
CSR for National Growth and Global Stability within the Era of Dual-carbon

Abstract

At present, the construction of ecological civilization has entered the development strategy of peak carbon dioxide emissions and carbon neutrality, which has promoted the overall green transformation of economy and society. Considering the fact that the existing literature seldom studies the fulfillment of corporate social responsibility (CSR) by each subject in logistics operation under the background of "double carbon", this paper systematically analyzes the conflicts among upstream enterprises, downstream enterprises and multiple government subjects in supply chain in fulfilling CSR in logistics operation by using F-H method. The results show that, in theory, the conflict problem can get four globally stable outcomes. Combined with the differences of national policies in practice and the different value propositions of each subject in logistics operation, the global stability outcomes chosen by upstream and downstream enterprises and the government will be different. According to the current "double carbon" goal, the common stability outcomes of all parties to the conflict are further analyzed. The results show that the parties to the conflict are most likely to choose the overall stable outcome: the upstream and downstream enterprises in the supply chain fulfill corporate social responsibility (CSR), and the government subsidizes the enterprises. Based on this, some suggestions are put forward for the development of logistics enterprises.

Keywords: dual-carbon; corporate social responsibility (CSR); conflict analysis

1.Introduction

Corporate social responsibility (CSR) is to analyze the impact of enterprises on society and environment from the perspective of non-financial information. The most obvious manifestation of logistics industry in corporate social responsibility is the impact on the ecological environment, and it is also a key area committed to

achieving the goal of dual-carbon. In the report of the 20th National Congress of the Communist Party of China, our party proposed that the future should be transformed into intelligent and green, relying on new energy, artificial intelligence, high-end equipment and other new profit growth points, to achieve high-quality development, with the help of the Internet of Things to realize the interaction of logistics and information flow, build a convenient, efficient and smooth circulation system, and realize the rationalization of logistics. Nowadays, transportation, warehousing, packaging, distribution and other links in logistics operation management consume many resources. How to coordinate economic and sustainable development has become the general trend. How to transform to green logistics and fulfill their social responsibilities in the context of dual-carbon has become a research hotspot. The research purpose of this paper is to find out that the upstream and downstream enterprises and governments of the logistics supply chain will inevitably appear conflicts for their own interests under the dual-carbon target, and put forward relevant suggestions.

2.Literature Review

With the development of e-commerce platform, the volume of trade is increasing, and the momentum of logistics development is rapid. After China put forward the goal of dual-carbon, the operation of green logistics has received more attention and discussion, and the corporate social responsibility and environmental problems it brings have been paid more and more attention.

2.1 The concept of corporate social responsibility

Nowadays, many companies are engaged in CSR research. Ni et al. (2015) ^[1] mainly analyzed the benefits and social benefits of CSR performance of upstream and downstream enterprises in the supply chain. Fan et al. (2017) ^[2] had found that not only involves the product quality decisions of manufacturers and retailers in the upstream and downstream of the supply chain under the performance of CSR, but also regards the government as a relevant stakeholder. Moreover, Liu (2020) ^[3] had systematically analyzed the representative CSR reports of logistics enterprises that

have been released, and then summarizes the problems of corporate social responsibility and report release. Later, Liang (2022)^[4] had verified the relationship between corporate performance and CSR performance from the perspective of corporate management. Consistent with previous studies, Yang (2023)^[5] believes that the salary of executives of listed (deep A-share) enterprises affects the CSR performance of logistics enterprises, while the confusion and lag of internal management of enterprises will delay the practice of social responsibility.

