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Game Analysis and Countermeasures Discussion on Green Marketing

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Abstract On the basis of making certain assumption on the game situation of carrying out green marketing, this paper conducts game analysis on the green marketing choice among enterprises, the green marketing choice between enterprises and consumers, and the green marketing choice of consumers. Then this paper expounds the necessity of implementing green marketing as follows: the green marketing is the inevitable requirements of sustainable development of economy; the green marketing is the inevitable choice of green consumption mode; the green marketing is the inevitable results of legalization of environmental problems. The problems faced by the implementation of green marketing are analyzed as follows: first, the concept of green marketing has not yet been established; second, the sociality of green demand has not yet taken shape; third, production characteristic of green products has not yet formed. The countermeasures of implementing green marketing as follows: pay attention to the propaganda and education of modern marketing concept; regulate the competition in the market of green products; strengthen transparency of green market information; reinforce the legislation work of food safety.

Key words Green marketing, Game, Countermeasures, China

In recent years, the negative publicity concerning China's food industry occurs frequently. First, there are incidents of toxic milk powder and swill-cooked dirty oil, and then lean meat powder incident and dyed steamed bun incident emerge. The food industry in China is in face of unprecedented trust crisis. The confidence of consumers and the public in food is nibbled. In the large market with 1.37 billion people, the advantage of self-produced food in China is gradually vanishing, while the rigid demand of food industry makes some foreign brands get a chance to step in, to share this cake of food market. As China's laws and administrative regulations at present are not perfect, the consumption concept of most of consumers is not so mature; the level of consumption is still at relatively low level; the awareness of green consumption is still weak, so that the market of green consumption is not fully developed, while the performance of green consumption and green marketing has certain external dependence. Meanwhile, to implement and carry out green marketing, the enterprises also need the input of extra costs and expenses, which make considerable enterprises still hold wait-and-see attitude. Consequently, implementation of green marketing of enterprises is the result of game of different-level enterprises with different management ideas, and game of consumers and these enterprises. At the same time, we should find that adopting green marketing grace enterprise brands. For example, Mengniu Dairy grows and thrives by virtue of the capital of 10 billion yuan at early stage, and it uses 1/3 of the capital to build, publicize and consolidate green brand, in order to promote the affinity of Mengniu from the perspective of technology, green, nutrition and so on. On the basis of analyzing relevant main body of green marketing and game model, I use game theory to discuss the problems existing in the process of implementation of enterprises, and put forward corresponding countermeasures.

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1 Game analysis of green marketing

1.1 Game situation assumption We should first make certain assumption on carrying out the game situation of green marketing. We assume that all parties participating in the market are all rational economic man, the aim of which is maximization of profits. Second, when the enterprises involved in game choose business strategy, they regard the strategies of other enterprises as given ones, that is, they do not take into account the impact of their own decisions on the business decisions of others. Market information is completely open, that is, the enterprises involved in game are conversant with the characteristics, business strategy and market power mutually, yet before making decisions, the enterprises involved in game do not know actions each other, and the game among them is a kind of static game. The behaviors adopted by the enterprises in market competition have no governmental intervention and policy guidance. The market of green products is still in the early stage of market development; consumers' awareness of green concept is weak; the level of consumption of green products is relatively low. In the mean time, the capacity of whole market is certain, but the degrees of demand for different products (non-green products and green products) are not the same. Under the same kind of marketing strategy, the increment of product prices, unit costs, and variable costs of the enterprises involved in game is basically the same.

1.2 Game model analysis

1.2.1 Game among enterprises. The enterprises involved in game are assumed as a kind of rational economic man, and at the moment, the pursuit of profit maximization is the original

power for survival and development of enterprises. In the market competition, the enterprises should take seeking profit maximization as the fundamental goal of themselves. The main basis and principles of all business decisions of enterprises are centered on profit maximization. I analyze the process of game among different types of enterprises in green marketing respectively as follows.

