Research on Psychological Driving Factors of Enterprise Green Innovation Strategy

Zhuo Jiang[*]

School of Economics and Management, Beihang University, Beijing 100191, China
*Corresponding Author.

Abstract:

The concept of green development is widely accepted all around the world. The enhancement of environmental awareness in various countries has greatly reduced environmental risks and improved the long-term sustainable competitiveness of enterprises. Enterprise innovation plays a positive role in enterprise environmental performance. This has been accepted by most scholars. However, in the process of production and operation, enterprises have different driving forces in environmental innovation, and most enterprises are unwilling to invest resources to green innovation activities. The implementation of enterprise green strategy and green innovation is affected and driven by a variety of internal and external factors. The research on the driving force of enterprise innovation is of great significance for green development implementation. Using Likert's five point scale to collect data, taking the questionnaire data of 574 industrial enterprises in 28 provinces in China as an example, and using structural equation model, this paper analyzes the driving factors on enterprise green innovation, including external factors represented by policy environment and market environment, and internal factors represented by enterprise strategy. The relationship between enterprise green innovation and environmental performance satisfaction, as well as the relationship between enterprise environmental strategy and enterprise business performance, are also studied. The main findings of this paper are as follows. Policy environment and enterprise strategy have a significant positive impact on enterprise green innovation. The policy environment specifically includes environmental policies, punishment measures, industry alliance guidance, green publicity and other factors. Enterprise strategy specifically includes enterprise development objectives, enterprise development level, enterprise reputation and enterprise industry status. The market environment is not enough to promote enterprise innovation, including investor opinions, consumer driven, horizontal competition, social responsibility pressure and other factors. We use financial status, management ability, R & D ability and managers' attention to measure the business level of the enterprise. Comprehensive environmental satisfaction, carbon emission satisfaction and energy intensity satisfaction are used to measure enterprise environmental performance satisfaction. So we find that enterprise strategy affects enterprise management level, and green innovation level has positive significance on environmental performance satisfaction. The conclusion of this study is of great significance to ecological environment protection and long-term development of enterprises. Both green policy and enterprise strategy have a positive driving effect on enterprise innovation. We should scientifically formulate green policies to guide enterprises to change from high energy consumption production to green development. At the same time, enterprise strategy also plays a direct role in

promoting environmental innovation. We should improve the green awareness and management ability of enterprise managers.

Keywords: *Driving factors, Innovation, Green strategy, Enterprise.*

I. INTRODUCTION

With the continuous development of modern industry, a series of problems have appeared in the global ecological environment. The concept of green development has been gradually promoted and widely recognized all over the world. In 1962, Rachel Carson introduced the great damage to the ecological environment caused by the traditional industrial social civilization in her book Silent Spring [1]. In 1972, Donella meadows et al. questioned the adverse impact of the industrialization growth model of high energy consumption and high pollution in western countries on long-term sustainable development in their book Limits to Growth [2]. In 1987. The World Commission on Environment and Development advocated the development and utilization of new energy, improve energy efficiency, weaken the impact of pollution and improve environmental benefits in the book Our Common Future [3]. In 1989, David pierce et al. wrote the book Blueprint for a Green Economy, put forward the concept of "green economy" for the first time, advocated the valuation of products and services in production and operation process, so as to coordinate and coexist the economy and environment and promote the realization of long-term sustainable development [4].

Since the 21st century, a new round of industrial revolution characterized by the deep integration of information technology and manufacturing industry is booming. Global scientific and technological innovation presents new development trends and characteristics. There is an obvious trend that new technologies replace old technologies and intelligent technologies replace labour-intensive technologies. The global industrial competition pattern has accelerated reconstruction, showing a new development trend. Emerging industries continue to innovate in technology, and enterprises have changed from high-energy consumption to green service. In the process of industrial development from high energy consumption to green service, the concept of environmental risk management and sustainable development has been further strengthened, and green technology innovation has become the future development direction.

This paper uses Likert's five point scale to collect data, takes the questionnaire data of 574 industrial enterprises from 28 provinces in China as an example, and uses structural equation model to analyse the impact of external factors represented by policy environment and market environment, and internal factors represented by enterprise strategy on enterprise green innovation level and enterprise management level, This paper studies the relationship between enterprise green innovation level and environmental performance satisfaction, and tries to find the path to improve enterprise environmental performance through the role of internal and external factors.