You(2023)^[6] studies that social responsibility norms affect corporate social responsibility through political leaders, corporate executives, employees and the public. An enterprise headquartered in a city with more responsible social norms still shows a higher ESG score after excluding demographic, regional and economic factors. Social responsibility norms encourage enterprises to be more responsible, but they are ineffective in preventing irresponsible corporate behavior. Jackson, S.et al(2023)^[7] thinks that the government plays an important role in promoting enterprises to fulfill their social responsibilities, and the introduction of reasonable policies is conducive to the coordinated development of social economy and environmental protection. Xin, Yi, and Du (2022)^[8] verified that digital finance is positively related to the fulfillment of corporate social responsibility in pollution-intensive industries by using the data of listed companies in China and the digital finance inclusion index (PKU_DFIIC) in China, Peking University. The research holds that the government should increase its support for the development of digital finance to promote the corporate social responsibility of pollution-intensive industries and the green and sustainable development of the economy. Zeng, Wang, and Zhang^[9] (2022) Select the panel data of listed companies in China from 2010 to 2018, and use the fixed effect model to analyze the impact of economic policy uncertainty on corporate social responsibility from the short-term and long-term perspectives. The results show that in the short term, the uncertainty of economic policy is mainly manifested in the risk effect on enterprises, thus damaging corporate social responsibility. However, in the long run, the uncertainty of economic policy is transformed into the impact of policy dividends on enterprises, which has a positive

effect on corporate social responsibility. In addition, the test of intermediary mechanism and parallel intermediary mechanism shows that business risk and financial performance play a significant intermediary role between economic policy uncertainty and corporate social responsibility. The results of heterogeneity test show that the uncertainty of economic policy has a significant impact on corporate social responsibility among executives with non-overseas background and low proportion of independent directors. Cheng et al. (2023)^[10] thinks that enterprises should pay more attention to sustainable development, thus reducing emissions while maintaining their competitive advantage. The results of the study provide suggestions for researchers and practitioners on the balance of economic, environmental and social responsibilities of multinational corporations.

These results mainly study the development of enterprises in the supply chain, and do not involve the related research on CSR performance in logistics operation under the goal of dual-carbon.

2.2 The corporate social responsibility and its conflict

Under the goal of dual-carbon, the conflict between upstream and downstream enterprises in logistics supply chain is more typically met. As early as the 1980's, Fraser and Hipel^[11] proposed an effective method for studying conflict problems, named the F-H model. Many scholars have carried out research based on this theme, such as Zhao (2010), Li (2017), and Chen (2018)^[12-14]. In the theme of water resources allocation, the model is used to analyze the contradiction of interest distribution among all parties. Hu et al. (2017)^[15] used the F-H analysis method to clarify the issue of migrant workers' wage collection, and concluded that only when the rights and interests of workers are protected can labor disputes be reduced or eliminated. Wang et al. (2021)^[16] used the F-H model to identify conflicts in land use issues in the Lijiang River Basin and proposed different land management schemes. The F-H method can solve the conflict problems of the parties well and make them get satisfactory decisions.

Prabawani et al. (2023)^[17] In 2021, the Indonesian Ministry of Environment and Forestry issued the latest regulations on the rating and evaluation mechanism of

environmental business, and introduced enterprise social innovation (CSI). It is found that proper planning is an important driving factor of corporate social innovation (CSI) in Indonesia, and it is also an important experience to promote the transformation from CSR to CSI. Abuya(2016)^[18] takes Kenyan people's dissatisfaction with Tiomin (K) Company's mining operations as an example, and calls on enterprises to change from simply fulfilling CSR to multi-win and mutually beneficial development, so as to minimize mining conflicts. Velásquez(2012)^[19] explained the role of scientific research in the cooperation and conflict of mining exploration in the highlands of Ecuador, and analyzed the difference between enterprises consciously fulfilling their corporate social responsibilities and fulfilling their legal obligations.

While the existing researches on the CSR performance of logistics enterprises is relatively few under the goal of dual-carbon, this paper selects the node enterprises at all levels in the supply chain and the government as the main body of behavior, and uses the F-H method to systematically analyze the conflict phenomenon of CSR performance of multi-agents in operation. Combining the differences of national policies and the different value propositions of upstream and downstream enterprises, this paper studies the decision-making tendency of each node enterprise in the supply chain to practice corporate social responsibility under different choices, and then formulates the most stable and reasonable solution.