1.2.1.1 Game between enterprises implementing green marketing and enterprises not implementing green marketing. Because green food and green marketing in China have not yet been implemented for so long, and the relevant governmental departments have not yet taken effective surveillance measures on the production of green food and green marketing, so many enterprises have not yet established the idea of production of green marketing, and the majority of consumers' concept and awareness of green consumption are still very weak. Meanwhile, the cost of producing green products is higher than that of non-green products for enterprises. If the consumer demand of green products in market is short, and the level of green consumption is relatively low, producing green products by enterprises may lead to negative profits, so that the enterprises are caught in " prisoner's dilemma". For example, assuming that the market has Enterprise A and Enterprise B, and assuming that they are both rational economic man, with the main objective of seeking profit maximization. If Enterprise A and Enterprise B both implement traditional marketing and do not produce green products, then the profit they obtain is 0; if Enterprise B implements traditional marketing, then the profit is 0, and if Enterprise A implements green marketing, its profit is −45; if Enterprise A adopts traditional marketing, its profit is 0, while Enterprise B adopts green marketing, its profit is −45; if Enterprise A and Enterprise B both adopt green marketing, their profit is −25. Therefore, no matter whether Enterprise A adopts green marketing, the optimal choice of Enterprise B is traditional marketing. In the same way, no matter whether Enterprise B adopts green marketing, the optimal choice of Enterprise A is also traditional marketing. Therefore, according to the principle of pursuit of profit maximization, Enterprise A and Enterprise B will eventually opt for traditional marketing. The matrix of corresponding choices and profit of Enterprise A and Enterprise B can be seen in Table 1.

Table 1 Game between green marketing and traditional marketing

	A Adopting green marketing	B Adopting traditional marketing
A Adopting green marketing	−25, −25	−45, 0
B Adopting traditional marketing	0, −45	0, 0

1.2.1.2 Game between true green marketing and false green marketing. Assuming that in the market, there are some enterprises with counterfeit green products and fake green marketing, and they obtain more profits from the market via counterfeit green products. Because green marketing enterprises need to bear certain outlay on research, development, marketing and publicity, so that the consumers choose and accept green products, and increase purchase volume, thus the production of green products will have relatively high profit margin. Assuming that the total cost of producing and developing green products for enterprise is 1 million yuan, and the profit margin of enterprises is 40%, then the profit of enterprise is 0.4 million yuan. Assuming that the cost of producing non-green traditional products for enterprise is only 0.5 million yuan, and the profit margin after adopting traditional marketing is 18%, then the profit of enterprise is 90 000 yuan. If the enterprises which produce counterfeit green products enter the market, given that the counterfeiting process will also increase part of the cost of counterfeiting, its cost increases from 0.5 million yuan to 0.6 million yuan, with profit of 0.4 million yuan, then the profit margin is 66%. That is to say, the fake green marketing enterprises share part of the profits that the green marketing enterprises should obtain. The profit margin of them can be seen in Table 2.

Table 2 Game between true green marketing and false

	B Adopting false marketing	B Adopting traditional marketing
A Adopting green marketing	40,66	40,18
A Adopting traditional marketing	18,0	18,18

This game model is that Enterprise A implements green marketing, and Enterprise B adopts green marketing. The green marketing is the optimal choice adopted by Enterprise A, while the optimal choice adopted by Enterprise B is fake green marketing. Enterprise B sees the high profit margin obtained by Enterprise A which implements green marketing, and driven by the greed, produces fake green products. Considering the immature consumption psychology and consumption concept of some consumers, and their poor consumption knowledge of the green products, Enterprise B produces fake green products as the authentic green products, to obtain high profit, thus Enterprise B which produces fake green products hitches a ride of implementing green marketing by Enterprise A. When there is a great gap between implementation of fake green marketing and authentic green marketing by enterprises, and if the government's legal penalties are insufficient at the moment, Enterprise B will choose to implement fake green marketing, to obtain greater illegal profit, so the behaviours of counterfeiting green products will remain incessant after repeated prohibition. Only when the governmental departments step up punishments on fake green marketing will the Enterprise B stop behaviours of counterfeiting green products.

