

Consumers' Sustainable Product Preference and Green Supply Chain Management Analysis

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Abstract

With the continuous rapid growth of national economy and the prominent improvement of people's income level, people's consumption concepts and habits have been significantly changed. People also have higher and higher requirements for the quality of life and environment. In recent years, as the safety problems of foods and life products are frequently exposed, the quality safety problem of products also has become a focus. How to eat and use safely becomes the topic that people are most concerned about. So people all cast their eyes to gradually certified pollution-free and green sustainable products. The sustainable product is not just a fashion concept of brand consumption but also of importance significance in solving product quality safety, improving product value, protecting environment and enhancing the international competitiveness of products. In the paper, we first make a survey on consumers' sustainable product preference by the questionnaire. The paper analyzed the problems existent in consumer sustainable product preference in the form of questionnaire, discussed the mutual relation between corporate green logistics supply and sustainable product production, and put forward beneficial suggestions for corporate green supply chain management.

Keywords: Sustainable products, consumer preference and green supply chain

1. Introduction

The constant development of science and technologies increasingly highlighted environmental problems; the wording of sustainable development gradually entered into people's living sight. Sustainable development was raised in the process that humans required realizing the sustained harmonious development of population, resource environment and economy and is an important conclusion reached by the international society through lots of analyses and research work. Sustainable development is the common development strategy of both developed and developing countries correctly handling the mutual relation of economic development and environmental protection in the 21st century and the only approach for humans to seek survival and development. As people are getting familiar with and attaching importance to sustainable development, sustainable products are also slowly integrated into every corner of our life. But how is consumers' cognition and attitude towards sustainable products? In the paper, we developed questionnaire survey, statistics, tabulation and analysis on consumers' sustainable product preference and made a discussion on the relation between the production of sustainable products and enterprise green supply chain.

2. Research Method

2.1. Respondent

In the survey about consumers' sustainable product preference, the survey respondent group that we face is relatively wide. We did not make planned biased selection to gender, age, location, salary level, etc. They come from all corners of the country and have different life backgrounds. We make a random survey to this in order to improve the authenticity and representativeness of the survey result.

2.2. Questionnaire

We totally designed 14 questions for the questionnaire. Through the 14 questions, we mainly conducted a survey from consumers' gender, age, income, cognition on sustainable products, liking degree, and worries.

2.3. Survey Method

From October 25 to November 10, 2015, we designed the questionnaire and compiled the network questionnaire through the support of the platform wenjuan.com. We used the random method to issue and recover the questionnaire in various kinds of friend circles and group chat and collected 151 valid questionnaires by November 10.

3. Consumers' Sustainable Product Preference

In the survey on consumers' sustainable product preference, the ratio of males and females participating in the survey approached 1:1, mostly aged 20-50. More than a half people never heard of the word "sustainable product". The design of the questionnaire is mainly divided into two parts. The first part is mainly to understand consumers' cognition degree to sustainable products; the second part is consumers' cognition to the future development prospect of sustainable products.

3.1. Consumers' Cognition to Sustainable Products

Four questions are set for the part of consumers' cognition to sustainable products.

Question 1: Which do you think are sustainable products among the following products?

The survey result is as shown in Figure 1.

