International Journal of Smart Home
Vol. 10, No. 2, (2016), pp. 153-164
http://dx.doi.org/10.14257/ijsh.2016.10.2.15

Research on the Management Innovation in Green Supply Chain: an Empirical Analysis based on Probit Model

Xueling Nie

School of Business Administration, University of Science and Technology Liaoning, Anshan 114051, China

Abstract

Green supply chain management joined the concept of environmental friendly, so it received more and more attention from governments, academia and the business community after its concept have been proposed. In this paper, we test the management innovation diffusion in green supply chain by using Bass model, the result shows that green procurement and ecological design has always been the important factors, which influence enterprises whether to adopt green supply chain management or not. Other factors in turn are the enterprise internal environment management, investment recovery and customer cooperation. Study shows that the implementation of green supply chain management will not only improve the environmental performance of enterprises, but also enhance the economic performance of enterprises, so as to achieve the win-win effect.

Keywords*: Management innovation; Green Supply Chain Management; Diffusion; Bass model; Chasm phenomenon*

1. Introduction

With gradual improvement of environmental laws and regulations increasingly perfect and public environmental awareness, the environmental management of enterprises has attracted much attention and also with one of the most important manifestation of the economic globalization and the economic globalization, the globalization of manufacturing, manufacturing the competition between enterprises gradually by the supply chain competition replaced. As the US supply chain management expert points out, 21th Centuries is not the competition between enterprises and enterprises, but the competition between the supply chain and the supply chain [1]. Green supply chain management is based on the supply chain management to join the concept of environmental friendly, so since its concept proposed, more and more attention from governments, academia and the business community. China has a large population, although the number of resources, but the per capita resources amount to do resource failure [2]. To this end, the Chinese government from a strategic height to take a new road to industrialization vigorously develops the circular economy, the development of new energy, carbon reduction and other macroeconomic measures involving the people's livelihood. So China scholars and manufacturing industry pay more and more attention and began to explore China's manufacturing industry how to deal with the new competition situation and the environment brought to the enterprises by the challenge, enhance enterprise's environmental management ability is one of the important content. And green supply chain management is one of the important tools to achieve this goal, enterprises want to get in to environment friendly as new elements of competition of competitive advantage, need from original based on terminal management change management models for life cycle environmental management mode, "from cradle to grave" or further "from cradle to cradle" management mode; need to achieve from the resources development, product design, production, distribution, use and recycling of waste management activities such as environmental friendly[3-4]. China's manufacturing

ISSN: 1975-4094 IJSH

industry in the challenge facing the international competition and unified global market formation, through the development of green supply chain management to enhance corporate environmental friendly degree and gain a competitive advantage is particularly important and urgent.

In manufacturing enterprises to carry out green supply chain management, is of strategic importance to the sustainable development of manufacturing industry, the manufacturing industry directly reflects a country's level of productivity, is an important factor in the difference between developing countries and developed countries, it in the national economy of the developed countries in the world occupies an important share. Since the reform and opening up, China's manufacturing industry has been rapid development. As a very important category in the industry and even the national economy, the manufacturing industry has received extensive attention, and has gradually become the material foundation of the national economy and the main body of the industry[5]. Therefore, it is very important to strengthen the development of green supply chain management in China's manufacturing enterprises, and to speed up the spread of green supply chain management in manufacturing enterprises. In the manufacturing enterprises to carry out green supply chain management, which is of strategic significance to the sustainable development of manufacturing industry of, research and manufacture enterprises in green supply chain management innovation diffusion model, has an important role to the understanding of enterprise to carry out the situation and the future development trend. This study aims to understand the green supply chain management in China's manufacturing enterprises between the spread of diffusion process, a comprehensive understanding of the integrity of the green supply chain management, this management innovation diffusion model, and identification of enterprise in the choice of whether to adopt the green supply chain management practice of the important elements, for the government formulate corresponding policies to provide a scientific basis.

