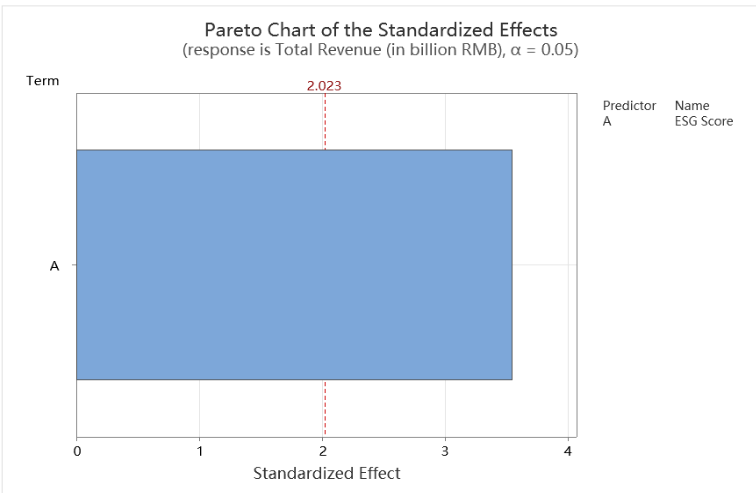

Figure 2: Pareto chart of the standardized effects (Photo/Picture credit: Original).

In the subsequent analysis, this paper conducted a correlation analysis and created a chart (Figure 3), revealing a correlation coefficient 0.49 between the two variables. This further confirms the existence of a certain correlation between a company's ESG score and its total revenue in the corresponding quarter.

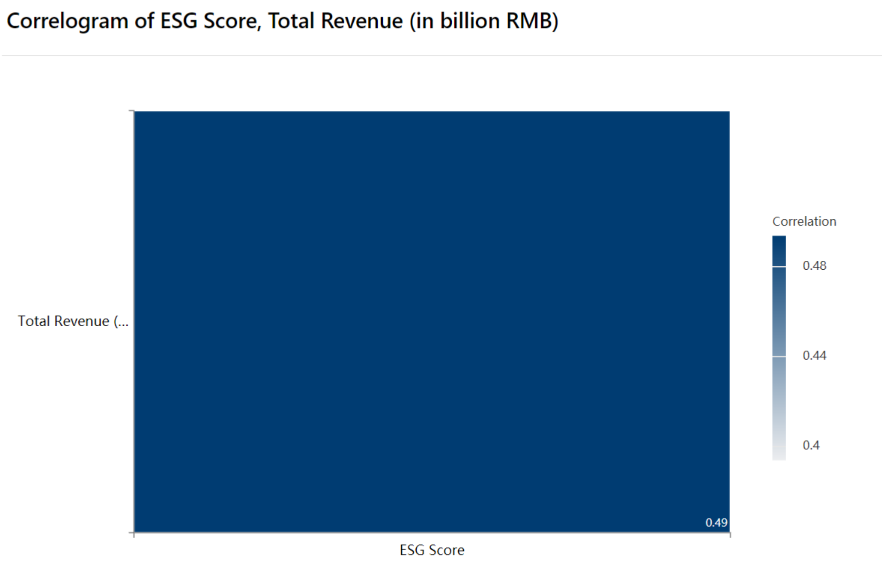

Figure 3: Correlation analysis (Photo/Picture credit: Original).

Through data analysis, the paper found that although many indicators commonly included in ESG ratings may not have a direct relationship with corporate performance, the data shows that improving ESG ratings can positively impact a company's revenue performance. This undoubtedly provides a basis for exploring the feasibility of companies actively optimizing their ESG practices. Furthermore, recent research indicates that at the supply chain level, if a supplier faces an ESG crisis (i.e., environmental or social scandals), the average import volume of related customer companies upstream and downstream will decrease by 30%, and there is a 4.3% higher likelihood of terminating the business relationship [7]. This represents significant and potentially devastating losses for supply chains. Data analysis reveals that ESG performance is positively correlated with the sales growth rate of company supply chains. In publicly listed companies, supply chains with higher ESG ratings have an average sales growth rate of 22%, while those with lower ratings have -8%. In non-publicly listed companies, the figures are even more significant, with 30% for higher-rated supply chains and -14% for lower-rated ones. In addition to the data, research mechanisms also indicate that better ESG performance leads to higher corporate value. Strong ESG performance helps alleviate financing constraints, enhances corporate investment efficiency, reduces financial risks, and consequently increases corporate value [8].