The marginal contributions of this paper are as follows:

Firstly, the existing literature mostly focuses on the impact of enterprise innovation on enterprise environmental performance, and rarely involves the empirical research on innovation driving factors. Starting from the enterprise level environment, studying the internal and external driving factors of product innovation is a supplement and improvement to the existing literature research.

Second, when the existing literature involves industrial environmental risk, most of the literature focuses on the environmental performance of one certain industry. This paper is based on the research of multiple sector samples of the secondary industry, which has a broader significance of universality.

Third, provide policy suggestions for green sustainable development. It provides a reference for the country to formulate enterprise supervision and management standards, and improve environmental protection related policies. This is of positive significance to enhance the social reputation of enterprises and promote the healthy development of enterprises, which is conducive to the long-term sustainable development of ecological environment.

II. LITERATURE REVIEW

2.1 Impact of Innovation on Enterprise Environmental Performance

With the gradual enhancement of people's awareness of environmental protection, Resource based view (RBV) was put forward by Wernerfelt in 1984 [5]. Its main point is that the tangible and intangible resources of enterprises are heterogeneous. These resources can be transformed into unique capabilities that other enterprises are difficult to copy and imitate. These capabilities and resources make the competitiveness of enterprises different. So that enterprises can maintain long-term competitive advantage. RBV theory holds that the development and success of enterprises depend not only on external factors, but also on internal characteristics. RBV helps us to analyze product innovation and environmental performance, because this view clearly recognizes the importance of intangible resources such as technology, corporate culture and reputation. Based on RBV theory and Porter hypothesis, the relationship between environmental risk and technological innovation has been widely discussed. Barney (1991) [6] studied the relationship between limited resources and sustainable competitive advantage, discussed four indicators of sustainable competitive advantage of enterprise resources, including value, scarcity, imitatability and substitutability, and analyzed the possibility and potential of different enterprise resources to produce sustainable competitive advantage. This paper studies the possible impact of sustainable competitive advantage resources on other business areas of enterprises.

According to the endogenous growth theory, technological progress brought by R&D investment can improve the utilization efficiency of natural resources and energy (Romer, 1990 [7]; Helpman, 1992 [8]). On this basis, Hart (1995) [9] put forward the natural resource-based view (NRBV) for the first time, emphasizing that enterprises should focus on long-term sustainable development rather than immediate

profits. Therefore, NRBV theory discusses the relationship between enterprise resource use and enterprise long-term sustainable performance. Porter hypothesis also puts forward a similar view that the comprehensive strength of enterprises is closely related to innovation ability and depends on the performance of innovation activities in cost saving (Porter and Linde, 1995 [10]).

Enterprise technological innovation improves energy efficiency, promotes energy regeneration, helps to improve enterprise environmental performance, and has a significant positive significance for improving the ecological environment.

Many studies show that R&D investment is of positive significance to improve enterprise environmental performance. Bostiana et al. (2016) [11] used network DEA method to estimate enterprise environmental performance, decomposed productivity change into efficiency change and technology change, and studied the impact of technological progress on environmental performance. Ghisetti and Quatraro (2017) [12] took environmental productivity as the measurement index and found that R&D investment related to environmental innovation improved the environmental performance of enterprises, and the regional departments with higher green technology level had better environmental performance. Zhao and Cheng (2019) [13] believe that technological innovation can also be called green innovation, or green technological innovation, which is an important link to improve the environmental performance of enterprises and can usually help enterprises achieve environment-friendly green development. They divided the effect of technological innovation on the improvement of enterprise environmental performance into two aspects: On the one hand, it is to avoid in advance, introduce green technology in the production process, reduce energy consumption and carbon emission, and improve environmental performance; On the other hand, it is post governance. Green technological innovation helps enterprises improve the level of environmental governance and more effectively deal with environmental problems caused by the production process.

2.2 Driving Factors of Enterprise Innovation

Further, scholars have studied the driving factors of innovation. Porter and van der Linder (1995) [10] pointed out in Porter's hypothesis that appropriate environmental regulation is conducive to promoting technological innovation, improving enterprise productivity and product quality, and offsetting the production cost brought by environmental investment, so as to improve the market profitability of enterprises, obtain market competitive advantage and promote the improvement of industrial productivity. Hojnik and Ruzzier (2016) [14] believe that there are two kinds of driving factors for enterprise innovation: external environmental factors and internal organizational factors.