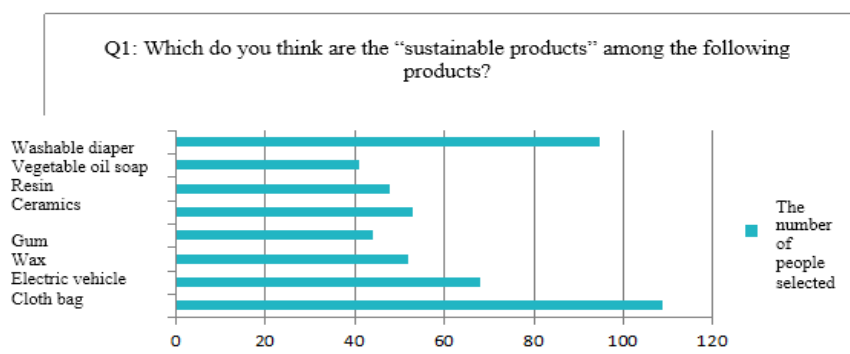


Figure 1. Statistical Diagram for Consumers' Recognition of Sustainable Products

It can be seen from Figure 1 that more than 60% of consumers know “washable diapers” are sustainable products and more than 70% consumers know “clog bags” are sustainable products. This is because people’s life has a close contact with the two products, fully familiar with them. Besides, they know cloth bags are “sustainable products”, which has a lot to do with the government greatly promoting the use of cloth bags instead of plastic bags that cannot be recycled. Regarding gum that is not close to people’s life and not promoted by the government, people’s recognition to it as a sustainable product is greatly lowered. Therefore, the government should strengthen the publicity and education for consumers to enable them correctly recognize the importance of green consumption, distinguish real sustainable products and create green consuming atmosphere. So the government should cooperate with enterprises, make use of various advertising media and combine with professional associations to promote environmental protection knowledge and green consumption knowledge for consumers. Through effective promotion and education, the government should create good green consumption atmosphere, arouse consumers’ green consumption awareness, set up the green value and establish a green consumption pattern. Meanwhile, enterprises are also required to design the product more fit for consumers’ demands and make it be operated or used simply and conveniently.

Question 2: Please choose the options that conform to your attitude towards sustainable products in combination with your actual monthly income?

The survey result is as shown in Future 2.

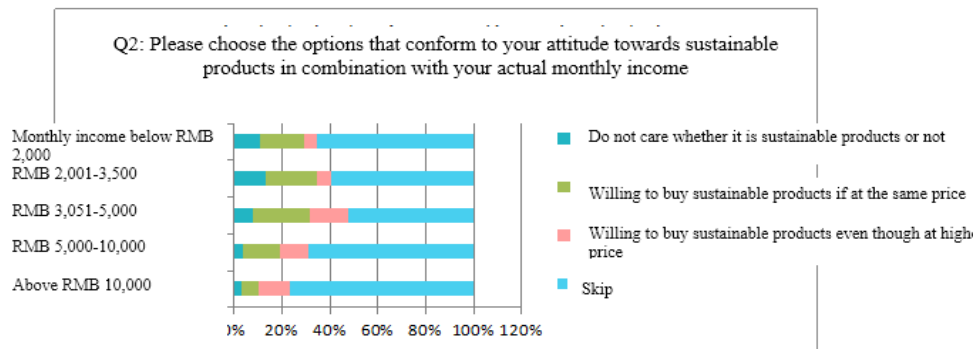


Figure 2. Statistical Diagram for the Level of Income on Consumers’ Attitude Towards Buying Sustainable Products

As the influence of the income level upon consumers’ sustainable product preference is improved with the income level, the rate that consumers are also willing to buy sustainable products in spite of higher price is generally higher than the rate of consumers with low monthly income. But it is unexpected that those who choose the option are not the part of consumers with the highest income, but those with middle level income. The number of consumers with the middle level income is larger, so the proportion is higher. In terms of the purchase of sustainable products, most consumers buy occasionally. Among consumers who buy occasionally, some consumers buy sustainable products due to unconscious purchase. For this reason, we also set the third question about why consumers do not buy sustainable products. The survey results are collated as follows:

Question 3: Which factors lead you not to buy green sustainable products?

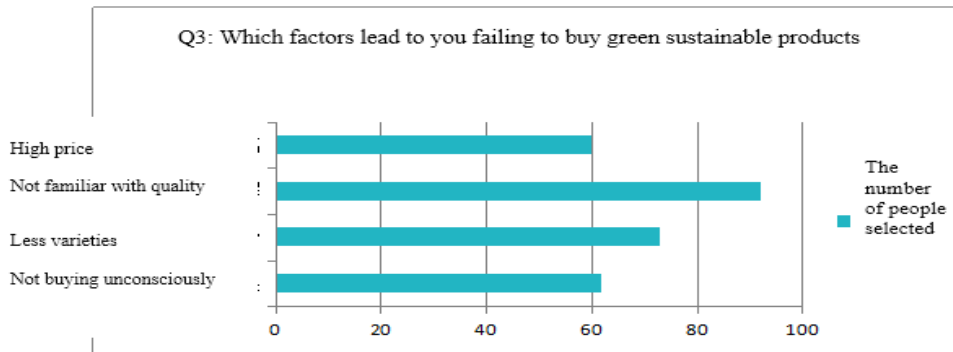


Figure 3. Statistical Diagram for the Reasons that Consumers Fail to Buy Sustainable Products

We can see from Figure 3 that the biggest reason for consumers not buying green sustainable products is that consumers are not familiar with its quality. Although sustainable products have been gradually favored by people now, people still have less cognition to sustainable products and most consumers are still skeptical about the quality of sustainable products. All people seem to avoid the occurrence of the similar phenomenon by rule that we have always felt that that we don't understand the genetically modified foods are good and safety foods. On the other hand, the purchase reasons for consumers who choose to buy sustainable products are also not the same

Question 4: What is the motivation for buying sustainable products?

