Research on the Security Mechanism of Green Supply Chain Management

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Abstract: Nowadays the human society is facing very severe environmental and resource problems. As a modern management model, the green supply chain management is brought forward to meet the development of economic globalization, to improve the enterprise's competitiveness, and to meet the requirements of human society for sustainable development. However, the green supply chain management in China has encountered substantial problems such as lack of legal system construction, information asymmetry and technological bottleneck, etc. With these questions in mind, we should set up corresponding security mechanism. The government needs to strengthen the legal system construction so as to secure the implementation of the green supply chain from a legal point of view; a network platform of the information system to maximize the information sharing is required; increased investment in science and technology is demanded to provide intellectual support for the implementation of the green supply chain. By these measures, the development of the green supply chain management in China will be healthily and effectively improved.

Keywords: Supply chain management, Green supply chain management, Security mechanism

Progress of science and development of technology have created enormous wealth for us, but have caused the destruction to environment and resources and disrupted the green balance at the same time. New environmental era has put forward new challenge to worldwide manufacturing enterprises, which is how to make industrial production and environmental protection developed in harmony. At present, the public requires modern enterprises not only to deal with the wastes produced, but also to reduce the production of the wastes. Furthermore, the public requires enterprises to produce green products with green management. Green supply chain management, from the point of view of sustainable development of society and enterprises, based on the green manufacturing theory and management techniques of supply chain, chooses the enterprises with green advantages to set up the alliance, adopts green technology to guide the whole production processes including design, marketing and recycle, and makes efficient use of resources as much as possible and limit the influence on the environment as less as possible[1]. The basic content of green supply chain management consists of green design, green supply, green production, green marketing, and green recycle. It is an effective approach to achieve sustainable development for enterprises in the 21st century[2].

1 An objective choice for enterprises to implement green supply chain management

As the objective choice of enterprise, implementing green supply chain management is an important source for enterprises to obtain competitive advantage which includes the following three aspects.

1.1 An objective choice for enterprises to implement sustainable development strategy

Technological progress and industrial development at full speed have created the enormous wealth, but caused the environmental pollution at the same time, resulting in the unbalance of society, economy and nature. With the development of economy and society, resource and environmental problems are increasingly becoming the focus of international community. People's consciousness of environmental protection is increasingly strengthened by the objective reality. Yearning for green and paying attention to environmental protection has already become the consumption trend and goal in pursuit of numerous consumers. Only by implementing the green supply chain management and meeting the demands of
consumers, can enterprises obtain more customers and markets, insuring the sustainable development of enterprises.

1.2 An objective choice of enterprises obtaining the qualification of market access

The deterioration of ecological environment and the waste of resources have already increasingly aroused the attention of the countries all over the world. The notion of protection with development and development with protection has already become the most important thing of China’s economic development strategy. The environmental protection law of China is also becoming stricter day by day. With the implementation of Law on Environmental Protection of the People's Republic of China, some new environmental protection regulations and rules are in the process of putting to practice. Production with high cost and low efficiency which is not in accordance with the requirements of environmental protection will be banned in succession. Only by implementing the green supply chain management, i.e. to bring the whole process of production and operation under the control of the green supply chain management, making the production and operation according to the laws, and making the products meet the green requirements of environmental protection, can enterprises obtain the qualification of market access and get the market share[3].

1.3 An objective choice of enterprises producing and operating under globalization

In the future, the competition between enterprises, to a great extent, is the competition of supply chains. The traditional supply chain is aiming at controlling the stock, lowering the cost and cooperation for mutual benefits with the members of the supply chain, which, however, does not take into consideration the negative impact on the environment and society. It solely pursues the economic profits at the cost of the external environment. Facing the severe situation of deterioration of the environment and exhaustion of natural resources caused by the traditional supply chain, the countries all over the world issue relevant policies to protect the environment and resources one after another, utilizing relevant regulations and clauses to set up the green trade barrier so as to limit the import of the goods from other countries and regions and subjecting the production and export of products under the traditional supply chain to more and more pressure. According to the relevant reports, since 2002 71% of the enterprises and 38% of the products in China have been influenced to different extents. So, China’s enterprises must say good-bye to the old model of the traditional supply chain completely and implement the new management model of the green supply chain decisively, so as to make the production and operation under economic globalization successfully.

2 The current situation and existing problems of the green supply chain management in China

At present, the environment has already become a key factor of social economic development day by day. The developed countries have already realized the importance of environmental protection and taken a series of effective measures. The central government and local governments at all levels of many countries have constituted more and more strict environmental protection regulations for enterprises. The consumers also have shown the great concern about environmental management. Our country is accelerating the building of a resource-conserving and environment-friendly society, promoting the pattern transition of economic growth. According to relevant planning, the gross investment of urban fixed assets of environmental sanitation of China is about 111,500 million yuan during the 'Eleventh Five-Year Plan' period. In November of 2006, State General Bureau of Environmental Protection and the Ministry of Finance jointly released the first green purchase list. It aims at manipulating industrial production by the government so as to promot the sustainable economic development of China and construct the harmonious relations among nature, government and enterprises [4]. Traditional supply chain management has no longer met the demands of environmental protection and economic sustainable development. China begins to advocate and implement the green supply chain management and has made preliminary achievements. In 2005, General Electric released the commercial strategy entitled ecomagination. In this plan, the reasearch funds that are used by GE
in clean technology would increase from 700 million U.S. dollars in 2005 to 1,500 million dollars in 2010. In the past three years, the products of ecoimagination, for example, the seawater desalination technology, the clean energy technology and the high-efficient engine and so on, have experienced three times the average growth of the company. The income from products and services of energy-conservation and environmental protection has already exceeded 12 billion dollars in 2006 [4]. However, due to the fact that the green supply chain management of China is in the starting stage, a lot of problems still exist in the process of development.

