

Influence Mechanism of Environmental Regulation on Corporate Green Response

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Abstract—Resource and environmental issues have become an important factor limiting social production efficiency and human sustainable development. The environmental regulation of manufacturing enterprises has become the focus of attention. Based on the Stakeholder Theory and Porter's Hypothesis, this paper divided environmental regulation into five dimensions: government regulation, public regulation, media regulation, internal regulation and customer regulation; this paper also divided corporate green response into green innovation, employees' behavior, green products and processes, environmental investment and information disclosure. Meanwhile, the paper summarized moderating factors of the influence of environmental regulation on corporate green response from internal and external levels, and proposed a conceptual model of the influence mechanism of environmental regulation on corporate green response, and provided suggestions for the formulation of government green policies. The possible innovation lies in systematically constructing the connotation of environmental regulation and green response based on the actual operating environment of Chinese manufacturing enterprises.

Keywords—Environmental regulation; Green behavior; Social responsibility; Porter Hypothesis; Stakeholder

I. PROPOSAL OF THE PROBLEM

Resource and environmental issues are common challenges faced by mankind. Promoting green growth and implementing a green new policy are the common choices of the world's major economies. Resource and energy efficiency has also become an important factor in measuring the competitiveness of the country's manufacturing industry. Promoting green development is the inevitable way to enhance international competition. Chinese industry has not yet got rid of the high-input, high-consumption and high-emission development mode. The resource and energy consumption is large, and the ecological and environmental problems are more prominent, which has affected the sustainable development of the economy and threatened the future of mankind. Therefore, green manufacturing has become the common voice of various stakeholders.

In 2015, Chinese State Council issued the "Made in China 2025" strategic plan, which puts forward requirements for comprehensively promoting green manufacturing from three aspects: accelerating the green transformation and upgrading of manufacturing industry, promoting high-efficiency recycling of resources, and actively constructing a green manufacturing system. In the same year, the CPC Central Committee and the State Council proposed to play a synergistic role in promoting energy conservation and emission reduction, carry out energy-

saving and low-carbon actions for key energy-using units, and carry out demonstration activities for the demonstration of conservation-oriented public institutions and strengthen the management of emission reductions, continue to reduce the total discharge of major pollutants. Under the call of the central government, various ministries and local governments have also deployed and planned green manufacturing. In 2016, the Ministry of Industry and Information Technology released the "Industrial Green Development Plan (2016-2020)" to develop a green manufacturing system. In the same year, Tianjin City issued local standards for green supply chain. In 2017, the Ministry of Industry and Information Technology of Hebei Province issued the "Green Manufacturing System Construction Implementation Plan". In 2018, the Ministry of Commerce and other eight ministries and commissions jointly issued the "Notice on Conducting the Innovation and Application of Supply Chain", proposing a green supply chain system for the whole process of development. A wave of green manufacturing and environmental regulation has been set up everywhere.

Under the call of the central government, the local government environmental protection department regulates the green production behavior of manufacturing enterprises by enacting local regulations and enforcing environmental law enforcement. The public has also joined the ranks of supervising green production and promoting energy conservation and environmental protection. The environmental regulations of enterprises are made into systematic engineering for the synergy of different stakeholders. To what extent does different types of regulation promote the green behavior of enterprises, and the difference in the degree of influence under different situations is a question worth exploring. Based on the background of the integration of industrialization and informatization in China, this paper explores the influence mechanism of environmental regulation on corporate green behavior based on literature review, and provides feasible suggestions for the formulation of government environmental protection policies.

II. RELATED RESEARCH ON ENVIRONMENTAL REGULATION

A. Micro level

Many researchers examined the impact of environmental regulation on corporate value, validated the Porter Hypothesis, and recommended that companies enhance sustainable value by strengthening environmental investment and promoting technological capital accumulation. Zhang Feng and Tian Wenwen (2018) examined the contingency impact of environmental regulation on technology innovation and found

that local government environmental regulation helps to stimulate enterprises to engage in exploratory innovation, while the incentives for development-oriented innovation are not obvious; the use of “officials replacement” to describe environmental regulation uncertainty will weaken the stimulating effect of environmental regulation on innovation, and using time spent dealing with regulatory agencies to characterize regulatory bureaucracy will also weaken the positive effects of environmental regulation [8].