Du et al. (2019) [15] further pointed out that the research on external driving factors highlights the restriction of environmental regulations, while internal factors emphasize the promotion of enterprises' own characteristics on technological innovation. Under the combined effect of external and internal factors, many enterprises, especially energy dependent enterprises, have adopted a series of technological innovation activities aimed at improving production capacity, reducing energy consumption and pollution

emissions, so as to avoid environmental regulatory penalties. The impact of market driving force on enterprise environmental performance mainly comes from investors, consumers, the public, competitors and so on. Aroa and Gang (1995) [16] explained in their monopoly theory that consumers with higher income tend to internalize the interests of products with environmental friendly attributes, so as to promote enterprises to actively reduce environmental pollution activities and improve the environmental friendliness of their products. Therefore, the market demand characteristics from consumers are a powerful force to promote enterprise green innovation. The environmental performance of similar enterprises in the same industry has a significant impact on the corporate reputation, which forces enterprises to take measures to improve environmental performance. Zhaofang Chu et al. (2018) [17] conducted a survey on 165 third-party logistics suppliers in China. The empirical results show that customer pressure and competitive pressure significantly promote the adoption of green innovation by third-party logistics suppliers. In the production process, they face the demand pressure from the community public. Padgett and Galan (2010) [18] studied corporate environmental performance and social responsibility (CSR), which believes that corporate social responsibility behavior can create assets that provide competitive advantages for enterprises and promote the improvement of community welfare, so as to meet the expectations of stakeholders.

The role of enterprise internal factors on environmental performance mainly refers to the impact of enterprise's own attributes on its environmental behavior mode, including enterprise scale, enterprise financial status, enterprise industry attributes, enterprise internal governance, enterprise R & D investment and so on. Gottsman and Kessler (1998) [19] studied the impact of financial status on the environmental performance of enterprises and found that the better the enterprise's financial status, the stronger the enterprise's awareness of environmental protection, so it is more inclined to show excellent environmental performance. Through a seven-year follow-up study on the data of 848 enterprises, Hrovatin et al (2016) [20] found that enterprises were promoted to make decision-making adjustments by environmental energy efficiency, including the cost of energy efficiency improvement, market demand expectation and industry attributes. Enterprises in different industries had different responses to environmental protection policy supervision and various pressures. At the same time, it was verified again that enterprises of different sizes had different status in energy efficiency improvement. It is believed that small and medium-sized enterprises with low energy consumption should become key regulatory objects.

Enterprise technological innovation activities are conducive to improve enterprise environmental friendliness, reduce enterprise environmental risks, optimize enterprise environmental performance, enhance enterprise long-term sustainable competitiveness, and have positive external effects. The driving force of enterprise innovation consists of external factors and internal factors. Different factors have different effects on enterprise innovation and enterprise environmental performance satisfaction.

III. DATA AND METHODOLOGY

3.1 Sample Overview

The samples used in this paper are 722 enterprises with more than 10 years of operation from 38 provinces in China, covering most industries such as construction, machinery, manufacturing, medicine, communication, mining, automobile and so on. This study carried out the survey in the form of questionnaire. Through the reverse questions set in the questionnaire, 148 questionnaires with contradictory answer logic were removed. A total of 574 valid samples were obtained, and the sample efficiency was 79.5%. Combined with the categories of driving factors of enterprise technological innovation in literature, this paper selects internal factors, including enterprise strategy, external factors, including green policy environment and green market environment to analyse the impact of enterprise management level, green innovation level and environmental performance satisfaction, measured by Likert's five level scale, from 1 to 5. The option score increases with the deepening of the question. For example, 1 indicates "very dissatisfied" or "very disagree", and 5 indicates "very satisfied" or "very agree". On this basis, the structural equation model is analyzed by AMOS software.

