

Supply Chain Concentration and Corporate Environmental Responsibility

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With the recent intensification of environmental problems such as the depletion of natural resources, air pollution, water pollution and shortage, and soil erosion, the balance between environmental protection and economic development has attracted worldwide attention, and both green economy and sustainable development have gradually become the future economic development directions of all countries in the world. The COVID-19 virus spread throughout the world since its discovery in late 2019. Many experts show that poor ecological environment is an important factor that affects the generation and spread of virus and the increasing mortality rates, hence stressing the importance and urgency of environmental protection. As micro-entities of national economic operation, enterprises are also subjects of natural resource consumption and ecological pollution and have an undeniable responsibility toward environmental protection. Improving the ecological environment should ultimately be integrated into the corporate environmental responsibility (CER) of firms.

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1. Introduction

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Compared with a large number of corporate social responsibility (CSR) studies in the fields of management and economics, CER has been relatively ignored in the literature ^[2]. Meanwhile, the existing works on the driving factors of CER are less numerous than the impact studies ^{[3][4]} and have focused on external pressures, such as legal and institutional factors ^{[5][6]}. Government attention and relevant laws and regulations do play an important role in promoting CER performance, but direct government control does not necessarily lead to better results than market solutions ^[7]. As a node in the supply chain, companies can consider improving CER performance through

good supply chain management [8][9], but few studies have examined the driving factors of CER from the supply chain perspective.

Many companies around the world have started to underscore the relationship orientation of economic development, which has a distinctive reliance on major suppliers or customers. For example, according to the China Stock Market and Accounting Research (CSMAR) database, almost all of the top five suppliers (customers) of Chinese listed companies from 2013 to 2019 had 30% or more annual purchase ratios (sales ratios). In addition, since the 1990s, American companies have gradually changed their previous practice of relying on quantities of customers and suppliers and sought to deal with fewer customers and suppliers. Relevant statistics show that more than one-third of the annual sales revenue of US manufacturing companies come from their few top customers. Therefore, supply chain concentration (SCC) is an issue that cannot be ignored in the field of supply chain management. Previous studies pointed out that SCC has a significant impact on business operations and financial conditions [10][11], so it is also very likely to be an important factor that affects CER, but related research remains scarce. From a traditional operations management (OM) perspective, maintaining close relationships with suppliers (customers) can promote the sharing of information between both parties, thereby improving cooperation efficiency and reducing transaction costs [12][13]. However, SCC may also increase business risks and reduce the negotiation ability of enterprises, which may force them to give up their interests [14][15]. What is the impact of SCC on CER performance? It will be explored in our study.

2. Corporate Environmental Responsibility

With the globalization and internationalization of environmental issues in recent years, the world has begun to acknowledge the importance of protecting and improving the environment. All sectors of society have paid full attention to environmental protection, and related research on CER, particularly on its impact, has received increasing attention. Having explored the impact of CER on financial performance, corporate value, cost of capital, investment efficiency, corporate risks, etc., Li et al. (2017) [3] found that CER performance positively affects financial performance and is negatively moderated by organizational slack. Li et al. (2020) [16] found that when companies begin to adopt environmental regulations, CER has a negative impact on corporate value. However, after reaching a certain level, CER begins to enhance the corporate value. El Ghouli et al. (2018) [17] investigated manufacturing companies from 30 countries and found that a high CER corresponds to a low cost of equity capital. Lee and Kim (2020) [4] investigated Korean companies and found that these companies can reduce their excessive investments through CER activities and that the degree of market competition can exacerbate such negative relationship. Cai et al. (2016) [18] found that the CER performance of companies can lead to corporate risks, and this reverse relationship is mainly reflected in the manufacturing industry.

However, relatively few studies have explored the antecedents of CER performance. In these studies, the pre-influencing factors mostly focus on (1) formal system factors (e.g., laws and regulations), (2) external pressure (including stakeholder, market, and social pressure), and (3) firm-specific factors and managerial characteristics. Kim et al. (2017) [5] found that CER performance in civil law regions is significantly better than that in common law regions. Dai et al. (2018) [6] found that customer and competitor pressures prompt companies to formulate positive

environmental strategies and that such relationship is moderated by the organizational culture. Tsendsure et al. (2021) ^[19] found that product market competition tends to prevent firms from addressing environmental challenges, but under market competition management capabilities play a positive role in improving corporate environmental practices. Wang et al. (2021) ^[2] found that gender diversity in the board of directors will increase CER, especially when female board members hold authoritative positions. Orazalin (2020) ^[20] found that the existence of a sustainability committee can improve the effectiveness of CSR strategies and enable companies to improve their environmental performance. Although some scholars explored environmental responsibility and green activities from the supply chain perspective, their results had no empirical backing ^{[9][21]}.