2. Literature Review

2.1 Management Innovation Diffusion

Management innovation is defined as the adhere to the scientific principle of management, at the same time, update the management concept, using rich creative management methods and means, implement a seminal management, that is, to create a new, more effective resource integration paradigm. Progressive, non abrupt, discontinuous, and positive processes are management improvements, not fundamental innovations[6]. Measures to improve the quality of management as: to reduce costs, to maintain a longer period of time, to improve the ability to withstand risks. Management innovation and management innovation diffusion are two closely related concepts and processes. First of all, the difference is that management innovation is the first successful application of new management concepts, management practices, management innovation diffusion is the new management practice once again applied". Management innovation of new management practices, with advanced and complete novelty; management innovation diffusion in the process of new management practices, also has a novelty, but this novel is incomplete, only to imitate the enterprise[7-8]. Innovation management has a high uncertainty and risk; management innovation diffusion has risks and uncertainty, but due to new management practice has achieved via the application, the management of uncertainty has disappeared, economic uncertainty and risk has been for lower. Management innovation with high investment, innovation and diffusion of investment than the input of management innovation is low. At the same time, there is an important link between management innovation and management innovation diffusion, diffusion should take the innovation as the premise, and the expansion of its quantity should be realized to show its significance. They are the introduction of new management practices,

despite the meaning of "new" different, to imitate the enterprise, diffusion and new management practices are introduced, and the process of imitation also contains a continuous exploration, and their combination, improvement and innovation, which is also called imitation innovation. Therefore, innovation and diffusion are two different and complementary processes[9].

Management diffusion is defined as the management practice from one enterprise to another, or from one manager to another. Here, the diffusion of the object is the new management practice, a new concept of management, system, means, ways and means of the idea, design and application. At the same time, the spread of the object is not just a simple management practice, but has been successfully applied in some enterprises in the management practice, has been completed and other management and economic factors combined with the management of practice. The activities of introducing and applying the new management practice are the management innovation, while the activity of applying and imitating the management innovation is the innovation diffusion of management.

2.2 Green Supply Chain Management Innovation

Green supply chain management is considered as an enterprise's environmental management strategy, the core of which is the idea of using integrated management in the field of enterprise green supply chain management. Green supply chain management is not only the production management, but relates to product composition, production and use of the whole process that the original idea of supply chain management based on emphasizing environmental friendly consciousness, and achieved a long-term and stable strategic partnership between enterprises in the supply chain, Nagel also stressed technical support to play a key role in the green supply chain operations, these two points is that he thinks the green supply chain is different from the characteristics of the traditional supply chain[10]. Green supply chain management is a kind of design, purchase, production, distribution, use and reuse of environmental friendly environment, and the management strategy, action and cooperation relationship formed in the supply chain. The green supply chain management activities include not only the activities of manufacturing activities or product transformation, but also the improvement of the environment design and the operation process of the suppliers. Zhu thinks that the green supply chain management is in the supply chain management consideration and strengthen environmental factors, specifically is through, downstream enterprise cooperation as well as the enterprise various departments of communication, from product design, materials selection, product manufacturing, product sales and recovery of the whole process to consider the optimization of the overall benefit, and improve the environmental and economic performances of the enterprises, in order to achieve the sustainable development of enterprise and supply chain[11]. In the author's opinion, the green supply chain management is mainly in supply chain planning, organization, control, coordination, management process, to resource conservation, environmental protection, improve the enterprise's environmental performance and economic performance for the main purpose, make full use of and play all kinds of modern management techniques, effective integration of enterprise resources, realize the enterprise's sustainable development.

Innovation diffusion theory is widely used to describe the behavior patterns and decision-making process, explain the mechanism and predict a new product, new inventions and how to succeed. Green supply chain management, as an increasingly important environmental tool, has all the characteristics of innovation diffusion, it can be said that a management innovation. First of all, the green supply chain management is a clear purpose, save resources, reduce pollution emissions, improve environmental performance of enterprises, therefore has the purpose; green supply chain management emphasizes "reuse", making the original chain of traditional supply chain into a ring structure, the increase of reverse logistics, extended producer responsibility. Great changes of the traditional supply chain management mode, which has the change; green

supply chain management is to discard the original unreasonable things, emphasizing the ecological design, in the design, make the product easy disassembly, recycling of parts, in the choice of materials, to abandon the original development of the use of hazardous materials. The new material, which has a novelty; green supply chain management is advanced, compatibility, complexity, experimental and observational; green supply chain management is not a constant, it is with the international ring Environment, national policies and the enterprise's own situation, so it has timeliness and dynamic; green supply chain management to enhance corporate environmental performance and economic performance, but enhance the economic performance is relatively long-term, short-term performance for high investment. Therefore, at present the enterprise whether to adopt the green supply chain management is uncertain; green supply chain management requirements to carry out the relevant practices, including ecological design, green procurement, internal environmental management and supply chain on the other enterprises of environmentally friendly cooperation with, so it has high investment.

