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REVIEW ARTICLE

## CONSTRUCTION OF A MATURE CIGARETTE BRAND COMPETITIVENESS EVALUATION SYSTEM BASED ON ENTROPY METHOD

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### ARTICLE DETAILS

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### ABSTRACT

In recent years, the tobacco industry has accelerated the development strategy of "big brand, big market and big enterprise", and the competitive landscape of cigarette brands has been taken shape. Based on the brand management goal of tobacco commercial enterprises and a review of existing research, this paper explores the evaluation model of brand competitiveness used entropy method. The research results show that the competitiveness of mature brands includes three aspects: development potential, market ability and basic ability, among which indicators such as market share and price index have the greatest influence on brand competitiveness.

### KEYWORDS

entropy method, cigarette brand, competitiveness, evaluation system

## 1. INTRODUCTION

In recent years, the tobacco industry has firmly implemented the development strategy of "big brand, big market, big enterprise", promoted the brand development goal of "136 and 345", further optimized the layout of cigarette brands, and the new competitive landscape of cigarette brands has been taken shape. However, with the change of environment and the adjustment of policies industrial enterprises often respond to the intensified competition with new product research and development, and the problem of "many, scattered and small" cigarette brands (specifications) is still unresolved. Too many cigarette brands (specifications) not only make it difficult to form the echelon layout of leading-guard-potential, but also cause problems such as scattered brand cultivation resources and vague cultivation goals of commercial companies. The tobacco industry urgently needs to establish a scientific and effective brand competitiveness evaluation model, and then perfect the mechanism of survival of the fittest, clarify the cultivation direction, standardize the retirement of product specifications, and form a good brand development pattern.

According to the brand life cycle theory, the development of a brand generally goes through four stages: introduction, growth, maturity and decline, and the characteristics of the four stages are obviously different. If all the product specifications are investigated and studied in a unified way, it is bound to cause confusion and imprecision in the index system. This paper takes the brands (specifications) that have entered the mature period as the research object, on the basis of reviewing the evaluation research of brand competitiveness, comprehensively sorts out the composition indicators of cigarette brand competitiveness, uses entropy method to establish the evaluation index system of mature cigarette brand competitiveness, defines the weights of various indicators in the evaluation system, and finally forms the evaluation model, which provides reference for tobacco commercial companies to carry out the evaluation of cigarette competitiveness.


## 2. LITERATURE REVIEW

The American Marketing Association (AMA) considers that a brand is a

name, term, mark, symbol, and design, or a combination of them, in order to identify a seller or a seller's products or services, and distinguish them from those of a competitor. Brand is considered to be an important asset of enterprises, which is of great significance for enterprises to participate in market competition. Brands survive in the survival of the fittest in market competition, and in this process, they have formed competitiveness of different competitiveness (Jiang and Dong, 2008).

After a long-term exploration, the marketing community has produced many brand evaluation methods, such as Interbrand evaluation method, Financial World evaluation method and MSD evaluation method, among which MSD evaluation method believes that brand value is the sum of brand market share, value-added profitability and development potential. Xu conducted a systematic study on brand competitiveness and believed that brand competitiveness includes three aspects of capabilities, namely brand marketability, brand management ability and brand foundation ability (Xu, 2005). Huang Shengquan and Jiang Lamei used the MSD evaluation method to evaluate the competitiveness of cigarette brands, which confirmed the effectiveness of the method (Shengquan and Lamei, 2009). Yue Yang believed that cigarette brand competitiveness should be constructed from three aspects: brand market ability, brand relationship ability and brand foundation ability (Yang, 2010). A group researchers explored a comprehensive evaluation system of brand competitiveness from the perspective of the brand management (Huan et al., 2015). Based on the three levels of industry, retailers and consumers, they sorted out 12 indicators, including sales volume, sales volume, over-the-counter listing rate and demand satisfaction. A group researchers explored brand competitiveness from three dimensions of financial performance, market performance and brand innovation (Zhao et al., 2015).

Although scholars and experts both inside and outside the industry have conducted systematic research on brand competitiveness, and have drawn some valuable conclusions, it is difficult to carry out and implement. Many indicators need a large number of investigations and interviews, which is difficult to implement conveniently and quickly at the level of prefecture and municipal tobacco companies. Based on the previous studies, this paper will adhere to the basic principles of simplicity, convenience, operability and comparability, and explore the construction of the

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evaluation index system of brand competitiveness of prefecture level and municipal tobacco companies.

### 3. CONSTRUCTION OF EVALUATION SYSTEM

From the existing research, the research of brand competitiveness basically focuses on brand making profit ability, brand market expansion ability and brand basic management ability. The core significance of brand competitiveness evaluation of tobacco commercial enterprises lies in adjusting the brand layout, clarifying the cultivation focus, optimizing the allocation of resources, and further improving the efficiency of brand cultivation. Based on the perspective marketing decision-making of tobacco commercial enterprises this paper believes that the evaluation index system of cigarette brand competitiveness should include three dimensions: development potential, market ability and basic ability.

