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Establishment of Chinese Agricultural Brand Value Scale and Study of Its Reliability and Validity Based on Customer Value

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Abstract In this paper, we explore the influencing factors as well as inherent mechanism related to the formation of Chinese agricultural brand value. On the basis of empirical survey on Chinese agricultural brand, we establish a scientific and operable evaluation indicator system to measure Chinese agricultural brand value, and this system consists of four parts (brand quality and safety control force, brand market power, brand innovation force, brand vitality).

Key words Agricultural brand, Customer value, Brand value

1 Introduction

Agricultural branding is an inevitable result of market-oriented, specialized and socialized agricultural production. The level of China's agricultural branding is not high, and it is now in a critical period of industrial upgrading and brand creation. Agricultural brand is the extension and use of brand concept in agricultural products, and it can be used to identify agriculture-related product attributes, representing product managers' pledges and commitments for consumers, so it is intangible asset for agricultural product owners. Agricultural brand is formed on the basis of product differentiation, and there are a variety of reasons for this differentiation, including the differences in types, production areas, production methods and marketing methods. Customer value, as the value orientation of customer, leads to the relationship with consumer spending behavior. Foreign scholars' studies on customer value are focused on the following aspects. The first is the definition and connotation of customer value. Forbis *et al.* (1981) believe that customer economic value refers to the highest value that consumers are willing to pay when they know comprehensive information about known core products and other products, and can obtain the competing products (Forbis JL, Mehta NT, 1981). Christopher (1982) points out that customer value is the price that customers are willing to pay in order to get goods, and such willingness to pay is the perceivable benefit provided by goods to the customer (Christopher M, 1982). The second is how companies provide high-quality customer value for customers based on the correct understanding of customer value. In this regard, Philip Kotler, Porter and Carpenter all put forward their respective views. In addition, some scholars, such as Desarbo, try to quantify the customer value. Brand value mainly consists of cost value, relationship value and rights value. Brand value is the stable future excess return brought by brand to the enterprise, and it is an intangible asset of brand. It needs the enterprise's efforts on brand

operating and maintenance, and it also depends on the consumer's internal cognition of brand, and is the result of interaction between enterprise and consumer. Agricultural brand value, on the basis of this definition, is the further expansion in the field of agriculture. In this study, based on brand value, we put forward the agricultural brand value evaluation methods in line with Chinese agricultural brand characteristics, establish the indicator evaluation system for Chinese agricultural brand value, analyze the current situation of brand value, and explore the reasons for low agricultural brand value in China.

2 Evaluation system for agricultural brand value

2.1 Evaluation design of agricultural brand value In this study, referring to the agricultural brand value evaluation system established by Li Min (2008) and MSQD method developed by Bai Guang and Ma Guozhong (2006), we divide the agricultural brand value evaluation system into brand market power, quality and safety control force, brand innovation force, and brand vitality of agricultural products. The intensity indicators of agricultural brand value are divided into 4 first level indicators, 10 second level indicators, and 24 third level indicators, and the weight of each evaluation indicator is calculated according to the Delphi method. The quality and safety control force of brand is selected due to the particularity of agricultural products. The quality and safety level of agricultural products is constrained by the environmental quality in the origin and industrialization level. Brand market power includes brand's market share, market characteristics and regional influence. In terms of brand innovation force, capability of independent innovation has become a core factor of brand value competitiveness, and scientific fund management and R&D investment is an inexhaustible motive force to promote innovation of the brand. In terms of brand vitality, on the one hand, it focuses on the existing viability of brands and examines whether the brands comply with the law and are protected by law; on the other hand, it also focuses on the future development of brands, and examines the efforts of enterprises in brand operation. To ensure that the data obtained are really reliable and truly reflect the operation of en-

terprises, we can use industrial analysis report of agricultural products and company's open annual report, as well as the financial, business management and service information obtained by the enterprises. For the qualitative part, the third-party evaluation in-

stitutions and internal and external experts in the project team are responsible for scoring, and necessary conversion is performed, to get scientific evaluation results of agricultural brands.