3. Green supply Chain Management Innovation Diffusion Bass Model

Green supply chain management has gradually become the enterprise to obtain and enhance the international competitiveness of the important practice. So it has got more and more attention of domestic and foreign enterprises, since the 1990s, the green supply chain management in China's large enterprises began to gradually spread, so far there are a large number of enterprises has been carried out and is considering to carry out green supply chain management practice. From the above analysis shows that the green supply chain management has a purpose, it aims to conserve resources, reduce pollution emissions, improve environmental performance of enterprises; green supply chain management with innovation, emphasis on "re-use", so that the chain of traditional supply chain into a ring structure, the increase of reverse logistics, extended producer responsibility. Great changes of the traditional supply chain management model; green supply chain management is new, it is not reasonable to discard the original things, emphasizing the ecological design, in the design, make the product easy to disassemble, zero parts recycling, in the choice of materials, to abandon the original harmful material, development the use of new materials; green supply chain management is advanced, compatibility, complexity, experimental and observational; green supply chain management has timeliness and dynamic, it is not immutable and frozen, along with the country International environment, national policies and the enterprise's own situation and change; green supply chain management with high investment, it requires to carry out the relevant practice, including ecological design, green procurement, internal environmental management and supply chain of other enterprises environmental friendly cooperation with. Green supply chain management has all the characteristics of innovation diffusion, so it can be said that it is a kind of management innovation.

3.1 Bass Model

Note that M for the implementation of the greatest potential for a number of enterprises green supply chain management, on behalf of all the possible implementation of the total number of enterprises of green supply chain management, M is unchanged, enterprises in the implementation of green supply chain management innovation diffusion Bass model for:

$$\frac{dN(t)}{dt}=\left(\alpha+\beta\frac{N(t)}{m}\right)(m-N(t))$$

Among them, α is innovation coefficient, α (m-N(t)) represents the imitation with a number of enterprises green supply chain management practice; β is imitation coefficient and β N(t) (m-N(t))/m through innovation with a number of enterprises green supply chain management. The analytical solution of the model is:

$$N(t) = m\frac{(1-e^{-(\alpha+\beta)t})}{(1+\frac{\beta}{\alpha}e^{-(\alpha+\beta)t})}$$

The general accumulation and diffusion curve Bass model for a s type curve, the shape of the curve depends on the parameters α and β. Curves in the t* time to reach the inflection point, the curve from the concave convex, the speed of the spread from the rise to fall. If α>β, that is, enterprises to implement green supply chain management mainly through the enterprise's own innovation. At this time, the diffusion model will be showing a similar logarithmic function of convex curve, diffusion rate at the initial moment after the biggest decline, description of diffusion for failure; if α<β that most enterprises implementation of green supply chain management is affected by the other enterprises, is to imitate other enterprises successful management practice, then the diffusion exhibits a S-shaped logistic curve, diffusion rate first increased and then decreased, diffusion success.

The bass diffusion model, there are three parameters: the implementation of a number of enterprises green supply chain management has the greatest potential to m, innovation coefficient α, imitation coefficient β, α and β as the core elements of this study. Innovation coefficient α is large, indicating that the manufacturing company of our country by using the possibility of green supply chain management is bigger, and then have what factors affect enterprise innovation with the possibility of green supply chain management. According to the previous research, this paper gets several main influence factors as:

1) ***Corporate environmental vision:*** corporate environmental vision is the long-term aspirations of the enterprise environment and the future situation, the blueprint for the development of the organization, reflecting the eternal pursuit of the organization. Environmental vision is the intersection of environmental strategy and corporate culture, which is not only the guide of environmental strategy, but also the navigation of enterprise culture. Enterprise environment strategy is the fundamental guiding ideology of enterprise as a whole, how to carry on the environmental management.

2) ***Leader support:*** green supply chain management innovation can not be separated from the support of the leaders. Due to the senior leaders in the development of the whole enterprise's special status and management control, or they personally put forward ideas into practice, or have a significant impact on the management innovation activities, so the entrepreneurs is a key figure in the success or failure of the management innovation. Enterprises to continue to innovate, we must first have to forge ahead of the innovative entrepreneurs. Middle managers, and green supply chain management practices can successfully carried out closely related to people, only middle managers know to carry out the importance and necessity of the green supply chain management practice, practice to smoothly, in the enterprise practice further improvement and innovation.