B. Industry level

Many researchers analyzed the differences in innovation behaviors of industrial industry in response to environmental regulations and the impact of different innovation behaviors on industrial innovation performance, the reasons for the regional differences in the role of environmental regulation in improving China's technological innovation capability. It was found that the threshold effect of different types of environmental regulation on green economy efficiency varies in different regions and periods.

Cai Wuzhan, Zhou Xiaoliang (2017) found that the indirect effect of environmental regulation on green total factor productivity is affected by the regional technology innovation, factor structure and the heterogeneity of FDI level. The most influential path is the element structure [11]. Wang Xiaohong and Feng Yanchao (2018) found that there is an inverse U-type nonlinear relationship between energy-saving and emission-reduction environmental regulations and China's circular economy performance [2].

III. RESEARCH ON THE CORPORATE GREEN RESPONSE

A. Enterprise green decision

Hao Zutao (2014) used the Entropy Weight Decision Model to identify the key factors affecting the green behavior decision-making of resource-based industrial clusters, and further horizontally compare and analyze the key differences of key factors affecting the green behavior decision-making of different nature enterprises, and found the expected Revenue-driven and environmental regulation constraints are the two types of root causes that influence corporate green behavior decisions [17]. Based on stakeholder theory, resource-based view theory and group environment dynamics theory, we can use evolutionary game analysis to explore the evolutionary mechanism of green behavior motivation and green behavior decision-making to construct structural equation of influencing factors on green decisions.

B. The cause of the green response of the enterprise

Some researchers constructed the enterprise's adoption model for green technology from the perspective of enterprises and individuals, and analyzed the influencing factors of green innovation technology adoption behavior. Li Dongwei (2016) constructed an corporate green response evaluation index based on the characteristics of environmental management process. Through Cluster Analysis method, the green response practice of Chinese enterprise was divided into five types: non-fulfillment, passive performance, active performance, environmental excellence and leadership advantage to reflect the state of practice from negative avoidance to active response, and regression analysis was used to verify that environmental

visibility is an important factor in predicting the corporate green response [17].

IV. RESEARCH ON THE RELATIONSHIP BETWEEN ENVIRONMENTAL REGULATION AND CORPORATE GREEN RESPONSE

Xia De (2015) selected 533 respondents from 98 companies in Chinese manufacturing industry to test the linkages between variables in the green technology decision-making process, and used the Integrated Structural Equation Model to test the complexity of the company's technology adoption and measure the task orientation. The impact of the environment (direct stakeholders, market environment, financial and social dynamics) and the macro environment (legislative, social and technological development stages, etc.) on green technology choices [21]. Xu Shichun (2012) analyzed the impact of three environmental regulations (sewage tax, auction permit and tradable permit) on the green technology innovation of enterprises [18]. The main influencing factors of enterprise emission reduction are the ability of green technology innovation, environmental regulation and the degree of incentives for corporate green technology innovation.

Xiao-xing Huang (2016) found that regulatory and customer pressures contributed to the organization's green response and improved green innovation performance [22]. Environmental regulation and technological innovation can influence the transformation models of different enterprises. From the perspective of heterogeneous of host countries, the differences exist in the impact of environmental regulation on the green technology innovation of the home country enterprises with different OFDI motivations. Environmental regulation in the eastern and central regions of China is positively affecting green innovation, while environmental regulation in the western region does not have a significant correlation with green innovation. Wang Yun (2017) found that when select negative media coverage of corporate environmental pollution as a proxy variable, media attention will significantly increase its environmental investment [10].

Wang Fengzheng and Chen Fangyuan (2018) found that board governance has a significant positive impact on corporate green technology innovation [5]. Some researchers found that executive gender has an important impact on corporate CSR decision-making. Wang Wang Fengzheng (2018) found that local government quality and environmental regulations significantly affect corporate green product innovation and green process innovation [7].