1.2.2 Game between enterprises and consumers.

1.2.2.1 Game of enterprises and consumers on whether to purchase green products or common products. Because we assume that the enterprise is rational economic man, so profit maximization is the goal the enterprise seeks, while the goal the consumers seek is utility maximization. When the enterprises implement the strategy of green marketing and produce green products, whether the consumers choose to buy green

products or not will have a great uncertainty. If consumers choose to buy green products, then the interests and utility of two parties are maximized, and the two parties realize balanced game. When consumers do not choose to buy green products, the enterprises choose to produce common products, and the long-term interests of consumers can not be guaranteed. The most ideal state is that the enterprises produce green products, and the consumers choose green products, thus the enterprises and the consumers achieve win-win situation, in line with Pareto optimal rule. Due to the externality of green marketing, the benefits of whole society are improved[1]. The game matrix of whether the enterprises and consumers choose to produce or buy green products or common products can be seen in Table 3.

Table 3 Game of enterprises and consumers on whether to purchase green products or common products

	Consumers purchase green products	Consumers purchase common products
Enterprises produce green products	30,30	0,0
Enterprises produce common products	0,0	15, −15

1.2.2.2 Game of enterprises and consumers producing or purchasing true green products or false green products. When the green awareness and consumption concept of consumers are strong, the green products have certain advantages in terms of the market competition, and the price of green products is higher than that of the common products, therefore, the green products have more profits as against the common products, which makes some unscrupulous enterprises risk danger in desperation, to produce and make fake green products, being engaged in fake green marketing activities. At this time if the profit of fake green marketing is less than the profit of authentic green marketing, the enterprises will choose to implement authentic green marketing, and consumers will also buy green products. If the profit of fake green marketing is greater than the profit of authentic green marketing, the enterprises will choose the measures of authentic green marketing, and consumers will choose to purchase green products as the optimal selection strategy. If consumers choose to buy fake green products, then producing fake green products by enterprises is the optimal choice. Of course, in terms of consumers themselves, buying fake green products is detrimental to their health and society, so we should avoid buying these fake green products. The game matrix can be seen in Table 4.

Table 4 Game of enterprises and consumers producing or purchasing true green products or false green products

	Consumers choose true green products	Consumers choose false green products
Green marketing of enterprises	30, 30	0, 0
False green marketing of enterprises	0, 0	40, −10

1.2.3 Consumers' self-game. Because consumers are the ultimate main body of purchasing market products, and the consumers' ultimate goal of purchasing market products is to ensure the safety of health and lives, and also protect the ecological environment and the harmony between man and nature. The process of choosing to buy green products for consumers, in essence, is a game process. There are mainly two types as follows.

1.2.3.1 Game of consumers' selfish consumption behaviors and selfless consumption behaviors. Assuming that the consumers consider the immediate economic interests, that is, the payment utility arising from selfish consumption behaviour is 1, and the payment utility arising from selfless consumption behaviour after taking into account the long-term interests is −1. Because in the stage of research and development, when the enterprise chooses green marketing, to produce green products, it needs more inputs, thus the production costs increase to some extent, which makes the price of green products higher than that of the common products, but choosing to buy green products is conducive to consumers' health, environment and society. If after a fierce ideological struggle, consumers' selflessness excels selfishness, they will choose to buy green products. On the contrary, if consumers' selfishness excels selflessness, the consumers will choose to buy common products. In the game at this time, consumers' selfish consumption behaviour is the optimal strategy of choice, and driven by the short-term interests, the consumers will choose the consumption behaviour of common products. Game matrix of consumers' selfish consumption behaviours and selfless consumption behaviours can be seen in Table 5.

