Agricultural Products Marketing Analysis System in Big Data Era

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Abstract

Marketing is business activities including market research, audience selection, product development, promotion discount and so on in complex market environment to meet consumer demands and enhance the sales of enterprises. In the current market environment, market competition in the same industry and even different industries becomes fiercer due to the limited available market share. Marketing is paid wide attention as a way to enhance the sales volume and establish a good corporate image. As a kind of techniques for marketing, Internet can effectively reduce the cost of sales, improve the sales of agricultural products and market competition. Especially in the context of our country's great attention to agricultural development, it is of great theoretical and practical significance to carry out agricultural products marketing through the Internet and raise the income level of the farmers. Subject to a variety of subjective or objective factors, China's agricultural products marketing has some problems, and did not play its due role. Therefore, this paper excavates and analyzes the marketing data of agricultural products, and proposes the transformation path of agricultural products marketing, which is helpful to improve the marketing of China's agricultural products.

Keywords: Big Data, Agricultural Products, Marketing, Data Mining.

1. BACKGROUND

1.1 Introduction

The Internet is the greatest invention in the twentieth century. It brought human society together and radically affected people's traditional life style and development in various fields. Big data is an outcome of the highly developed Internet. Ma Yun, the founder of Alibaba Group, once mentioned that the future is not an information technology era but an era of data science and technology, which shows that big data plays an important role in the development of various fields. In the marketing of agricultural products, big data has had a huge impact on the traditional marketing mode. Moreover, it has brought new opportunities for the transformation and development of agricultural products marketing. Due to the interactive nature of the Internet, the Internet has solved the time and space constraints of traditional marketing, abandoned and can effectively improve the ability of information exchange with more freedom and less interference. Therefore, the traditional marketing model will undergo a great change, which is not just technical innovation, but also the reform of traditional marketing concepts.

1.2 Purpose

In the Internet environment, marketing reform based on big data is of great significance to promote the sustainable development of enterprises. First, to promote the marketing reform can establish a new global hope and trade network, effectively enhance the competitiveness of enterprises, especially bringing the opportunity for the development of small and medium-sized enterprises; Second, via the marketing reform, consumers can access to a large number of product information more conveniently, select the most affordable, best quality and most suitable products, so as to maintain the healthy development of the market; third, after the marketing reform, the rent for stores, insurance, business inventory pressure can be mitigated, reducing the marketing cost of the enterprise; Finally, carry out the marketing reform can establish a good corporate image. Through a variety of marketing activities, consumers can obtain personalized service, enhancing the satisfaction of the enterprise, thus establishing a good brand image (Tian et al., 2014). In e-commerce, the trade in agricultural products has its own particularity. The main features are as follows: First, agricultural products are indispensable materials in people's lives. The demand for agricultural products is continuous, and the agricultural products cannot be obtained through production by consumers and can only rely on agricultural development; second, people's demand for agricultural products is diversified. However, agricultural production is regional. Residents often want to obtain high quality
agricultural products from other places; Third, agricultural products are not unchanged. If they are transported for too long or without good preservation equipment, the agricultural products are subject to decay, causing unnecessary economic losses (Zhang and Fan, 2014). Marketing includes many aspects, such as sales of goods, market research, production and supply, creating market demand, balance public relations etc. Nowadays, marketing has become a science. After years of development, a variety of marketing tools and concepts have formed, such as integrated marketing, database marketing, online marketing, direct marketing, relationship marketing, green marketing, social marketing, viral marketing, crisis marketing and more. The enterprise must follow the following marketing principles: honesty and trustworthiness, righteousness and benefit, reciprocity and mutual benefit, and rational harmony (Yang, 2014).