3.2 Model and Hypothesis

Taking the policy environment, market environment and enterprise strategic as the driving factors, we analyze the impact of each driving factor on green innovation and enterprise's business performance. Due to the interaction between various latent variables, the three driving types may have an impact. We build the structural equation model as Figure 1 for analysis.
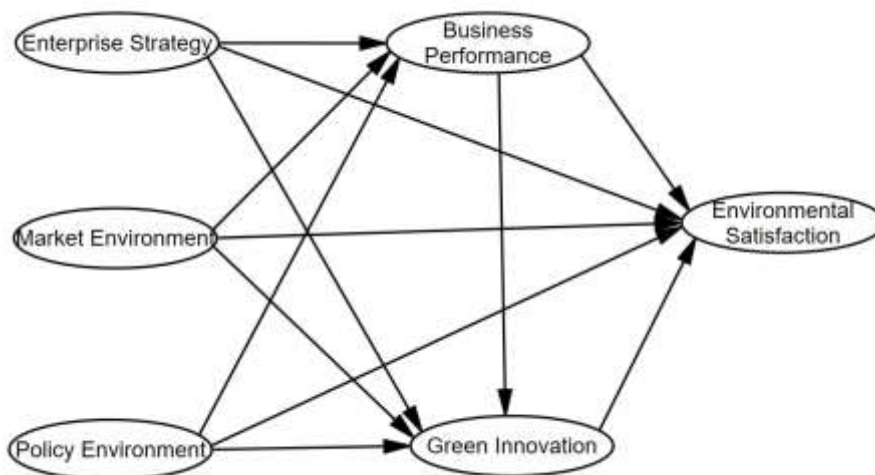

Fig 1: Enterprise innovation driven model

Policy environment, market environment and strategic positioning may have an impact on enterprise innovation level, operation level and environmental performance satisfaction. Enterprise operation level may affect enterprise innovation level, and both operation level and innovation level may affect environmental performance satisfaction.

The relevant theoretical assumptions are as follows:

H1: enterprise strategy has a positive impact on enterprise business performance

H2: enterprise strategy has a positive impact on green innovation

H3: corporate strategy has a positive impact on environmental satisfaction

H4: green market environment has a positive impact on enterprise business status

H5: green market environment has a positive impact on green innovation

H6: green market environment has a positive impact on environmental satisfaction

H7: policy environment has a positive impact on enterprise business performance

H8: green policy environment has a positive impact on green innovation

H9: green policy environment has a positive impact on environmental satisfaction

H10: business performance has a positive impact on the level of green innovation

H11: enterprise business status has a positive impact on environmental satisfaction

H12: green innovation has a positive impact on environmental satisfaction

According to relevant research literature, this paper divides the factors affecting enterprise innovation into three latent variables: green policy environment, green market environment and enterprise strategy. Each latent variable includes four elements. Dependent variables include three latent variables: enterprise green innovation level, enterprise business performance and environmental performance satisfaction. Among them, enterprise business performance includes four elements, and green innovation and environmental satisfaction each include three elements. The corresponding relationship between latent variables and explicit variables is shown in Table I.

TABLE I. Meaning and description of questionnaire variables

LATENT VARIABLES	LABLE	DESCRIPTION
ENVIRONMENTAL SATISFACTION	A1	I am satisfied with the environmental performance of the enterprise
	A2	Enterprise's carbon dioxide and other gas emissions have been controlled to a minimum
	A3	Enterprise's energy efficiency is very high
GREEN INNOVATION	B1	The enterprise has invested a lot of resources to carry out R & D and innovation of green production technology
	B2	The enterprise has a strong awareness of environmental innovation and attaches great importance to green development
	B3	The enterprise's green development strategy and environmental innovation policy are perfect and systematic
POLICY ENVIRONMENT	C1	Government environmental policies and regulations
	C2	Government environmental law enforcement and punishment
	C3	Guidance and requirements from industry associations or alliances
	C4	Environmental publicity and education
MARKET ENVIRONMENT	D1	Opinions of enterprise investors and sources of funds
	D2	Consumer behavior
	D3	Competitive pressure from similar enterprises in the same industry
	D4	Social responsibility and public opinion pressure
ENTERPRISE STRATEGY	F1	Enterprise development positioning objectives
	F2	Current development stage
	F3	Enterprise reputation and industry status
	F4	Enterprise scale
BUSINESS PERFORMANCE	G1	Financial status of the company
	G2	Enterprise management ability
	G3	Enterprise R & D capability
	G4	Enterprise managers' decision-making ability

3.3 Reliability and Validity Test

Before analyzing the relationship between latent variables, first test the reliability and validity of the questionnaire. In this paper, Cronbach's alpha coefficient is used to test the reliability of the questionnaire. The analysis results are shown in Table II. Cronbach's alpha coefficient of each latent variable is greater than 0.7, indicating that all parts of the questionnaire have good consistency in reliability.