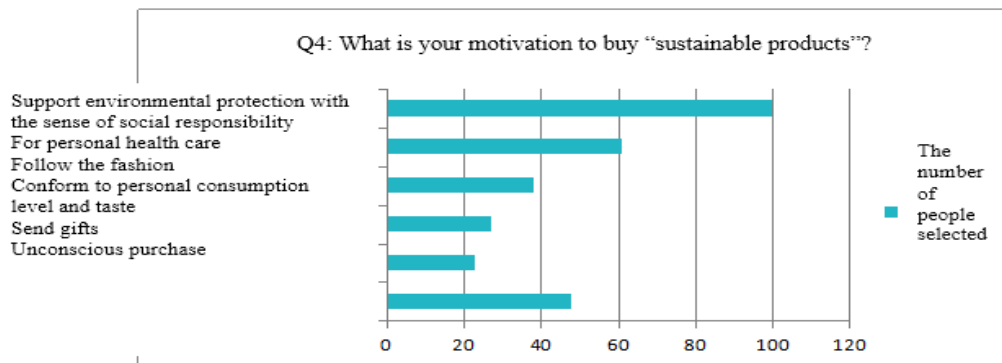


Figure 4. Statistical Diagram for Consumers' Motivation to Buy Sustainable Products

As shown in Figure 4, the reasons that consumers choose to buy sustainable products are mostly for supporting environmental protection with the sense of social responsibility or for personal health care, and there's only a minimum number of consumers who choose "send gifts" as the motivation of buying sustainable products. Quite a few consumers are unconscious in buying sustainable products. It is not difficult to find from the motivations that consumers buy and do not buy sustainable products that there are always some people unconscious in buying or not buying, and their cognition to sustainable products is still basic understanding. If the government or enterprises promote sustainable products greatly, most consumers will have a sense of responsibility for the society, so it will play a very good promotion role to drive the consumer groups in buying or not buying sustainable products unconsciously to support sustainable products.

We also made a questionnaire on the promotion ways of sustainable product that consumers like, of which 59 people out of 151 people chose to understand sustainable

products via TV ads and 36 and 34 people respectively choose to read the specifications, newspapers and periodicals.

3.2. Development Prospect of Sustainable Products

To better understand the development prospect of sustainable products, the questionnaire surveyed consumers' preference degree for sustainable products and the future development of sustainable products in the eyes of consumers.

Question 5: In general, how is your preference degree for sustainable products (five-grade marking system as the evaluation criteria)?

Table 1 Consumers' Preference Degree for Sustainable Products

Level of preference degree	Number of people of the level	Proportion of the level
1 score	4	2.65%
2 scores	8	5.30%
3 scores	25	16.56%
4 scores	62	41.06%
5 scores	52	34.44%

We divide the preference degree of consumers for sustainable products into five levels. One score stands for very dislike; two scores stand for dislike, three scores stand for general like attitude towards sustainable products; four scores stand for like; five scores stand for like very much. As shown in Table 1, the proportion of consumers whose preference degree for sustainable products is above like is up to 75.5%, accounting for more than 3/4 of the surveyed consumers, from which it can be seen that consumers generally accept and like sustainable products.

Question 6: How do you look upon the future development of sustainable products (the five-grade marking system as the evaluation criteria)?

Table 2. Future Development of Sustainable Products in the Eyes of Consumers

Level of expectation	Number of people of the level	Proportion of the level
1 score	3	1.99%
2 scores	5	3.31%
3 scores	33	21.85%
4 scores	43	28.48%
5 scores	67	44.37%

We divide the expectation for the development of sustainable products in the eyes of consumers into five levels. One score stands for very much non-expecting; two scores stand for non-expecting; three scores stand for general expecting degree to the future development of sustainable products, remaining neutral; four scores stand for expecting the future development of sustainable products; five scores stand for very much expecting. Among consumers participating in the survey, the number of consumers whose expectation for the future development of sustainable products above four scores is nearly 73%. It can be seen that consumers have greater expectation for the future development of

sustainable products, while consumers' expectation is the greatest motivation for the development of the sustainable product industry.