3) ***Environmental activity cost:*** the cost of environmental activity is one of the most influential factors that hinder the practice of green supply chain management. Even if the green supply chain management to implement better the enterprise can obtain the better performance improvement, but due to the short interest benefit is

not obvious, the high cost of disposal of hazardous materials, high cost of production of environmentally friendly products by environmentally friendly packaging costs higher, making some companies are still on the green supply chain management to maintain a wait-and-see attitude.

Imitation coefficient β is greater, indicating that China's manufacturing enterprises to imitate the possibility of green supply chain management more, then there is what factors will influence enterprises to imitate the green supply chain management, mainly in the following aspects.

1) ***Supply chain pressure:*** supply chain pressure and government laws and regulations are the two most important factors for manufacturing enterprises to imitate the use of green supply chain management. Elkington believes that the most important factor to force the enterprise to solve the environmental problems is the emergence of the "green consumption" trend. Many scholars found that "green consumption" has become more and more important. Here said the consumer not just end consumers, including downstream enterprises, when the downstream enterprises to carry out green supply chain management practice, requiring his suppliers also carry out environmental management activities, provision of goods if environmental friendly and so on. At the same time, the pressure on the supply chain is not only from the consumer, but also a cooperative enterprise.

2) ***Government laws and regulations:*** due to the increasingly severe environmental situation, governments have formulated relevant laws and regulations, including recycling laws and regulations to encourage enterprises to carry out environmental protection production, reduce waste of resources and environmental pollution. Laws and regulations of the government to promote enterprise management, product and process of environmental innovation at the same time, prompting more large enterprises or active or passive choice imitate the successful practice of other enterprises to complete the enterprise environmental management progress. However, there is another situation in fact. Although China has developed a series of environmental laws and regulations, but because of lax enforcement, or corporate law brings a fine of less than or even less than the cost of compliance with the law. This greatly dampen the enthusiasm of enterprises to carry out green supply chain management

3) ***Current and potential opportunities:*** green supply chain management as the previous quality management is bound to eventually to accepted by most of the enterprises used, therefore, as soon as possible the green supply chain management will likely bring more development opportunities for the enterprise.

3.2 Divide Theory

Moore Goeoffrey point out classical technology diffusion life cycle theory, put forward the "divide" concept. Namely: in the high-tech products "early market" and "mass market" between the two stages, there is a gap. Enterprises must try to overcome the gap, in order to achieve the real development. In each stage of technological development, enterprises will face the challenges of different nature. Five stages in each correspond to different kinds of customers: keen on new technology innovator, early adopters, early and late mass, outdated person laggards. Among them, between the early market by the innovators and early adopters and consists of early and late majority in the mainstream market exists at a chasm, it can cross the chasm is the proliferation of the success of the decisive factor. According to their own ideas, nature and attitudes to green supply chain management can also be divided into 5 different nature of the enterprise group:

1) ***Irmovators:*** they are keen on new things (including new technologies, new standards, new management practices, and so on), and they always want to be the first to try green supply chain management. Innovators in the bell curve in only a small part of.

2) ***Earlyadapters:*** early adopters are also a group of very far sighted people, if they see the green supply chain management is beneficial to their development, they are rarely mind cost. They want to find a breakthrough, rather than a simple improvement, so they are willing to try the green supply chain management. However, this part of the business for the mainstream market, is still a very small part of.

3) ***Earlymajority:*** a pragmatic, early mass is part of the mainstream market, the main and key part of the green supply chain management. Want to make the group enterprise adoption of green supply chain management is very difficult, because these enterprises has good after the operation, in the adoption of green supply chain management on the need to repeatedly to consider many factors, they are worried about the new management practice disrupted the original mode of operation but bring unfavorable results. Unwilling to take risks as well as the cost of attention is the two characteristics of the early public.

4) ***Latemajority:*** conservatives, the number of people in the late stage are almost the same as that of the early public. They have similar views and needs as early as the general public, but they are more conservative in their attitudes towards green supply chain management. These companies do not necessarily understand the green supply chain management, perhaps they are aware of the benefits of green supply chain management, but when it comes to the implementation of their own business, they will still shake the head.