In conclusion, while the factors influencing ESG ratings may not seem directly connected to corporate performance, data suggests at least some level of correlation. In other words, the application of ESG principles and the improvement of ESG ratings can have a direct impact on a company's performance, especially at the supply chain level. This could be one of the main reasons companies are actively developing ESG practices: ESG aligns with their original performance objectives and can serve as a superior alternative for optimizing the current situation.

3.2. Using ESG to Optimize the Supply Chain

As concluded in the previous sections, ESG (Environmental, Social, and Governance) represents a more environmentally friendly and sustainable business approach and offers potential positive feedback regarding business performance. However, in China, relatively few companies have actively utilized ESG to optimize their supply chains for improvement. This is an area that most companies have yet to explore. Furthermore, within the realm of ESG ratings in China, there needs to be more specific evaluation criteria dedicated to supply chains [9]. While there may be sporadic assessments

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related to macro-environmental indicators such as energy utilization or pollution emissions, a comprehensive and standardized evaluation system for supply chains needs to be implemented. This fundamental lack of standards is a key reason many companies must prioritize ESG within their supply chains [10].

In this phase, the study has identified that achieving standardized ESG assessment criteria is crucial for companies in different industry sectors. This is because different industries have varying ESG focal points. For example, the chemical industry may emphasize greenhouse gas emissions, water resource management, and waste disposal concerns. At the same time, logistics companies might prioritize metrics like electric vehicle coverage and adopting eco-friendly packaging. Furthermore, the current market demands that suppliers disclose ESG information as a prerequisite for entry. In other words, the first essential step for ESG in the supply chain is data standardization. With standardized data, diverse indicators across various industries can be compared using a uniform assessment framework, and this data can also be aggregated into broader categories, such as environmental or social responsibility. Likewise, companies can follow specific paths to achieve optimization goals under standardized data.

Considering that the development of ESG in China is still immature, JD.com's consistent inclusion of supply chain evaluations and optimization measures in its ESG reports over three years could become a precedent for many other Chinese companies to follow. Furthermore, JD.com achieved a high international S&P CSA rating of 47 points in 2022, positioning itself among the top global logistics companies, thereby enjoying a competitive advantage and ESG recognition. This article uses JD.com as an example to analyze the company's contributions in standardizing ESG within its supply chain.

In JD.com's model, it was observed that the company has successfully avoided common pitfalls that many other businesses fall into, such as prioritizing activities over operations or focusing more on publicity than management. In JD.com's model, ESG is considered one of the key objectives of supply chain management, which aligns with the company's logic for sustainable development. In 2022, JD.com, based on its unique business model, categorized various ESG objectives and data standards for different segments of its supply chain operations, including warehousing, sorting, transportation, and delivery. Furthermore, JD.com established short-term, medium-term, and long-term goals. For instance, in its future planning for 2023, the primary criteria for supply chain ESG at JD.com are supply chain security, reliability, and resilience, which are reflected in corresponding indicators within the ESG report. These studies, tailored to JD.com's specific business, are often conducted by dedicated ESG committees and working groups. In JD.com's 2022 report, the company outlined various demands, including developing new energy vehicles, promoting eco-friendly packaging in logistics, and enhancing supply chain adaptability. Corresponding data standardization and optimization directions were established to address these diverse requirements. As an example, under the category of "Promoting eco-friendly packaging in logistics," JD.com set the impact period as medium-term (M) and long-term (L) and detailed ESG subcategories under resource efficiency. Achievements include regularly deploying 700,000 reusable ice packs and reducing 200 million foam boxes. They also introduced new eco-friendly packaging production standards (DWOP). They collaborated with supply chain partners to achieve an 80% or higher replacement of disposable packaging by 2030, reducing over a trillion single-use packages, and so on.

Considering the current state of ESG development in China, this article highlights that optimizing ESG in a company's supply chain involves several critical steps. Firstly, a dedicated ESG organization and department should be established, and personalized ESG evaluation standards should be devised based on the company's characteristics and business requirements. Additionally, alignment with widely recognized ESG rating agencies is crucial apart from data standardization. With these preparatory conditions in place, companies can formulate ESG plans and goals according to their specific circumstances, ultimately aiming to enhance the sustainability of their supply chains.