TABLE II. Questionnaire Cronbach's alpha

CRONBACH'S ALPHA >0.7	DIMENSION	CRONBACH'S ALPHA >0.7
0.947	Environmental Satisfaction	0.809
	Green Innovation	0.795
	Policy Environment	0.839
	Market Environment	0.871
	Enterprise Strategy	0.900
	Business Performance	0.933

Using spss19 software to test the validity of the scale, taking principal component analysis and KMO and Bartlett spherical test, the results of Table III show that the KMO test value is 0.941, which meets the standard of greater than 0.9, and the significant level is less than 0.05, indicating that the scale has good construction validity.

TABLE III. KMO and Bartlett test

KAISER-MEYER-OLKIN		0.941
BARTLETT TEST	Approximate chi square	10145.771
	df	231
	Sig.	0.000

By constructing the first-order confirmatory factor analysis model (CFA) and using Amos 26 for analysis, according to the standardized analysis results, it can be seen from Table IV that the factor load of all elements is greater than 0.5 and the significance of all variables is less than 0.001, indicating that all variables have good fitting.

TABLE IV. Standardized regression weights

PATH			ESTIMATE	AVE	CR
A1	<---	Environmental Satisfaction	0.769	0.5735	0.8012
A2	<---	Environmental Satisfaction	0.726		

A3	<---	Environmental Satisfaction	0.776		
B1	<---	Green Innovation	0.875		
B2	<---	Green Innovation	0.86	0.6328	0.8351
B3	<---	Green Innovation	0.627		
C1	<---	Policy Environment	0.794		
C2	<---	Policy Environment	0.769		
C3	<---	Policy Environment	0.641	0.5666	0.8385
C4	<---	Policy Environment	0.796		
D1	<---	Market Environment	0.793		
D2	<---	Market Environment	0.816		
D3	<---	Market Environment	0.791	0.6306	0.8722
D4	<---	Market Environment	0.776		
F1	<---	Enterprise Strategy	0.845		
F2	<---	Enterprise Strategy	0.835		
F3	<---	Enterprise Strategy	0.838	0.6944	0.9009
F4	<---	Enterprise Strategy	0.815		
G1	<---	Business Performance	0.9		
G2	<---	Business Performance	0.942		
G3	<---	Business Performance	0.887	0.7851	0.9358
G4	<---	Business Performance	0.81		

In addition, according to the factor load of the corresponding measurement item in the CFA model, the construction reliability and mean variance extraction of each latent variable can be calculated (average variance extracted), the construction reliability of all latent variables of environmental satisfaction, green innovation, green policy environment, green market environment, enterprise strategy and enterprise business performance is greater than 0.8, and the corresponding average variance extraction is greater than 0.5, indicating that the combination reliability of the model is good and the internal quality of factor analysis is good.

IV. EMPIRICAL RESULTS

4.1 Factor Confirmatory Analysis

We use Amos 23 to construct the structural equation model of the relationship between six latent variables: environmental satisfaction, green innovation, green policy environment, green market environment, enterprise strategy and enterprise business performance, and conduct hypothesis test analysis. The estimated values of the path parameters are shown in Table V. The results of confirmatory factor analysis among various variables show that: The significance test results of only five paths are less than 0.05, and the other paths are not significant, so the model needs to be modified.

TABLE V. Standardized regression weights

PATH			ESTIMATE	S.E.	C.R.	P
Business Performance	<---	Enterprise Strategy	0.877	0.085	12.026	***
Business Performance	<---	Market Environment	0.113	0.1	1.272	0.203
Business Performance	<---	Policy Environment	-0.143	0.075	-2.265	0.024
Green Innovation	<---	Policy Environment	0.388	0.101	3.788	***
Green Innovation	<---	Enterprise Strategy	0.632	0.148	4.065	***
Green Innovation	<---	Market Environment	-0.352	0.131	-2.483	0.013
Green Innovation	<---	Business Performance	-0.147	0.088	-1.383	0.167
Environmental Satisfaction	<---	Green Innovation	0.972	0.047	18.731	***
Environmental Satisfaction	<---	Business Performance	0.069	0.052	0.993	0.321
Environmental Satisfaction	<---	Enterprise Strategy	-0.121	0.092	-1.144	0.253
Environmental Satisfaction	<---	Market Environment	0.084	0.079	0.901	0.368
Environmental Satisfaction	<---	Policy Environment	0.041	0.061	0.598	0.55