5) ***Laggards:*** the number of the group and the number of the early recipient groups are about the same as the number of the early adopters. This group of companies will not consider the use of green supply chain management. The government in the process of promoting green supply chain management, to ensure that the old people will not affect the other group of enterprises to adopt the green supply chain management.

Green supply chain management will be very easy to spread in the early market, but to enter the mass market is a very difficult thing. Because mass market enterprises even seeing the early market enterprises to carry out green supply chain management practice and get a win-win environment and benefit, they will not be inviting, they think that is a handful of activists, the early market within the enterprise is not trustworthy, they are not in their learning of the model. Only when other mass market enterprises carry out the green supply chain management practices and obtain the environment and benefits of a win-win situation, they will begin to seriously consider whether the use of green supply chain management. Therefore, the formation of a gap between the early market and the mass market, this is the green supply chain management innovation diffusion gap phenomenon.

4. Empirical Analysis

4.1 Model Building

In the Probit model, each explanatory variable of the enterprise has a critical level of its own, and when the explanatory variables that can represent the innovation exceed the critical level, the innovation is adopted. Here, there are two problems, namely, to determine all the explanatory variables and the critical level. Five practical elements of

green supply chain management are as follows: internal environment management, green procurement, customer cooperation, product ecological design and investment recovery. These five elements are the key attributes that can be used to represent the green supply chain management activities and whether the green supply chain management has been adopted.

Let Xi is the i-th enterprises explanatory variables, X consists of IEM, GP, CC, eco and IR, on behalf of the internal environmental management, green procurement, including environmental needs of customers cooperation, ecological design and investment recovery, in order to understand the model, assuming a continuous index Z dependency on the theory of explanatory variable x as:

$$Z_i = \alpha + \beta_1 IEM_i + \beta_2 GP_i + \beta_3 \mathrm{CC_i} + \beta_4 ECO_i + \beta_5 IR_i$$

A as constant, IEM, GP, CC, ECO, and IR, respectively, the internal environmental management, green procurement, including environmental requirements of customer cooperation, product design, investment and recycling of individual characteristics of the i. Observations of the Zi for the i-th enterprise theory of continuous indexes, Zi is not observable, but we can distinction belonged to a category and belongs to another category of observation data. Probit model analysis to solve the parameters of the A and the estimate of the knife, but also to obtain information on the indicators Z. Assuming that X follows normal distribution or uniform distribution, Z is also subject to normal distribution or uniform distribution. Set Y to represent the discrete random variables of 0 and 1, the enterprise chooses to adopt the green supply chain management, it is 1; the enterprise does not choose to adopt the green supply chain management, it is 0. In the L moment, the assumption that Z* is the critical level of Zi, more specifically, is that:

- If **Zi≥Z***, it means enterprise adopt green supply chain management;
- If **Zi<Z**, it means enterprise don't adopt green supply chain management.

The data used in this research is a questionnaire survey, and the time is two times in 2014 and 2015. Questionnaire for internal environmental management, green procurement, including environmental needs of customers cooperation, product eco design and investment recovery implementation, 21 questions. Answer the question by five levels, namely 1 menas not considered; 2 menas prepared to consider; 3 menas considered; 4 menas ministry to carry out the practice; 5 menas comprehensively carry out practice. On behalf of the green supply chain management in the middle level of the enterprise, the final available questionnaire is 254. Respectively in 2014 and 2015 five explanatory variables for inspection, are consistent with the conclusions of normal distribution. In order to further investigate the actual cumulative frequency and expected cumulative probability between different, from the castration of normal P-P diagram, namely, the cumulative probability maps of the residuals can be seen that the residual based the on y = 0 under the uniform distribution. The vast majority of residuals of absolute values of less than 0.04 in that the normality of good.

4.2 Cluster Analysis

Based on cluster analysis and variance analysis, the types of manufacturing enterprises in the green supply chain management are identified. This study uses the two stage clustering and the two-way analysis of variance in SPSS. Among them, in 2014, 245 samples were classified as 3 categories: 133 samples (543%) of leading enterprises, 72 samples (29.4%), 40 samples of backward enterprises (163%). In 2015, 254 samples were classified as 3 categories: 141 samples (55.5%), 75 samples (29.5%) and 38 samples of backward enterprises (accounting for clever.0%).