2. AGRICULTURAL PRODUCTS MARKETING POSITIONING DECISION MODEL BASED ON CUSTOMER VALUE

2.1 Customer delivered value theory

The customer delivered value theory is proposed by Philip Kotler, the father of modern marketing. The idea of the method for inferring the customer value from the customer delivered value and the satisfaction is to calculate the difference between the total customer value and the total customer cost. The total customer value is the total benefit received by customers in receiving services or purchasing products, including product value, service value, personnel value, image value and so on. The total customer cost refers to the time, money, energy, physical strength, etc. that the customer spends in receiving services or purchasing products (Zhao and Yang, 2015). For customers, they often want to use the least cost to obtain more benefits. Therefore, in the process of shopping, different products will be compared to select the highest value and lowest price products, that is, the products with highest customer delivered value, the most competitive products, which is also a common purchase standard. The customer delivered value theory is a way to improve the competitiveness and enhance the corporate image by improving customer value (Jun and Zhang, 2013). Suppose the total customer value is $V_{tc}$, the product value is $V_p$, the service value is $V_s$, the staff value is $V_{ps}$, and the image value is $V_i$, then:

$$V_{tc} = f(V_p, V_s, V_{ps}, V_i)$$

(1)

In the above expression, any change of value factors will directly lead to the change of total customer value. Assuming the total customer cost is $C_{tc}$, the money cost is $C_m$, the time cost is $C_t$, and the mind cost is $C_e$ then:

$$C_{tc} = f(C_m, C_t, C_e)$$

(2)

The customer delivered value is the difference between the total customer cost and total customer value, and the formula for customer delivered value $V_c$ is as follows:

$$V_c = f(V_p, V_s, V_{ps}, V_i) - f(C_m, C_t, C_e)$$

(3)

The customer delivered value theory can bring some tips for the marketing. On the one hand, enterprises shall focus on not only the product value, but also consider marketing, after-sales service etc. in the marketing process for brand construction. On the other hand, it helps enterprises clarify the composition of the value of modern products and thus has a deeper understanding of marketing and puts forward many new ideas and methods (Wang et al., 2013).

2.2 Components of agricultural products customer value

In the current social context, enterprises want long-term development, not only need excellent quality, superior products, also need a sound marketing team. With the rapid development of the Internet, the homogeneity of product quality is so serious that it is difficult to increase sales through higher-quality products. As a result, marketing plays a more and more important role (Dan and Tian, 2013). Figure 1 shows the key components of customer value of agricultural products under the Internet Environment.
The customer price of agricultural products comprises of two parts: customer perceived benefit factors and customer perceived loss factors. The customer perceived benefit factors mainly comprise of: First, product quality, comprising use value, freshness and green degree of agricultural products; Second, brand, comprising population and reputation; Third, service, comprising attitude, effect, promise and speed. In addition, the logistics is also an important factor; Fourth, environmental science, comprising planting environment, geographical environment and environmental protection; Fifth, innovation, comprising science and technology and innovation, mainly the development level of agricultural mechanization; Sixth, customer relationship, comprising customer relationship service capabilities, as well as personalized customer service in the Internet environment; Seventh, personal preference, mainly comprising sociology, culture and personal (Wang, 2013). The customer perceived loss factors mainly comprise of: First, product price, the price of agricultural products; Second, time and energy cost in the Internet environment, spent on query and transactions of agricultural products; Third, psychological cost, comprising pesticide residue, quality and the safety of Internet transactions. Therefore, the marketing ideas are divided into the following two parts macroscopically:

First, increase the customer perceived benefit. Perform analysis of customer demands and preferences through big data analysis, and develop personalized products and services, such as fresh food delivery, home delivery, etc., so that services provided by enterprises are consistent with the demands of the customers, to enhance customer trust in the enterprise to create a good brand (Hu, 2011).

Second, reduce the customer perceived loss. In the trade of agricultural products, customer perceived loss is
mainly reflected in product prices, shopping convenience, logistics costs etc. In addition, the quality of agricultural products such as freshness, pesticide residues are also key factors affecting customer perceived loss. Therefore, agricultural enterprises should not only strengthen the marketing efforts, but also enhance the quality of the products (Li and Jing, 2011).

### 3. AGRICULTURAL PRODUCTS MARKET POSITIONING DECISION MODEL WITH CUSTOMER VALUE THEORY

#### 3.1 Customer value recognition model under the internet background

The rapid development of the Internet has changed the traditional mode of trade from the seller’s market to the buyer’s market. The focus of marketing has shifted from products to consumers. At the same time, the market competition has become increasingly fierce, attracting more attention on marketing. In the marketing of agricultural products, customer value is the most important basis for determining shopping behavior. The customer value cognitive process is influenced by internal stimulus and external stimulus. The internal stimulus mainly refers to their demands, physical and psychological, etc. The external stimulus refers to the attributes of the product, market environment, etc. (Zhou, 2015). Figure 2 shows the model of customer value recognition under the internet background.