4.2 Model Modification and Fit

Delete the paths with low significance in the model, judge the fitness of the model, analyze the correlation of residuals, correct the relationship between latent variables in the model, and obtain the modified structural equation model, as shown in Figure 2.
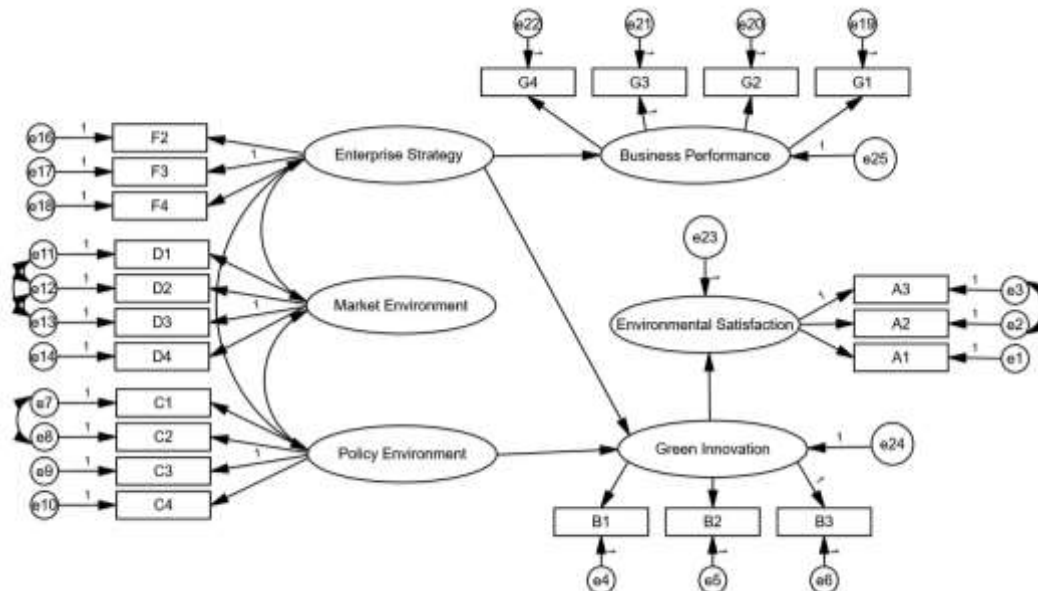

Fig 2: Modified enterprise innovation driven model

According to the final model, the four paths that enterprise strategy - > enterprise business performance, enterprise strategy - > green innovation, policy environment - > green innovation, green innovation - > environmental satisfaction are significant, and other assumptions have not passed the test.

TABLE VI. Structural equation model fit

INDEX	CHI-SQUARE/DF	GFI	RMSEA	PNFI	NFI	PGFI	NNFI	CFI
evaluation criterion	<5	>0.8	<0.08	>0.5	>0.9	>0.5	>0.9	>0.9
evaluation value	4.474	0.877	0.078	0.773	0.917	0.672	0.922	0.934
Fitting results	OK	OK	OK	OK	OK	OK	OK	OK

TABLE VII. Modified standardized regression weights

PATH	ESTIMATE	S.E.	C.R.	P
Green Innovation<---Policy environment	0.384	0.063	5.931	***
Green Innovation<---Enterprise Strategy	0.166	0.059	2.714	0.007
Environmental Satisfaction<---Green Innovation	0.953	0.043	20.277	***
Business Performance<---Enterprise Strategy	0.901	0.046	23.25	***

The estimated values of path parameters and model goodness of fit of the modified structural equation model are shown in Table VI. The fit goodness of the modified model is 4.474, which belongs to the acceptable range. The fit indexes such as GFI, RMSEA, PNFI, NFI, PGFI, NNFI and CFI are all within the acceptable standard range, and the model goodness of fit is good. The estimated values of path parameters of the modified model are shown in Table VII. Each path is significant.

V. CONCLUSIONS

Based on the theory and practice of green strategy, this paper studies the driving effect of internal and external factors such as enterprise strategy, policy environment and market environment on enterprise environmental innovation, analyses the impact of enterprise strategy on enterprise business performance, studies the impact of enterprise innovation level on enterprise environmental performance satisfaction, and studies the interaction relationship between six potential variables.