Table 1. Cluster Analysis Results (2014)

category	number of enterprises	Effective percentage	Total percentage
Leading enterprise	133	54.3%	54.3%
Start-up enterprise	40	16.3%	70.6%
Backward enterprise	72	29.4%	100.0%
Total	245		100.0%

Table 2. Cluster Analysis Results (2015)

category	number of enterprises	Effective percentage	Total percentage
Leading enterprise	141	55.5%	55.5%
Start-up enterprise	38	15.0%	70.5%
Backward enterprise	75	29.5%	100.0%
Total	254		100.0%

4.3 Regression Analysis

Zi for the theory of the first I enterprise indicators, although the Zi is not observable, but we can distinguish it belongs to a specific category, such as leading enterprises, enterprises and backward enterprises. At the same time, based on the above analysis results, we set up:

$$y_i = \begin{cases} 1, & Z_i \geq Z^* \\ 0, & Z_i < Z^* \end{cases}$$

We make the coefficient regression of probit model. Using SPSS in linear regression tool, get the table 3.

Table 3. Regression Result

variable	2014			2015		
	coefficient	Sta.err.	T test	coefficient	Sta.err.	T test
IEM	0.072	0.026	2.761	0.051	0.023	2.196
GP	0.149	0.017	5.090	0.161	0.028	5.761
CC	0.071	0.027	5.561	0.023	0.025	0.916
ECO	0.120	0.023	5.484	0.191	0.025	7.653
IR	0.116	0.021	2.681	0.052	0.022	2.347
constant	-1.171			-0.871		

The regression coefficients indicate that the linear relationship between the Zi and the explanatory variables is important for each coefficient, and it is important for their relative size rather than absolute value. The results show that in 2014, green procurement, ecological design and investment recovery can explain why enterprises choose to adopt or not adopt green supply chain management. Among them, the green procurement coefficient is the biggest, the ecological design and the investment recovery coefficient is similar, but the internal environment management and the customer cooperation which includes the environment demand nearly is the green purchase coefficient 1/2. In 2015, only eco design and green procurement best explain why companies choose to adopt or not adopt green supply chain management. Among them, the internal environmental management and investment recovery coefficient is similar to the ecological design coefficient of 272%, is the green procurement coefficient of 32.3%, while the

environmental needs of the customer cooperation is the smallest, only 12% of the ecological design coefficient.

The regression coefficients obtained above were brought back to the original model, and the Probit model of the innovation diffusion of green supply chain management in 2014 was obtained:

$$Z_i = -1.171 + 0.072IEM_i + 0.149GP_i + 0.071CC_i + 0.12ECO_i + 0.116IR_i$$

And Probit model of innovation diffusion of green supply chain management in 2015:

$$Z_i = -0.871 + 0.051IEM_i + 0.161GP_i + 0.023CC_i + 0.191ECO_i + 0.052IR_i$$

Using Probit SPss regression to find the value of the critical level of Z*. From the analysis of the results shows that, the enterprise in carrying out the investigation of green supply chain management practice, enterprises in the implementation of the probability of green supply chain management 50% corresponding Zi in 2014 must reach 0.542,95% confidence interval as realization of the ability to 0.50522 0.57383. In 2015 Zi must reach 0.49623, 95% confidence interval between 0.45909 to 0.52848 can be achieved.

Green supply chain management of the various elements of the practice of the normal distribution of the parameters, the practice of the enterprises and the percentage of the existence of the phenomenon of the table 4.

Table 4. Pararneters of Distribution of GSCM Elements

variable	2014			2015			change	chasm
	mean value	standard deviation	P value	mean value	standard deviation	P value		
IEM	3.53	0.97	0.31	3.60	0.97	0.30	-0.01	NO
GP	2.94	1.03	0.16	2.79	0.95	0.09	-0.06	YES
CC	2.90	1.04	0.12	2.95	0.97	0.13	0.01	YES
ECO	3.48	1.02	0.31	3.08	1.11	0.23	-0.08	NO
IR	3.45	1.00	0.29	2.94	1.00	0.14	-0.15	YES

From the green supply chain management in the practical elements of distribution can be seen, internal environmental management, eco design and investment recovery mean row in the forefront, indicates that there is a considerable part of the enterprise has to carry out internal environmental management, eco design and investment recovery, and outside the enterprise to carry out environmental management of enterprises is relatively small, the majority of enterprises is still in the consideration stage. And from the probit regression results of view, green procurement and ecological design has always been whether a company will adopt an important practical elements of green supply chain management, followed by the internal environment of enterprise management, investment recovery and environmental needs of the customer cooperation. Among them, from the distribution of the elements of the practice, it can be known, has carried out the internal environmental management practices of enterprises most, but it is not the enterprise to adopt the green supply chain management of the most important practical elements. Perhaps it is because there is a considerable part of the enterprise in order to cope with the higher authorities of environmental inspection or only in order not to violate environmental laws and regulations and to carry out environmental management within enterprises, but these enterprises did not further environmental management plan, and not to the adoption of green supply chain management.