In addition, most existing CER studies are based on western theories, which are rooted in free markets applied to developed countries. Therefore, they may not be fully applicable to developing countries and emerging economies, where the market mechanisms are often inefficient and related legal systems are incomplete ^[22]. China, as the largest developing country and one of the largest overall carbon emitters in the world, is a good sample for expanding related research.

3. Outcomes of Supply Chain Concentration

Supply chain concentration is an important feature of an enterprise's supply chain structure, including two dimensions, supplier concentration (SUP) and customer concentration (CUS), which reflect the degree of dispersion of upstream suppliers and downstream customers, respectively, in the supply chain ^[23]. We find that previous researches on the impact of SCC have mainly focused on three aspects, namely, economic consequences for firms, corporate management decisions, and corporate capital market performance ^{[10][11][14][15][24][25]}. The details are as follows. Economic consequences mainly include SCC and corporate performance, financing capabilities, capital results, and cost management. Kwak and Kim (2020) ^[10] found a U-shaped relationship between CUS and supplier profitability that weakens along with an increasing equity proportion of insiders involved in company management. Chod et al. (2019) ^[24] found that retailers with dispersed suppliers obtain less trade credit than those whose suppliers are more concentrated. Meanwhile, corporate management decisions mainly include SCC and accounting decisions, inventory management, corporate innovation, commercial credit supply, and corporate investment. Zhong et al. (2020) ^[11] revealed a significant inverted U-shaped relationship between CUS and corporate sustainable innovation. Using Chinese firms as examples, Zhang et al. (2020) ^[15] found that high-SUP firms are inclined to hold more cash due to precautionary concerns. Capital market performance mainly includes SCC and dividend policy, stock price, and stock price collapse risk. Lee et al. (2020) ^[14] argued that CUS may represent the source of significant cash flow and business risks for supplier firms and found that corporate customer concentration is positively correlated with a stock price crash risk, while government customer concentration is negatively correlated with a stock price crash risk. Cheng et al. (2020) ^[25] investigated Chinese companies during the COVID-19 crisis and found that a higher degree of SUP was related to more serious stock price declines over the short-term and medium-term windows right after the Wuhan lockdown.

In general, the research on the impact of SCC presents three perspectives. One view is that increasing SCC positively affects companies. Operations management and marketing literature point out that a high concentration

of enterprise suppliers (customers) corresponds to a closer relationship between the firm and its suppliers (customers) and is conducive to information sharing among enterprises, which will reduce suppliers' demand uncertainty and promote JIT manufacturing ^[26]. For customers, coordination and information sharing activities with key suppliers that provide the firm with insights into suppliers' processes, capabilities and constraints, ultimately enable a more effective product and process design, improve the efficiency of goods acceptance and lower the transaction costs. ^[12] However, the opposite view is that increasing SCC adversely affects enterprises because a higher-SUP (CUS) will drive the overreliance of companies on upstream (downstream) firms. On the one hand, such overreliance will increase the firms' business risk (e.g., large-scale interruption of raw materials and reduction in sales) and the cost of their equity capital ^[27]. On the other hand, companies will lose their bargaining power and be forced to make concessions in product prices, trade credit, and so on in supply chain games, which is not conducive to a better financial performance or R&D intensity ^{[28][29]}. Some scholars have combined these two perspectives and propose that the impact of SCC on companies changes over time. For example, Irvine, Park, and Yıldızhan (2016) ^[30] found that the relationship between customer concentration and profitability is negatively correlated at the early stage but becomes gradually positive as the relationship matures. In sum, the impact of increasing SCC on enterprises is multifaceted and complex, and, regardless of whether the pros or cons of increasing SCC will vary across different research objects and contents, researchers and managers should analyze specific problems. However, no previous study has specifically explored the relationship between SCC and CER and the related impact mechanism.

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