Table 5 Game of consumers' selfish consumption behaviors and selfless consumption behaviors

	Consumers' selfish consumption behaviors	Consumers' altruistic consumption behaviors
Consumers' selfish consumption behaviors	1,1	1, −1
Consumers' altruistic consumption behaviors	1, −1	0,0

1.2.3.2 Game among consumers. Green marketing has environmental and social benefits. The consumption of green products has positive external economy, while the consumption of non-green products has negative external economy. The consumption of green products can promote the consumer's health, and in the mean time, it is also conducive to environmental protection and social harmony, but the consumers will pay more money for choosing green consumption. The consumption of non-green products cannot obtain environmental protection and health, and sometimes it even exerts some negative effects on the social environment, but the consumers can pay less money. Some consumers clearly know that choosing the consumption of non-green products will affect the interests of the public and social environment, but for personal interest, or seeing others doing so, they will choose the behaviour of following the general trend. If every consumer choose the consumption of green products, the welfare of whole society will in-

crease. If Consumer A chooses the consumption of green products, while Consumer B does not choose the consumption of green products, then Consumer A will get the short end of the stick; if Consumer B chooses green consumption, while Consumer A does not choose the consumption of green products. Consumer A hitches a ride, and profits at expense of Consumer B. If all consumers in society do not choose green consumption, then all consumers are in an unfavorable situation. This makes that the welfare of the public in whole society is not improved. From the cost of payment, the consumers' optimal choice is the consumption of non-green products. Game matrix among the consumers can be shown in Table 6.

Table 6 Game among consumers

	Consumer B chooses green consumption	Consumer B chooses non-green consumption
Consumer A chooses green consumption	1,1	1,2
Consumer A chooses non-green consumption	2,1	−1, −1

2 Necessity of green marketing

2.1 The green marketing is the inevitable requirements of sustainable development of economy Because of unsustainable production mode and excessively predatory consumption pattern, there has been environmental crisis, which seriously threatens survival and development of human. At present, the contradiction between energy saving, environmental protection and economic development more and more stands out. People are driven by short-term interests, lacking the concept and awareness of ecology. The traditional production mode and short-term interest behaviour of enterprises, as well as the method of draining the pond to get all the fish to take advantage of all kinds of natural resources, damage the ecology. One-sided pursuit of immediate high-benefit and high-speed economic growth, causes severe damage and pollution on environment and ecology. The reality of environmental crisis requires the developmental goal to change from one-sided pursuit of economic development to pursuit of harmony between man and nature, and the strategy of sustainable development, so that the behaviour of enterprises will be more and more rational and sensible.

2.2 The green marketing is the inevitable choice of green consumption mode As residents' living standards are improved, myriad consumers' health awareness and consumption concept change dramatically, and the green consumption get the recognition from more and more consumers. Survey shows that 78% of the American, 70% of the Dutch, and 82% of the German consider the problems of environment and ecology when they purchase goods, they are willing to choose green food. Currently, the demand for green products in China's well-off families is also increasingly shown. For example, the survey on the consumers in Beijing, Shanghai and other cities shows that 75% to 85% of consumers want to buy green products. In the face of the tide of green consumption, the enterprises must strengthen the implementation of green management and green marketing, develop green products, and enhance competitiveness. What accompanies the green marketing is the transformation of consumption concept and consumption behaviours in whole society.

2.3 The green marketing is the inevitable results of legalization of environmental problems As the issues concerning environment and food safety become more prominent, the legal documents regarding environmental protection and food safety are formulated increasingly, involving wider field ceaselessly. The enforcement of *Food Sanitation Law*, *Food Safety Law* and other laws enhances the effectiveness and coerciveness of protective measures, having a profound impact on the development of green consumption and green marketing. Under the regulation of the government, the enterprises must comply with the trend of legalization of environmental problems, change the production technology and production mode, and implement green marketing and green management, so that the activities of production and operation go on within the allowable range of the national laws, and policies.

3 The problems faced by the implementation of green marketing

3.1 The concept of green marketing has not yet been established The marketing concept of market undergoes the stages of production concept, merchandising concept, marketing concept, social marketing concept, green marketing concept and so on, along with the change of supply and demand relations in market. Marketing concept is the idea and guiding thought for enterprise's marketing activities, and whether the marketing concept is in line with practical needs is related to the success of operation of enterprises. Because China's market economy is still unsound, and many enterprises seek short-term interests in production, lacking the considerations of environmental protection and social benefit. Most of the enterprises still lack proper understanding of varying levels of consumer demand, arising from demand for green products. Most of the enterprises lack consideration of difference of competitiveness of green products, and lack sufficient knowledge of market opportunities arising from the marketing concept. Although they realize the market opportunities brought by green marketing, they falter for fear of the exorbitant cost, thus they can not win market opportunities ultimately.