Green procurement in the enterprise to carry out green supply chain management plays an important role. In: first, it can positively impact the suppliers, suppliers in order to win customers will certainly take active measures, improve the enterprise's environmental

management level and the level of technological innovation, to provide enterprises with green raw materials.

5. Conclusions

In this paper, we construct the manufacturing enterprise green supply chain management innovation diffusion probit model, data was collected in 2014 and 2015, we make statistical data analysis by using two manufacturing enterprises to carry out empirical data from the questionnaires of green supply chain management practice elements as the case study data. Identify the explanatory variables, the five explanatory variables are: internal environment management, green procurement, customer cooperation, including environmental requirements, product design and investment recovery. The regression model coefficients were used to determine the critical level of the explanatory variables, and to identify the important practical factors in the adoption of green supply chain management. Through the questionnaire design to determine the elements of the practice of the critical level, combined with the theory of gap, through the enterprise has carried out the practical elements of the probability distribution of the identified in the practice of green procurement, including environmental needs of customers cooperation and investment recovery has a chasm phenomenon. Study shows that the implementation of green supply chain management, not only can improve the environmental performance of enterprises, but also enhance the economic performance of enterprises, so as to achieve the "win-win" effect. Companies should adopt a positive attitude to the adoption of green supply chain management, rather than negative in order to cope with environmental regulations, supply chain requirements or environmental requirements of the higher authorities. From the source, and earnestly carry out the green procurement and ecological design practice, from the overall upgrade of enterprise environmental management, and thus enhance the competitiveness of enterprises.

References

[1] M. Azadi, A. Shabani, “Planning in feasible region by two-stage target-setting DEA methods: An application in green supply chain management of public transportation service providers”, Transportation Research Part E: Logistics and Transportation Review, vol.70, **(2014),** pp.324-338.
[2] I. Mallidis, D. Vlachos, “Design and planning for green global supply chains under periodic review replenishment policies”, Transportation Research Part E: Logistics and Transportation Review, vol. 72, **(2014)**, pp.210-235.
[3] L. Xu, K. Mathiyazhagan, “Multiple comparative studies of Green Supply Chain Management: Pressures analysis”,Resources, Conservation and Recycling, vol.78, **(2013)**, pp.26-35.
[4] N. Stefanelli, C. Jabbour, “Green supply chain management and environmental performance of firms in the bioenergy sector in Brazil: An exploratory survey”, Energy Policy, vol.75, **(2014)**, pp.312-315.
[5] S. Mirzapour, A. Baboli, “A stochastic aggregate production planning model in a green supply chain: Considering flexible lead times, nonlinear purchase and shortage cost functions”, European Journal of Operational Research, vol.230, **(2013)**, pp.26-41.
[6] J. Luo, A. Yee-Loong, “Green Supply Chain Collaboration implementation in China: The mediating role of guanxi”, Transportation Research Part E: Logistics and Transportation Review, vo.71, **(2014)**, pp.98-110.
[7] J. Sarkis, “A strategic decision framework for green supply chain management”,Journal of Cleaner Production, vol.11, **(2003)**, pp.397-409.
[8] S.Vachon, “Green project partnership in the supply chain: the case of the package printing industry”,Journal of Cleaner Production, vol.14, **(2006)**, pp.661-671.
[9] A. Jabbour, “Mixed methodology to analyze the relationship between maturity of environmental management and the adoption of green supply chain management in Brazil”, Resources, Conservation and Recycling, Vol.92, **(2014)**, pp. 255-267.
[10] Y. Kainuma, N. Tawara, “A multiple attribute utility theory approach to lean and green supply chain management”,International Journal of Production Economics, vol.101, **(2006)**, pp.99-108.
[11] O. Michelsen, A. Magerholm, “Eco-efficiency in extended supply chains: A case study of furniture production”, Journal of Environmental Management, vol.79, **(2006),** pp. 290-298.