2.1 Lack of sound government's legal system construction

The United States set up a special environmental protection agency in 1976 to purchase regenerated products and products with environmental protection treating process on behalf of the government, and began to take the compulsory measures to require government to purchase this kind of products. In 1993, American former President Bill Clinton signed Decree No. 12783 to require the Federal Government to buy the regenerated products. For example, one of the regulations stipulates that the manifold paper government purchased should contain 20% regenerated paper. After that, in 1998, Clinton signed Decree No. 13101 to improve Decree No. 12783, detailing the price range and feasibility of the regenerated product purchase. For example, the percentage of purchasing regenerated paper was raised to 30%. Two injunctions concerning the environmental protection regarding electronic products were formally published by the European Union as far back as February of 2003. Two regulations about the electronic rubbish were published in August of 2004 [4]. The research of the green supply chain management just started in China. There is no perfect legal system to regulate and supervise the behavior of enterprises. The punishment to the enterprises’ polluting behavior is relatively lenient at present. There is a lack of effective supervision. For example, the existing rate of pollution charge is far below the expense of comprehensive treatment of pollution. Enterprises would choose to pay the pollution charge directly for the sake of the cost, rather than manage the pollution. It is legal to externalize the manufacturing cost, which can increase the profit of the manufacturer, although it results in conflicts between the individual goal of the supply chain members and the unitary goal of the green supply chain, violating the principle of compatible environment.

2.2 The information asymmetry among the enterprises in the supply chain

The green supply chain management emphasises the environmental nature of supply chain. Each role in the supply chain must be environmentally and effectively managed, ensuring the environment effect and consumption of resources in each stage of the product life cycle are valid controled. Furthermore, the environment management of the whole supply chain needs coordination to make it have least environment effect and resource consumption on the basis of sharing information about the systematic environment of the supply chain. Due to the introduction of environment management to green supply chain management, it requires the enterprises in green supply chain to improve the information integration and sharing. It is proved by some multinational enterprises such as Lucent Technologies, Wal-Mart, P&G, 7-11 company and Dell computer company, etc. that information sharing of supply chain is able to creat values which can also be achieved by small and medium-sized companies. Top employees in some creative companies such as Hewlett-paackard and West Forest always set the top priority of supply chain management when they are dealing with the overall plan. However, some business entities in our country block news and even disseminate false news through legal or illegal ways to maximize their own profit and put themselves in a favourable position in the competition and transaction. Many diversified information asymmetry risks exist in commodity exchange process which keep enterprises from exchanging commodities effectively and maximizing supply chain profits. So, it is a problem must be solved that how to make every enterprise in the supply chain to share environment information effectively.

2.3 Lack of sound green technology

With the social progress and development of technology, Green supply chain management becomes a new requirement to production and consumption. As the practical application of sustainable
development theory in enterprise management, it meets the requirements of environment and resources of modern society. According to the survey, 89% of the American citizens care much about the environmental impact of the product they purchased. 78% of them are willing to pay 5% more for purchasing green product. In Netherlands, about 70% persons are willing to choose products with green label[5]. Different from tranditional supply chain model, green supply chain model emphasizes the effective integration of green design, green material, green technics, green packaging and green recycle in the life cycle of products, which broaden the content and increase the difficulty of the supply chain management. At the same time, it requires enterprises to make the overall innovation and upgrading of technology. But our supply chain technology is far below the green requirements. The size of our manufacturing enterprise is relatively small. The development and competition of some industries are out of order, which put much pressure on the environmental protection. The extent and advancement of mechanization of supply chain don’t meet the requirements of green supply chain. The material used in the supply chain is also not in accordance with the requirements of reusable and degradable material which are advocated by the green supply chain.

3 The construction of the security mechanism of green supply chain management

In order to achieve the effective and healthy development of green supply chain management, China should build up corresponding security mechanism. As for the construction of security mechanism, we can mainly start from the following aspects:

3.1 The government needs to strengthen the legal system construction so as to secure the implementation of the green supply chain from a legal point of view

To achieve the effective implementation of green supply chain management, the making of corresponding regulations and policies and the strengthening of the effect of making and implementation of environmental laws are indispensable steps. Because the green supply chain management in our country is till on early stage, the companies’ environmental protection consciousness, management level, technical force and fund are relatively limited. Therefore, the company will not make efforts to improve the production process so as to save resources and energy and reduce environmental pollution. What we should do is to build up effective administrative management system and mechanism, to carry out scientific and strict management, to enhance protection efforts to natural resources and ecological environment.