![Figure 2. The Model of Customer Value Cognition under the Internet Background](image)

**3.2 Purchase decision model from customer value perspective**

**3.2.1 Description of model**

Suppose that under the internet background, there are k kinds of agricultural products P sold by the enterprise, and there is a customer C. Purchasing this commodity via the internet platform, assuming that \( P_j \) denotes the j-th product of agricultural products P and contains n kinds of customer perceived benefit attribute PB and m kinds of customer perceived loss attribute PS, where CV denotes the customer value in product P, and j, k, n and m denote the natural numbers, satisfying \( 1 \leq j \leq k \) (Liu and Cheng, 2015). We can see:

The customer perceived benefit vector of \( P_j \) is: \( PB_j = (pb_{j1}, pb_{j2}, ..., pb_{jn})^T \), the customer perceived loss attribute vector of \( P_j \) is: \( PS_j = (ps_{j1}, ps_{j2}, ..., ps_{jn})^T \), the customer recognized perceived benefit attribute weight vector is: \( WB_j = (wb_{j1}, wb_{j2}, ..., wb_{jn})^T \), the customer recognized perceived loss attribute weight vector is: \( WS_j = (ws_{j1}, ws_{j2}, ..., ws_{jm})^T \), the customer value of \( P_j \) is: \( CV_j = F(PB_j, PS_j, WB, WS) \), and the purchase decision behavior is: \( MAX(CV_1, CV_2, ..., CV_j, ..., CV_k) \). Therefore, in essence, the process of purchase decision is process of customer value maximization. How to evaluate customer value is the key issue of purchase decision.
3.2.2 Formula

We can see from the above that customer perceived profit vector and customer perceived loss vector contain a variety of different attributes respectively. In this paper, assuming the following conditions are true, you can calculate the customer perceived benefit attribute and customer perceived loss attribute using the level-additive weight method. The conditions are as follows:

First, the individual attributes of customer value satisfy the various conditions required by the additive form;
Second, all kinds of value functions are linear.

Therefore, the customer perceived benefit for $P_j$ is evaluated as:

$$V_j = WB \times PB_j = \sum_{i=1}^{n} wb_i \ast pb_{ji}$$  \hspace{1cm} (4)

The customer perceived loss for $P_j$ is evaluated as:

$$C_j = WS \times PS_j = \sum_{i=1}^{n} ws_i \ast ps_{ji}$$  \hspace{1cm} (5)

Using the same method, we can also conclude the result of $pb_{ji}$ and $ps_{ji}$. According to the above, two results can be obtained. The first one is the customer value based on the value chain potency difference. The remaining absolute value obtained by the customer after purchasing the product is evaluated, focusing on the customer value. Second, customer value based on the potency ratio of the value project, which evaluates the product value for the customer's unit cost, and focuses on qualitative evaluation of the product value (Zhang, 2016).

3.3 Factors affecting the shopping behavior

3.3.1 Cultural factor

Culture has a subtle influence on customer behavior and the most essential element in determining human desires and behaviors. In human society, people of different social class still have different cultures, values, and behaviors. First, people of the same class have similar code of conduct and ideological and ethical standards than those from different classes; Second, people can judge their social status by their social class; Third, the social class is affected by many factors; Finally, the social class is not static but changing (Zhao et al., 2013).

Human beings are social animals. In different social environments, they will exert some influence on people's consumption, mainly including: First, the reference groups show new behavior patterns and lifestyles to consumers; second, each person tends to imitate the behavior of others. A consumer trend often leads to consumer frenzy; Finally, people's consumption tends to be consistent to a certain degree, which will have a direct impact on the choice of brands and products, and the influence of reference groups is related to the product brand, product quality and life cycle of enterprises. Therefore, in the process of marketing, we should increase the emphasis on reference groups and conduct marketing through reference groups (Chen et al., 2011).

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