4. Suggestion

Based on the analysis in the previous sections, it is evident that there is room for improvement in both the feasibility of Chinese companies pursuing independent ESG (Environmental, Social, and Governance) development and the specific actions they can take within their supply chains. Addressing the first issue, as the proponents and primary promoters of the ESG concept, the government and relevant organizations should increase the influence of research findings and actively promote the idea that ESG is a superior, long-term, and sustainable choice in terms of corporate performance, even in the short term. When the benefits of ESG as a strategic approach become more widely recognized, companies will be more motivated to voluntarily participate in ESG initiatives, thus facilitating ESG's development. Regarding the analysis of the second part, the main challenge for companies is the need for a standardized framework and a clear path to follow for effective ESG optimization within their supply chains. JD.com's case provides a potential solution involving the localization of ESG integration into a company's supply chain. This means tailoring ESG initiatives to the specific needs and characteristics of the business. Companies can select appropriate ESG rating indices aligning with their business objectives and then standardize them internally. By doing so, they can establish relatively uniform evaluation standards and specific numerical action targets. This approach ensures the effectiveness of the integration of ESG into their supply chains.

5. Conclusion

Through data analysis, this article finds a direct positive correlation between ESG ratings and short-term changes in a company's total revenue. Similarly, ESG ratings also have a certain influence on the stability and scale of trade relationships between upstream and downstream customers. The conclusion suggests that ESG concepts, which focus on long-term sustainability, are consistent with areas of greater concern for companies, such as performance and short-term goal achievement. In other words, for businesses, ESG development is more like an enhancement and refinement of their existing models rather than a negative force that runs counter to their goals. Therefore, if the positive impact of ESG at this level is recognized and promoted, it can encourage more companies to voluntarily invest in ESG development, contributing to the long-term growth of ESG.

At a time when the integration of ESG and supply chains remains a relatively underexplored topic in China, this article analyzes the feasibility and operational methods for introducing ESG in China, proposing a relatively mature development path. Currently, there are relatively few examples of ESG integration with supply chains in China, and there needs to be more awareness and emphasis on this concept. This article can serve as a valuable reference for subsequent researchers looking to address these issues in this relatively unexplored field.

Furthermore, due to the limited number of specific ESG implementation instances in Chinese supply chains and the relatively short duration of many existing cases, challenges such as small data samples and data gaps in certain areas have posed difficulties for research. These challenges are largely attributed to the early stage of ESG supply chain development in China. Additionally, the need for unified standards in China and localization after ESG's introduction may not necessarily align with international examples. In the future, more practical case examples may become available for research in this evolving field.

DOI: 10.54254/2754-1169/65/20231632

References

[1] *Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. Journal of Corporate Finance, 66, 101889.*

[2] *Li, T. T., Wang, K., Sueyoshi, T., & Wang, D. D. (2021). ESG: Research progress and prospects. Sustainability, 13(21), 11663.*

[3] *Halbritter, G., & Dorfleitner, G. (2015). The wages of social responsibility—where are they? A critical review of ESG investing. Review of Financial Economics, 26, 25-35.*

[4] *Dimson, E., Marsh, P., & Staunton, M. (2020). Divergent ESG ratings. The Journal of Portfolio Management, 47(1), 75-87.*

[5] *Filbeck, A., Filbeck, G., & Zhao, X. (2019). Performance assessment of firms following Sustainalytics ESG principles. The Journal of Investing, 28(2), 7-20.*

[6] *Cao Q., Xu Q. (2019) Research on the construction of financial "environmental, social and governance" (ESG) system. Financial Regulation Research, (04):95-111.*

[7] *Bisetti, E., She, G., & Zaldokas, A. (2023) ESG Shocks in Global Supply Chains. Working Paper.*

[8] *Wang, L., Lian, Y., Dong, J. (2022) A study on the impact mechanism of ESG performance on corporate value. Securities Market Herald, (05), 23-34*

[9] *Zhang H., Zhou Y., et al. (2017) Research on ESG green rating and green index. Financial Forum, 22(09), 3-14.*

[10] *Wang K., Zhang Z., (2022) Status quo, comparison and outlook of domestic and international ESG ratings. Finance and Accounting Monthly, (02), 137-143.*