Part of China’s enviromental protection policies lags behind the advance of economy. Though we have made some “green” policies about the operation of the enterprise, most of them are about end control. Besides, the legislation lags behind and doesn’t carried out strictly, so the efficiency of policies can’t meet the demands of sustainable development. To achieve the effective implementation of green supply chain management, China should further make or improve legislation, management methods and technical standards related to environmental protection. Apart from that, we should build up effective administrative system and mechanism, carry out scientific and strict management, strengthen the protection for natural resources and ecological environment from the aspect of increasing the cost in violation of legislative, enhance the punishment standard and force to pollutant sources, reduce the rate of return of traditional manufacturing model by legislation, prompt the company to add environmental protection consciousness into supply chain management so as to provide good competitive environment for the operation of green supply chain[6]. We should support the enterprises which implement green supply chain management by providing policy encouragement, prompting the green supply chain management to develop towards standardization.

3.2 Setting up network platform of information system to secure the implementation of green supply chain from an information point of view

Green supply chain management requires each party in cooperation to communicate sufficiently, share information and coordinate with each other. Data of some processes such as choosing green material, designing product, evaluating and selecting supplier, green manufacturing, marketing, logistics
and recycling waste must be well shared in time, which depends on the support of information technology. The successful implementation of green supply chain management depends greatly on making full use of network advantages, integrating environmental and other information and sharing data and information. Governments and organizations should establish green resource databases and provide domestic and abroad information of green manufacturing technology, green transportation, green material and green management technology. Additionally, each industry should make good use of network technology to set up network platform of information system which can support the green supply chain of its own industry, providing the data about the international environment protection standards, raw material, products related with the human beings and environment, and recycling ways different components. Each industry can realize information sharing by building green supply chain management databases, knowledge databases and information system, so as to establish foundation of the effective implementation of green supply chain management.

Many problems in the process of implementation of green supply chain can be solved by technology of information integration and exchange, etc., establishing a large database and united transmission form of data, integrating the processes of selecting green material, green purchasing, green production plan, green packaging, green storage, green transportation, green distribution and recycling, integrating and exchanging the information of internal and external data of each node in enterprises by using the electronic data exchanging technology. Each nodal enterprise can create a shared platform of information integration by using information system management software, enable upstream and downstream firms to share and transfer information, dispel the adverse selection and moral risks caused by information asymmetry, and make good use of advantages of green supply chain management.

3.3 Increasing the input of technology of green environmental protection to secure the implementation of green supply chain from a technology point of view

Green supply chain management is the intersection amalgamation of environment consciousness, effective use of resource and energy, and every tache of supply chain. It not only pays attention to the full use of internal resource of supply chain, but also takes the environmental impact of the plan chosen into consideration. The basic content of green supply chain management is green design, green material, green techniques, green packaging and green recycle. It focuses on the implementation of knowledge innovation among the supply chain members. Only through the constantly use of new knowledge, technology and resource, can it completely abandon the traditional “terminal” environment governance. Thus, the environmental protection strategy “Protection First, Governance Second” is carried out and also the shared effectiveness of knowledge among supply chain members is improved. So it can make timely effective implementation of new design and techniques among the members so as to truly realize “greenization” of supply chain management. It brings forward higher requirement of our technology.

For most enterprises in the supply chain, technological bottleneck is the biggest pressure of greenization. Due to the cause of technology, the implementation of green supply chain management might cause the decrease of product quality, the complexity of production techniques, the drop of production efficiency and the increase of production cost. However, it would greatly further the process of greenization of supply chain if we can invent and create advanced manufacturing technology, recycle technology, transportation technology and information technology which are good for the environmental protection and energy saving. At present, the protection to new technology is not well established in our market. Once a green product is created by some company, the other companies can imitate at once, which will make the innovative company lose its advantage. This kind of product is called spillover product. For coping with this problem, government should, first, carry out the intellectual property law strictly and protect the patent effectively; second, offer the innovative enterprises certain subsidy as supporting reward. In general, government should create conditions for, and reduce the cost of the implementation of green supply chain management.

4 Conclusion

With the development of global economic integration, supply chain management show its
outstanding advantages of shortening cycle of developing product, reducing stock, raising turnover rate of stock, reducing transportation cost. Academic circles and business community pay great attention to it. However, traditional supply chain management ignore the negative environment effect of supply chain implementation, which worsen the deterioration of environment and shortage of resource day by day. This is why supply chain management is restrained from being further rationalized. Therefore, both the intergrating of economic profits and environmental protection, the use of resource and ecological balance, and the pursuing of green supply chain management are becoming strategic choice of modern enterprises which is seeking sustainable development advantages. Based on explaining the necessity of green supply chain management, the paper raises some practical problems such as incomplete legal system, information asymmetry, low-tech etc., and proposes that government should strengthen legislation construction, increase the law enforcement, create the network platform of information system for supporting green supply chain management, realize the information sharing, increase the input of technology of green environmental protection, and provide corresponding security mechanism for the fast and effective development of green supply chain management in China, so as to promote the sustainable development of enterprises.

References


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