3.2 The sociality of green demand has not yet taken shape With China's economic development, there are a series of problems, such as environmental pollution, serious waste of resources, food safety issues and so on. Meanwhile, due to the low quality of the national people and lagging of the media publicity, most consumers do not understand the true meaning of green consumption, do not understand green products and the concept of green marketing, and have not yet formed the internal green consumer demand. Most of enterprises also lack fundamental understanding of changes of green consumer demand, and insufficient understanding of current market opportunities brought by the green marketing, which

makes the green marketing still in the state of low level, never forming socialized green marketing.

3.3 The production characteristic of green products has not yet formed The important part of implementing green marketing primarily is the production of green products. Only by improving the ecological environment can we bring true green products. Although the international community has long advanced the concept of clean production, and green manufacturing, and pursued the minimization of material consumption and energy consumption. The green production gets the widespread promotion and operation in some developed western countries. However, as China's production technology and production mode lag behind, and there are more inputs and less outputs in industrial production, the waste of resources is serious, generating considerable emission, waste water, and waste residue. According to statistics, the area of polluted China's farmland reaches as high as 80 million hm^2. This has fully demonstrated that backward production and management mode, will inevitably cause serious harm to the natural environment.

4 Countermeasures and suggestions

4.1 Pay attention to the propaganda and education of modern marketing concept As China is in the transitional period of economic system and the market economy system is not perfect, most economic subjects often lack a long-term vision in the implementation of marketing strategy and they tend to seek quick success and instant benefits in decision making. Therefore, the administrative authorities of the government should carry out a variety of forms of education and training on modern marketing concept, conduct guidance in terms of policies and enable enterprises to focus on long-term planning and harmonious development. In addition, they should also advocate and carry out green marketing strategies actively to establish a marketing sense which conforms to the green consumption demand[2].

4.2 Regulate the competition in the market of green products Because the order of the competition in the market is irregular, most enterprises lack professionalism and the sense of social responsibility, thus leading to the phenomen that fake green products and green marketing appear frequently. As the legal system and market supervision are not perfect, some non-green marketing enterprises attempt to take the " ride" of green marketing. For example, some enterprises produce large numbers of fake, shoddy, low-price, or even harmful products by making use of the immature consumption psychology and consumption attitudes of some consumers. This will threaten not only the health of human beings and environment, but also the survival and development of green marketing enterprises. Therefore, the government should pay attention to strengthening the management of the market, regulate the order of market competition and the behavior of marketing company and all kinds of media, promote the industrial self-discipline and cultivate a good professional ethic of enterprise and staff so as to enhance the social sense of responsibility.

4.3 Strengthen transparency of green market information We should intensify the whole society's supervision on the enterprise marketing and business activity, and expose those fake green products and fake green marketing by the supervision of various news media so that consumers will refuse to buy fake green marketing products and keep away from those products, thus making fake green products and fake green marketing lose their market at last.

4.4 Reinforce the legislation work of food safety Because of the inadequate understanding of the knowledge about consumer rights and interests and relevant laws, a majority of consumers lack relevant knowledge of green products and green marketing, and their awareness of fighting for the legitimate rights and interests and self-protection is poor. They can't give effective resistance to the fake green products and fake green marketing of some enterprises. Therefore, we should strengthen environmental protection and food safety legislation. Through different channels, we need to organize various forms of legal education, strengthen the knowledge of green products and the education of green marketing culture in the whole society so that consumers will protect their legal interests consciously and supervise the green marketing activities of enterprises. At the same time, we have to severely punish the fake green products and fake green market to achieve the goal that enterprises can not gain excessive profits through fake green marketing and enterprises can protect the legitimate rights and interests of the green enterprises.

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