3.Methods

3.1 The Main structure of the conflicts between logistics supply chain operators and CSR performance

Since energy consumption and environmental problems cannot be completely dependent on market regulation, government participation is needed. Therefore, this paper selects the behavior subjects in logistics operation, which are the upstream enterprises led by logistics service providers, the downstream enterprises led by logistics service demanders, and the other subject is the government. Among them, the CSR of upstream and downstream enterprises in the supply chain is to focus on

social responsibility, reduce energy consumption and protect the environment. The main responsibility of the government is to supervise the behavior of enterprises. In this process, the increased logistics costs due to CSR have made the conflicts between the parties increasingly prominent. The specific performance is that upstream and downstream enterprises will reduce their logistics costs by increasing the price of logistics services with the participation of the government.

3.2 The construction of the conflict model of CSR sharing of each subject

In this paper, the modeling language of F-H method is expressed as: $G = (N, Q, V, UI)$. Here, N is the set of players, $i \in N = (1, 2, \dots, i, \dots, n)$, i is the i player; q is the set of all possible outcomes that can be obtained, $Q = (q_1, q_2, \dots, q_m)$, q represents the combination of strategies generated by different choices made by each player, resulting in a total of m feasible outcomes; V represents the preference ranking of players for all feasible outcomes; UI represents the unilateral improvement situation set of the player's preference ranking. The F-H method is to formulate a relatively satisfactory plan for everyone in the game by constantly changing their own strategies, so as to better solve the conflict of people in each game and promote their own better development.

3.3 The players and their strategy

The conflict subjects involved in this paper are upstream enterprises, downstream enterprises and government of logistics supply chain. In order to protect the autonomous rights and interests to the greatest extent, the conflict subject mainly obtains the transformation and improvement of the outcome by changing the controllable strategy. Therefore, upstream enterprises have the following two choices: (1) to fulfill CSR, (2) not to fulfill CSR, but to be funded by downstream enterprises and bear a series of costs related to CSR. Downstream enterprises have the following two strategic choices: (1) fulfill CSR, (2) do not fulfill CSR, expect upstream enterprises to fulfill CSR and bear all costs. The government's choice has the following two kinds: (1) compensation policy: that is, which enterprises practice CSR

will give financial support; (2) punishment policy: enterprises that fail to fulfill CSR should be sanctioned and punished at the government level. The specific performance of fulfilling CSR is to bear the increased cost of fulfilling CSR.

For the possible strategies of the players, a decimal number will be selected to express more clearly in the specific calculation process in order to calculate more easily and intuitively. The specific formula is: $q = x_0 * 2^0 + x_1 * 2^1 + \dots + x_n * 2^n$. According to the above three strategies, $2^{2+2+2} = 64$ basic outcomes can be obtained. However, these 64 basic outcomes are not all feasible in practice. Some outcomes are simply impossible to achieve and have no practical significance. For example, if the upstream and downstream enterprises in the supply chain choose not to fulfill CSR, the government cannot choose to compensate them. Vice versa, if the upstream and downstream enterprises of the supply chain actively practice CSR, the government cannot impose punishment on them. In summary, after all the outcomes appear, it is necessary to eliminate some illogical and completely meaningless situations. After deletion, 12 feasible situations will eventually appear, as shown in Table 1, 1 indicates that the policy is selected, and 0 indicates that the policy is rejected.

Table 1 Feasible outcome

The player	strategy	situation											
		Upstream enterprises	perform	1	1	1	1	1	1	0	0	0	0
	Non-performance	0	0	0	0	0	0	1	1	1	1	1	1
The downstream enterprises	perform	1	1	0	0	0	0	1	1	1	1	0	0
	Non-performance	0	0	1	1	1	1	0	0	0	0	1	1
Government	compensation	0	1	1	0	0	1	0	1	1	0	0	0
	Penalty	0	0	1	0	1	0	0	1	0	1	0	1
Decimal number		5	21	57	9	41	25	6	54	22	38	10	42

4.Result and Discussion

4.1 The priority

Shunfeng Express (SF Express) has received about 140 million yuan of government subsidies for green, energy-saving and logistics standardization projects in 2021. In 2021, the government subsidy of cold chain warehouse and container standardization project obtained by Zhong Chuang Logistics Company is about 7.6 million yuan reported by Sina Finance. In order to determine the priority of the parties to the conflict, this paper takes Shunfeng Express, Zhong Chuang Logistics Company and other listed companies in the logistics industry as samples, and analyzes their data on government subsidies. It is found that there are environmental protection and energy conservation, logistics cost subsidies or logistics standardization project rewards in government subsidy projects. It is found that enterprises and governments attach importance to green environmental protection and social responsibility, which provides a basis for the situation preferences of the following conflicting parties. At present, the world is paying more and more attention to ecological and environmental issues. The government tends to encourage upstream and downstream enterprises to cooperate to jointly assume corporate social responsibility and promote sustainable economic development. The upstream and downstream enterprises of the logistics supply chain hope that the other side will bear the cost of fulfilling CSR for their own interests.