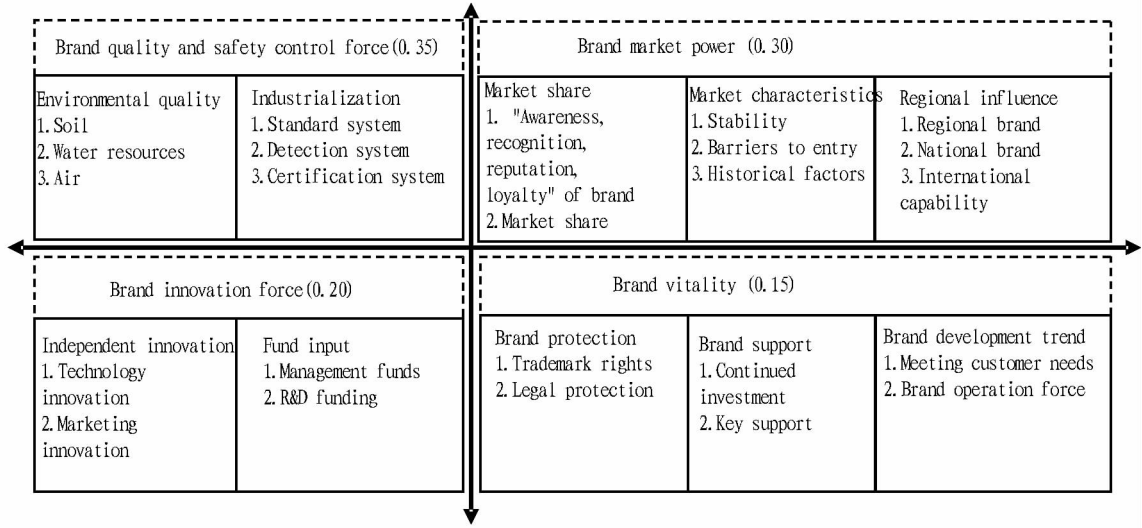


Fig.1 The evaluation indicator system model for Chinese agricultural brand value

2.2 Computing formula of agricultural brand value Brand value, like other similar economic assets, is the present value of ownership benefits. The formula is as follows:

$$\text{brand value} = \text{brand benefit} \times \text{brand strength multiplier}$$

where *brand benefit* represents the expected excess profit brought by brand; *brand strength multiplier* is determined primarily by the strength of the brand.

In the process of calculating brand benefit, the core is to determine the profits of the brand, which is the foundation of the entire assessment. In calculating brand value, it uses the profit after tax for three consecutive years, and under normal circumstances, it uses the average of the company's effective tax rate. The specific formula is as follows:

$$\text{brand earnings} = (\text{earnings} \times 3 + \text{earnings in the previous year} \times 2 + \text{earnings in the year before last} \times 1) / (3 + 2 + 1).$$

The calculation of brand strength coefficient is based on the brand value computing method of Interbrand, and the formula of relationship between brand strength and brand strength multiplier is as follows:

$$250y = x^2, x \in [0, 50]; (y - 10)^2 = 2x - 100, x \in (50, 100]$$

where x is the brand strength score; y is the brand strength multiplier.

2.3 Agricultural brand value scale In this paper, based on the four dimensions of evaluation indicator system model for Chinese agricultural brand value (Fig. 1), referring to the relevant literature, we design the items in line with agricultural brand value assessment (Table 1). (i) The first level indicator of brand quality and safety control force is divided into two second level indicators (environmental quality and industrialization). Environ-

mental quality includes three items, and industrialization also includes three items. (ii) The first level indicator of brand market power is divided into three second level indicators (market share, market characteristics and regional influence). Market share has four items, market characteristics include three items, and regional influence has three items. (iii) The first level indicator of brand innovation force is divided into two second level indicators (independent innovation and fund input). Independent innovation has five items and fund input has two items. (iv) The first level indicator of brand vitality includes three second level indicators (brand protection, brand support and brand development trend). Brand protection has two items, brand support has two items, and brand development trend has two items.

3 Empirical survey and analysis

3.1 Sample distribution In this survey, a total of 1200 questionnaires are given out, and 1060 valid questionnaires are returned. The questionnaire involves distribution of samples in each dimension. The ratio of male to female respondents is about 1.2:1, basically reaching a balance; more than 80% of respondents receive bachelor degree or above; most of respondents work in enterprises and institutions, or are self-employed, or work freelance from home, accounting for 97% of total samples; 88.8% of respondents' annual household income is less than 80000 yuan, but there are still 19.2% of respondents with annual household income of 80000-150000 yuan; in terms of purchase frequency of Chinese agricultural products, 94.5% of respondents purchase products every day; in terms of purchase expense, 98.5% of respondents pay expense of more than 200 yuan, and 79% of respondents pay expense of more than 500 yuan. In summary, the

samples are largely representative.