4. The Current Situation and Development Trend of Enterprises' Green Supply Chain

The green supply chain, involving suppliers, manufacturers, retailers and users, is a management mode with the least influence on environment and the highest resource efficiency in the whole process of products from materials acquisition, processing, packaging, warehousing, transportation and use to scrap disposal with the green manufacturing theory and supply chain management technology as the foundation. There have been many scholars studying the green supply chain. Conrad (1) pointed out that the production cost and price of environmental-friendly products is generally higher than ordinary products. Chitra's research indicated that the higher consumers' environmental protection consciousness, the higher their willingness to buy green products at higher price. As the education degree, value, environmental protection attitude and income level are different, the willingness is also different in different consumer groups. Moon et al's study showed that consumers' willingness to pay higher price for green products will prompt more enterprises to devote themselves to the research on green environmental-friendly technologies.

In China, the supply chain has entered into the rapid development period. As the environmental problem is getting more serious, the study on the green supply chain should also conform to the development trend of the times.

On the one hand, enterprises are still relatively strange to the recognition of the green supply chain, and the green supply chain management is still at the initial stage, far from becoming the conscious behavior of enterprises. There are only more than 5, 000 enterprises that have passed the certification of environmental management system, accounting for less than 1% of the total enterprises nationwide. Besides, the problems exposed due to the lack of green awareness in supply chain management also have existed for years. The Sudan red event involving large enterprises like Heinz China and KFC took place in the past, which triggered people's thought on the green supply chain. Shanghai Huayuan was found seriously exceeding the aluminum standard in multiple puffed foods due to the lack of strict control on ferment powder suppliers. In the textile industry, among more than 50,000 clothing companies in China, only 200 products of famous enterprises like FIRS, Bosideng and Topnew obtained the green certification, which reflected that Chinese textile and clothing enterprises lack of alertness in facing the green consumption tide sweeping across the world. For the standards and concepts of ecological textile products, they are still in the passive acceptance state and have not realized the importance and urgency of environmental protection.

On the other hand, China has joined WTO. Facing the strict mandatory environmental protection technical standards formulated by more and more countries, China's products face the severe challenge of international green trade barrier. EU's WEEE directive has formally come into force. It is predicted that China's electric appliance products which will be directly influenced by the two directives reach more than US 9 billion. From this, the pressure from various aspects urged the industry to transform to green products to conform to the tide of the international green supply chain. At present, some powerful and far-sighted suppliers have started breaking the green barrier hindering the export of products and set about implementing the management mode of the green supply chain. Skyworth Group has called up multiple suppliers to sign the green supply chain agreement in Shenzhen, which marked Skyworth's products will gradually march towards green manufacturing. On the World Environment Center Sustainable Development Prospect International Forum held in China, Ms. Elizabeth Lowry, Chairman of the World Environment Center and General Motors Vice President in charge of energy and

environment, announced that the World Environment Center will cooperate with General Motors and the Society of Automotive Engineers of China to start the green supply chain demonstrative project in China and help auto parts suppliers improve their environmental protection capacity. Reducing the consumption of energy and raw materials reflected the momentum that the green supply chain gradually starts developing in China. Although most enterprises in China still have relatively weak environment awareness and have not realized the importance of implementing green supply chain management, with the improvement of Chinese enterprises' environmental protection awareness, the perfection and implementation of environmental protection laws and regulations, and the gradual solution of problems such as the development of enterprise management systems and the modernization of communication means, the green supply chain management mode will be accepted by more and more enterprises and will become the only mode that enterprises achieve a triple-win situation in economic benefits, environmental benefits and social benefits.

At last, we find through investigation that when people understand products supplied by the green supply chain have the least environmental influence and the highest resource utilization rate, most consumers will be willing to buy such products. Even the cost of the products from the green supply chain increases, consumers are still willing to pay.

Question 7: The green supply chain is a kind of product supply form with the least environment influence (negative effect) and the highest resource utilization efficiency. Are you willing to buy products transported via the green supply chain in the purchase process?

Q7: The "green supply chain" is a kind of product supply form with the least influence (negative effect) on the environment and the highest resource utilization efficiency. Are you willing to buy the products transported via the green supply chain in your purchase process?