Therefore, the judgment of government situation preference is based on the following principles: (1) both upstream and downstream enterprises consciously fulfill CSR and bear the cost of fulfilling CSR by negotiating product prices; (2) The combination of compensation policy and punishment policy. The judgment of the situation preference of upstream enterprises is based on the following principles: (1) they do not perform, requiring downstream enterprises to perform CSR and bear costs; (2) The government subsidizes downstream enterprises and hopes not to punish themselves; (3) Hoping to get government subsidies after fulfilling CSR costs. The judgment of the situation preference of downstream enterprises is based on the following principles: (1) do not assume their own, require upstream enterprises to fulfill CSR and bear costs; (2) The government subsidizes upstream enterprises and

hopes not to punish themselves; (3) Hoping to get government subsidies after fulfilling CSR costs. Through the above preference selection, the priority order of the conflicting parties is shown in Table 2.

Table 2 The situation preference vector ranking of players

The player	Situation preference vector ranking											
Upstream enterprises	22	6	10	21	57	25	5	41	9	42	38	54
The downstream enterprises	25	9	10	21	54	22	5	38	6	42	41	57
Government	21	5	57	54	25	22	41	38	9	6	42	10

4.2 The stability analysis

In the stability analysis, if a situation does not unilaterally improve the situation for player i , the situation is a reasonable stable outcome of player i , denoted by r . If a situation unilaterally improves the situation for the player i , making the outcome more beneficial to oneself and the improvement of the situation is not punished by other players, then the situation is called a unilateral improvement outcome, recorded as u . If player i unilaterally improves a situation, and for player j 's unilateral improvement situation, other players have unilateral improvement situation corresponding to it. But player i 's preference for other players' unilateral improvement situation is not as good as the original situation. The situation is called the continuous punitive stable outcome of player i , denoted by s ; in the conflict analysis of CSR performance, there is no simultaneous punitive stability. If a situation is a stable outcome for all players (continuous punitive stability, reasonable stability, and punitive stability), such an outcome is said to be a globally stable outcome, recorded as E , and the remaining outcomes are recorded as N . According to the above method, the stability analysis of the feasible situation of the upstream and downstream

enterprises and the government of the logistics supply chain is carried out. The final stability analysis results are shown in Table 3.

Table 3 Stability analysis results

The player		stability analysis										
All	N	N	N	E	E	N	E	N	N	N	N	E
	r	r	r	s	r	r	s	r	s	u	r	r
Upstream enterprises	22	6	10	21	57	25	5	41	9	42	38	54
				22			6		10	41		
	r	r	r	s	r	r	s	r	s	u	r	r
The downstream enterprises	25	9	10	21	54	22	5	38	6	42	41	57
				25			9		10	38		
	r	s	r	r	u	u	u	u	u	u	r	u
Government	21	5	57	54	25	22	41	38	9	6	42	10
		21			57	54	57	54	57	54		42

As shown in Table 3, the stable outcome of upstream enterprises can be obtained as (22 6 21 10 57 25 5 41 9 38 54); the stability outcome of downstream enterprises is (25 9 10 21 54 22 5 38 6 41 57); and the stable outcome of the government is (21 5 57 54 42). In the stability outcome of the three parties, the common stability outcome is (21 5 57 54), that is, the global stability outcome.