Table 1 Agricultural brand value scale design

First level dimension	Second level dimension	Items	Sources
Brand quality and safety control force (0.35)	Environmental quality (0.5)	Lead, cadmium, mercury, arsenic and chromium in the soil of brand product origin reach the standard. The pH, cadmium, copper, mercury, arsenic and chromium in the production water for the brand product reach the standard. Carbon dioxide, nitrogen fluoride, and total suspended particles in atmosphere of the brand product origin reach the standard.	Li Wenfeng <i>et al.</i> (2011)
	Industrialization(0.5)	The brand product meets national standards, industry standards and regional standards in production. The brand product gets organic product certification, GAP certification, HACCP certification, and green market certification. In terms of testing, the brand product meets national standards, industry standards and regional standards.	
	Market share (0.5)	The brand product is very well-known in the similar products. Consumers are willing to pay a certain degree of reasonable premiums to buy the brand product. I can distinguish this brand product from other similar products. When one type of product is mentioned, I can quickly think of brand A product.	
	Market characteristics (0.3)	The brand market is stable. Economies of scale, high costs, resource occupation, product differentiation, and policy and regulation barriers, make other brands of similar products difficult to enter. The brand has a long history.	
Brand market power (0.30)	Regional influence (0.2)	Production and marketing of one brand product is completely finished in a small region, and all sales are from this region. Production and marketing of one brand product is throughout the country, and sales are from across the country. Production and marketing of one brand product is throughout the world, and more than 20% of sales are from international markets.	Yoo <i>et al.</i> (2000) Qiu Xiaodong <i>et al.</i> (2002) Keller (1993) Wang Xiaoyun (2011)
	Independent innovation (0.5)	The brand continues to improve existing products or services. The brand continues to improve existing technologies and methods. The brand strives to reduce various kinds of costs. The ads launched by this brand always use unconventional ways. The brand seldom adopt the distinctive marketing tools.	
	Fund input (0.5)	The brand continues to invest management funds in innovation. The brand continues to invest R&D funds in innovation.	
	Brand protection(0.3)	When the trademark rights are violated, the brand conducts active protection. The brand registers trademark timely and properly, and is protected by Trademark Law.	
Brand innovation force(0.2)	Brand support (0.4)	The brand gets continuous resource support from the parent company. The brand gets preferential resource support from the parent company.	Sands <i>et al.</i> (1977) Yang Zhi (2006)
	Brand development trend (0.3)	The brand product can meet my needs. The brand has the ability to attract customers through the brand promotion and market expansion.	
Brand vitality (0.15)			Han Bing (2005) Wu Youping (2002) Wang Like (2005)

3.2 Reliability and validity analysis In reliability test, α coefficient of agricultural brand value scale is 0.671, within the scope of reliability, so the reliability of the questionnaire meets the requirements. Validity test is divided into content validity test and construct validity test. The reference to high-quality questionnaire and previous in-depth interviews, have ensured the content validity of the questionnaire. In terms of structure validity, this study aims to explore the internal structure of consumers' food safety psychological contract, so the factor analysis is used to test the con-

struct validity of the questionnaire analysis. Bartlett sphericity test and KMO test results show that KMO of Chinese agricultural brand value scale is 0.789, and P is 0.000, indicating that it is suitable for factor analysis. Bartlett sphericity test is used to test the independence of the variables. Factor analysis results show that the internal structure of Chinese agricultural brand value consists of four common factors (Table 2), and the cumulative variance explanation rate is above 60%, so the construct validity of the questionnaire is good.

Table 2 Dimension weight and factor naming

Factors	Items	Factor score	Weight
Brand quality and safety control force (0.35)	Lead, cadmium, mercury, arsenic and chromium in the soil of brand product origin reach the standard.	0.671	0.07
	The pH, cadmium, copper, mercury, arsenic and chromium in the production water for the brand product reach the standard.	0.791	0.175
	Carbon dioxide, nitrogen fluoride, and total suspended particles in atmosphere of the brand product origin reach the standard.	0.781	0.105
Brand market power (0.30)	I can distinguish this brand product from other similar products.	0.838	0.09
	When one type of product is mentioned, I can quickly think of brand A product.	0.851	0.15
	The brand market is stable.	0.814	0.06
Brand innovation force (0.2)	The brand continues to improve existing technologies and methods.	0.627	0.04
	The brand strives to reduce various kinds of costs.	0.789	0.1
	The ads launched by this brand always use unconventional ways.	0.768	0.06
Brand vitality (0.15)	The brand gets continuous resource support from the parent company.	0.756	0.03
	The brand gets preferential resource support from the parent company.	0.806	0.075
	The brand product can meet my needs.	0.767	0.045

4 Conclusions

This study explores the key components of Chinese agricultural brand value, and establishes the theoretical framework of Chinese agricultural brand value. The building of evaluation indicator system for agricultural brand value and research results of its influencing factors, can provide practical guidance for the construction of agribusiness brand, regional agricultural brand and Chinese agricultural brand. Meanwhile, it is of great significance to promoting transformation and upgrading of modern agriculture, deepening rural reform, implementing agricultural and rural economic development plan, solving issues concerning agriculture, farmers and countryside, improving the quality of agricultural products and food safety, increasing farmers' income, enhancing the international competitiveness of agricultural brand, and achieving the shift from agricultural power to agro-brand power.

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