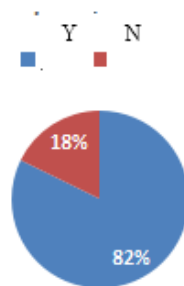


Figure 5. Statistical Diagram for Consumers' Willingness in Using the Green Supply Chain

What is shown in the figure above (Figure 5) is the question for consumers about whether consumers are willing to buy products transported via the green supply chain when we make the questionnaire survey. We find that the number of consumers willing to buy reach more than 82%. It can be seen that consumers are all very supportive of green supply chain products. Among the 82% consumers participating in the survey, 68% people are also willing to buy green supply chain products when the cost of the green supply chain increases.

Question 8: If the logistic way needs to increase the product cost, are you willing to bear the expense?

Q8: If it needs to increase the product cost in this logistic way, are you willing to bear the cost?

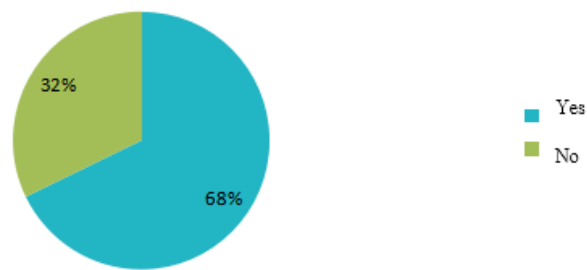


Figure 6. Statistical Diagram for Consumers' Attitude Towards the Using Cost of the Green Supply Chain

It can be understood from the figure above (Figure 6) that 68% people are willing to pay the corresponding cost for the green supply chain, which indicated that consumers have fully recognized the importance of green consumption to sustainable development and they are willing to pay a higher price for this. The government and enterprises should tell consumers from the view of civic duties and health that green consumption not only can reduce the damage of the consumption behavior to the environment from the consumption terminal to realize the due obligation of citizens but also lessen the waste of resources and environmental pollution in the consumption process via the green supply chain, so as to effectively improve people's consumption quality and environment in a three-dimensional way. Moreover, enterprises should actively set up the good image as environmental protection envoy, insist on the production of environmentally-friendly products, do well the green recycling of waste products, gradually popularize the promotion and application of the green supply chain and set a good example for consumers in green consumption.

5. Conclusions

In facing more and more serious environmental pollution problems and resource shortage problems, it has been imperative for China to carry out sustainable consumption and promote the green supply chain. However, from the survey we can see that consumers' cognition of sustainable products is not high. When knowing sustainable products and the green supply chain can bring better development for people's future life, even though people will spend more money for the purchase and use of such products, more than a half of consumers also chose to purchase the green supply chain products. Therefore, the green supply chain has a broad development prospect and it first needs the constant support and guidance of the government.

Secondly, green supply chain management is a kind of modern management mode that gives a comprehensive consideration to environmental influence and resource efficiency in the overall supply chain. Based on the green production theory and supply chain management technologies, it conducts green design on the overall supply chain from the view of the product life cycle to minimize the side effect on the environment and maximize the resource efficiency and finally achieve the objective of coordinated optimization of economic benefits and social benefits. Its realization is beneficial to enterprises to improve efficiency, adapt to the international competitive environment and gain advantages in competition. Therefore, Chinese enterprises should make transformation timely and gradually increase the investment in the green industry chain.

At last, the development of the green supply chain should also be closely connected with consumers' demands. From our survey we can see consumers also have their own

views for sustainable consumption and green supply chain: (1) Consumers need to have an open and transparent understanding of the quality of sustainable products and the links of the green supply chain; (2) consumers need explicit logo of sustainable products, publicity and education; (3) the green supply chain should gradually popularize and gradually replace the non-environmental-friendly logistics mode to ensure the interests of consumers and the transport speed and cost should not be changed too much.

Building the green supply chain and promoting the sustainable development of the green supply chain is not only the task of enterprises and governments but also a complex system engineering in the society. The factors that influence the establishment of the green supply chain and sustainable development are also not just limited to the four aspects mentioned in the paper. There are also various problems such as the different environmental protection standards of enterprises, the different law enforcement efforts of environmental protection departments, the existence of the opportunistic behavior, the unscientific evaluation methods for green supply chain management and the unreasonable profit distribution among supply chain members. Therefore, it needs to systematically analyze various factors influencing the sustainable development of the green supply chain and actively mobilize the power of the whole society to reasonably solve various problems in the sustainable development process of the green supply chain. Only by this way can the green supply chain be established successfully and the sustainable development of the green supply chain be carried out smoothly.

Acknowledgments

This paper was funded by four projects: BIPT-POPME; The national-level URT Projects2015J00122; Beijing philosophy and social science planning project (10BeJG338). 2014 education reform project of BIPT.

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