Through the above analysis, four global stability outcomes can be selected. They are the outcome 21, that is, both upstream and downstream enterprises in the supply chain choose to fulfill CSR, each enterprise is willing to bear the relevant expenditure, and the government subsidizes these enterprises. The outcome 5, that is, both upstream and downstream enterprises of the supply chain fulfill CSR and consciously bear all costs, while the government neither subsidizes nor punishes. The outcome 57, that is, the upstream enterprises of the supply chain practice their own CSR and pay

the corresponding cost, the downstream enterprises do not fulfill their CSR, the government subsidizes the upstream enterprises and punishes the downstream enterprises. The outcome 54, that is, upstream enterprises in the supply chain refuse to perform CSR, downstream enterprises choose to perform and take the initiative to bear the corresponding costs, and then the government punishes upstream enterprises and subsidizes downstream enterprises.

5. Conclusion and recommendation

5.1 Conclusion

Under the goal of dual-carbon, the problems for the cooperate social responsibility, resource consumption and environmental in the process of logistics operation occupy an important position. The upstream and downstream enterprises and governments of the logistics supply chain will inevitably have conflicts for their own interests. This paper uses the F-H method to study the conflict analysis between the upstream and downstream enterprises and the government of the logistics supply chain under the “dual-carbon” goal. In the current environment of achieving the “dual-carbon” goal, it has become a general trend for enterprises to actively assume CSR and take into account ecological benefits while achieving economic benefits. Although the logistics cost of enterprises will increase in this process, the government will subsidize enterprises and promote their structural transformation. Therefore, outcome 21 is the most likely global stable outcome for the upstream and downstream enterprises and the government in the logistics supply chain. On the basis of protecting the environment and improving social benefits, the cooperation between the upstream and downstream enterprises in the logistics supply chain can be achieved.

5.2 Recommendation

According to the previous research conclusions, this paper will put forward specific suggestions for logistics enterprises to fulfill CSR from the aspects of policy incentive, cost control, information construction and talent training.

- Introducing green development incentive measures for logistics enterprises

At the macro level, it is suggested that relevant government departments should actively encourage enterprises to implement energy conservation and emission reduction measures in the process of fulfilling CSR by logistics enterprises, increase support to promote the transformation and upgrading of logistics enterprises, and help achieve the dual-carbon goal while seizing economic benefits. On the one hand, it can be considered to improve the construction of regional logistics infrastructure and provide a harmonious, stable and safe business environment for related enterprises, minimize the uncertainty in the supply chain, improve the business performance of enterprises, and promote enterprises to better fulfill CSR. On the other hand, financial support can be given to the first-class enterprises in terms of financial incentives and financing green channels to enhance the enthusiasm of enterprises for green development.

- Improving the enterprise cost control strategy

Upgrading the traditional infrastructure of the enterprise, on the basis of taking into account social benefits and ecological civilization, the upstream and downstream enterprises of the supply chain can use new technologies such as artificial intelligence, cloud computing, Internet, and big data for data fusion, identify the core costs of each node of the enterprise 's operation, and refer to the data information fed back by other enterprises in the supply chain to carry out rational production and achieve effective control of the overall supply chain cost, prompting the enterprise to fulfill CSR. In addition, when conducting accounting calculations, enterprises should reasonably evaluate the monetary performance of green transportation, warehousing, distribution, packaging, etc., comprehensively regulate the cost of green logistics, and coordinate the environment and enterprise resources to rationalize logistics costs.

- Speeding up the supply chain information construction

First, consider the establishment of a regional logistics information platform led by the core enterprises of the supply chain. Each node enterprise of the supply chain can collect and publish data and information on the platform, so as to achieve interoperability and visualization of information; secondly, the enterprise implements the “wisdom plus sharing” logistics model, promotes the coupling and coordination of

various functional elements in the logistics system within the enterprise, promotes the improvement of the operational efficiency of the enterprise and the functional transformation and upgrading of the entire enterprise, accelerates the construction process of intelligent logistics, creates an interconnected and shared logistics ecosystem, and then realizes green and low-carbon development.

- Recruiting the high-quality logistics personnel

Enterprises should vigorously introduce more comprehensive high-quality talents who understand logistics, environmental science, green supply chain operation, and have a high sense of social responsibility, so as to bring more sustainable development and transformation suggestions for logistics enterprises, and then create higher economic benefits, taking into account social benefits and corporate responsibility, and finally achieve the dual-carbon goal.

Disclaimer

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