As shown by the results of structural equation model analysis, policy environment and enterprise strategy have a significant positive impact on green innovation, and the impact of policy environment on green innovation is deeper and more significant. While the market environment is not strong enough to drive enterprise innovation. Enterprise strategy has an impact on enterprise business performance, and green innovation has an impact on environmental performance satisfaction.

The above conclusions are of great significance for the development of industrial enterprises. First, the green policy environment plays the most important role in driving enterprise innovation, which means that in policy formulation, the government, industry regulatory departments and relevant departments should

accelerate the industrial transformation and upgrading, promote the enterprises transformation from energy consumption production to green development, reasonably guide the enterprises future development direction and promote green sustainable development through scientific policies and regulations. Second, the enterprise green strategy also plays a direct driving role in environmental innovation. The enterprise should optimize the governance system, strengthen the awareness of green development, improve the management decision-making ability, formulate the green development strategy based on long-term sustainable development, promote the enterprise green strategy implementation, and make an enterprise contribution to social ecological and environmental protection.

REFERENCES

[1] Rachel Carson. Silent Spring. Oxford University Press, 1962.

[2] Donella Meadows, Jorgen Randers, Dennis Meadows. Limits to Growth: A Report to the Club of Rome, 1972.

[3] World Commission on Environment and Development. Our Common Future. Oxford University Press, 1987.

[4] David Pearce, Anil Markandya and Edward B. Barbier. Blueprint for a Green Economy. Earthscan, London, Great Britain, 1989.

[5] Birger Wernerfelt, A resource-based view of the firm. Strategic Management.1984, 5(2): 171-180.

[6] Barney, J., Firm resources and sustained competitive advantage. J. Manag. 1991, 17(1): 99-120.

[7] Romer, P., Endogenous technological change. J. Polit. Econ. 1990, 98: 71-102.

[8] Helpman, E., Endogenous macroeconomic growth theory. Eur. Econ. Rev. 1992, 36: 237-267.

[9] Hart,S.L., A natural-resource-based view of the firm. Acad.Manag. Rev. 1995, 20(4): 986-1014.

[10] Porter, Michael E., Van der Linde, Claas, Toward a new conception of the environment competitiveness relationship. J. Econ. Perspect. 1995, 9 (4): 97-118.

[11] Bostiana,M., Färeb,R., Grosskopf, S., Lundgrenc, T.,Environmental investment and firm performance: A network approach, Energy Economics. 2016,57: 243–255.

[12] Ghisetti,C., Quatraro,F., Green Technologies and Environmental Productivity: A Cross-sectoral Analysis of Direct and Indirect Effects in Italian Regions. Ecol. Econ.2017, 132:1-13.

[13] Zhao F., Cheng S.S., External pressure, technological innovation and enterprise environmental performance——a mediation model. Study & Exploration, 2019, 287(6): 144-150.

[14] Hojnik,J., Ruzzier,M. What drives eco-innovation? A review of an emerging literature, Environ. Innov. Soc. Tr. 2016, 19: 31-41.

[15] Du, Y., Li, Z. Y., Li, N., Yan,B., Public environmental appeal and innovation of heavy-polluting enterprises, J. Clean. Prod. 2019, 222: 1009-1022.

[16] Arora S, Gang opadhyay S. Towards a Theoretical Model of Voluntary Over-compliance. Journal of Economics Behavior Organization, 1995(28):289-309.

[17] Zhaofang Chu, Jinghong Xu, Fujun Lai, and Brian J. Collins. Institutional Theory and Environmental Pressures: The Moderating Effect of Market Uncertainty on Innovation and Firm Performance. IEEE Transactions on Engineering Management 2018, 65(3): 392-403.

[18] Padgett, R.C., Galan, R.I. The Effect of R&D Intensity on Corporate Social Responsibility. J. Bus. Ethics 2010, 93: 407-418.

[19] Gottsman,L., Kesslei,J. Smart Screened Investments: Environmentally Screened Equity Funds that Perform Like Conventional Funds. Journal of Investing, 1998,7(3): 15-24.

[20] Hrovatin, N., Dolsak, N., Zoric, J., Factors impacting investments in energy efficiency and clean technologies: empirical evidence from Slovenian manufacturing firms. J. Clean. Prod. 2016, 127: 475-486.