V. THE BOUNDARY OF THE INFLUENCE OF ENVIRONMENTAL REGULATION ON THE CORPORATE GREEN RESPONSE

Zhang Feng, Tian Wenwen (2018) found regulatory uncertainty characterized by official turnover will weaken the stimulating effect of environmental regulation on innovation; the regulation of bureaucracy characterized by time spent dealing with regulatory agencies will also weaken the positive effects of environmental regulation [8]. Some researchers found environmental regulation must be combined with certain human capital to promote technological innovation. Meanwhile, the influence degree is high in the eastern and central regions of

China and there is almost no effect in the western region. Wang Yun (2017) found that the intensity of environmental regulation has enhanced the media's focus on promoting environmental investment [10].

Hao Zutao (2014) found that the influence of CSR and ecological environment on the green behavior decision-making of state-owned enterprises is more significant than that of private enterprises [17]. Wang Fengzheng and Chen Fangyuan (2018) found that board governance has a significant moderating effect on the impact of environmental regulation on corporate green technology innovation [5]. Meanwhile, the institutional environment has a significant moderating effect on the relationship between executive gender and corporate CSR quality. And the willingness of green technology innovation has different mediating roles between different types of environmental regulation and green technology innovation behavior. Wang Fengzheng (2018) found that the quality of local government is positively moderating the impact of environmental regulation on corporate green product innovation and process innovation [5].

VI. CONCLUSIONS AND RECOMMENDATIONS

Environmental regulation will bring many different levels of influence, and the green response of the company is a significant factor. Many scholars have studied the green behaviors of different levels of enterprises under different environmental regulations. However, the classification of regulatory methods and green response forms is not comprehensive enough, and the effectiveness of different regulatory bodies and different regulatory tools on the corporate green response is different. Research is not yet sufficient. This paper divides environmental regulation into government regulation, customer regulation, media regulation, public regulation, and management regulation. The corporate green response is divided into green innovation, employee behavior, green products and processes, information disclosure, and environmental protection investment.

At the same time, the impact of environmental regulation on the corporate green response is bounded. This paper argues that the following variables have moderating effects in the impact of environmental regulation on corporate green adoption: executive heterogeneity (values, gender, willingness), social responsibility, political connections, human capital, financial development, board governance, regulatory processes, time and space differences, regulatory uncertainty (time of dealing with regulatory agencies, replacement of officials), nature of the enterprise, quality of local government. The above factors can

be divided according to the external environment and internal governance. On this basis, a conceptual model of environmental regulation affecting the corporate green response is constructed.

Environmental regulation is a systematic project involving the game of government, manufacturing companies, suppliers, downstream customers, end consumers, the public, and the media. When guiding policy makers to engage in green production, adopt green technologies, and carry out green innovations, they should not only be limited to adopting administrative means and legal regulations, but also exert the regulatory power of different entities in the social system to form collaborative linkage of environmental regulations. In addition, when implementing environmental regulations, relevant departments should pay attention to the differences in geographical, corporate nature and governance mechanisms, and corporate managers and so on. Only closely integrated with local conditions will the government maximize the effectiveness of environmental regulation.

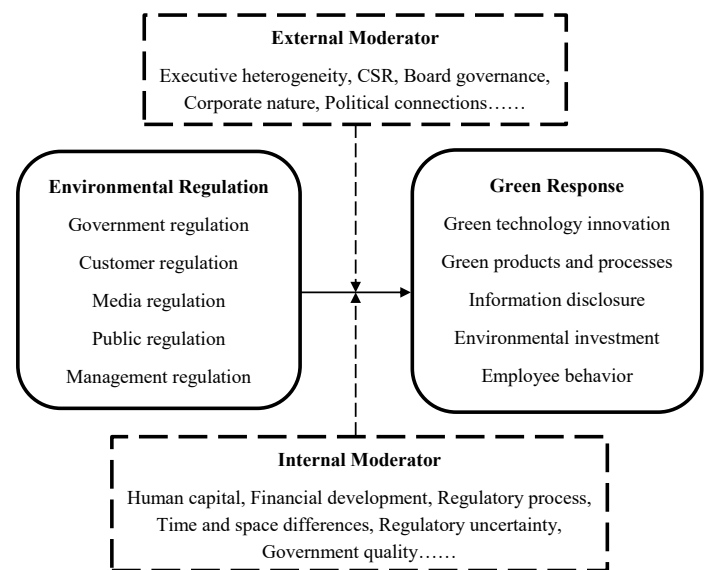


Fig. 1. Conceptual model.

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