#### 3.1 Development Potential

The sustainable development of the brand means that it has strong vitality, which is the reflection of the ability of effectively utilizing resources in the fierce market competition. Brand growth ability is the focus of tobacco companies' attention, also, it is the key to testing brand cultivation (Jia, 2018). Tobacco commercial companies focus on volume growth rates. Because the profit margin of cigarette of commercial companies is relatively fixed, the profit growth rate of cigarette is defined as the retail price index from the perspective of brand sustainable brand development and considering the profit level of retail customers. The sustainable development of cigarette brands requires the support of loyal customers. The higher the brand loyalty index, the stronger the retail customers' preference for brand management (Huan et al., 2015). For the convenience of operation, this paper measures the customers' loyalty to cigarettes by preference. To sum up, the development potential should include three indicators: sales growth rate, price index and preference.

#### 3.2 Market Ability

Market ability is the ability of a brand to attract consumers in the market competition, so as to obtain competitive advantage, reflecting the performance of the brand in the market. Market share is the main embodiment of market ability, reflecting the market value of the brand (Huang and Jiang, 2009; Yue, 2010). The dynamic sales rate of cigarette brand is an important aspect of their market performance, and the higher the dynamic sales rate, the higher the degree of best-selling. From the order level, it can also better reflect the strong demand of retail customers for cigarette brands, including the on-the-counter listing rate, repurchase rate and full order rate and other indicators. Overall, market ability should include five indicators, including market share, dynamic sales rate, over-the-counter listing rate, repurchasing rate and full order rate.

#### 3.3 Basic Ability

Xu Jinan believes that brand basic ability of brand is composed of enterprise management capability, technological innovation capability, human capital, etc. (Jinan, 2005). The formation of brand competitiveness cannot be separated from enterprise resource investment and marketing support (Wang and Yu, 2007). From the industry level, many resources tend to the cultivate key brands, so "whether the national key brand" is taken as one of the evaluation indicators. The management ability of tobacco commercial enterprises for brand is mainly reflected in the stability of supply, the support of cultivation, etc. In this paper, the data such as out of stock rate and demand satisfaction rate are used to represent the support of brand cultivation. Therefore, the basic brand ability should be composed of three indicators: whether it is a key brand, the out of stock rate and demand satisfaction rate.

In summary, the evaluation index system of cigarette brand competitiveness includes three dimensions: development potential, market ability, and basic ability, with 11 indicators (see Table 1).

**Table 1:** Evaluation Index System of Cigarette Brand Competitiveness

	Dimensions	Index	Indicator Description or Calculation Formula	Index Attribute
Evaluation Index System of Cigarette Brand Competitiveness	Development potential	Growth rate	$(\text{Sales in current period} - \text{Sales in previous period}) / \text{Sales in previous period} \times 100\%$	Positive
		Price Index	$(\text{Market retail price} / \text{retail guide price}) \times 100\%$	Positive
		Degree of preference	Retail customer preference for cigarette brands (specifications)	Positive
	Market ability	Market share	$(\text{Sales volume of product specification} / \text{total sales volume of this gear}) \times 100\%$	Positive
		dynamic sales rate	$\text{Sales volume in current period} / (\text{purchased in current period} + \text{previous inventory}) \times 100\%$	Positive
		over-the-counter listing rate	$(\text{Number of ordering retail households customers} / \text{number of launching households}) \times 100\%$	Positive
		Repurchasing rate	$(\text{Number of customers ordered in the previous period and re-ordered in the current period} / \text{number of customers ordered in the previous period}) \times 100\%$	Positive
		Adequacy ratio	$(\text{Sum of customer order quantity in current period} / \text{sum of customer launch limit}) \times 100\%$	Positive
	Basic ability	Key Brands	Key brand or not (1/0)	Positive
		Stock-out rate	The shortage of retail customers is obtained according to market survey data	Positive
		Demand satisfaction rate	The situation that the cigarette meets the needs of customers is obtained according to the market survey data.	Reverse

### 4. DATA SOURCE, ANALYSIS METHOD AND RESULT APPLICATION

#### 4.1 Data Source

The data used in this study are from the cigarette sales data and market survey data of Enshi tobacco company Taking cigarette brands (specifications) as the research object, through the marketing information system, we obtained the data of all the mature products in sales in Enshi Prefecture in 2020, and collected the indicators such as preference, out of stock rate, demand satisfaction rate and other indicators according to the Investigation of Cigarette Brands (Specifications) in Sale and the Investigation of Cigarette Sales Status uniformly organized by the provincial bureau (company).

#### 4.2 Selection of Evaluation Methods

The construction of cigarette brand competitiveness evaluation index system involves multiple dimensions and indicators. In the previous studies, the more mature methods are analytic hierarchy process (AHP), principal component analysis and entropy method. The analytic hierarchy process is a method based on subjective weighting, which cannot completely avoid subjective factors, and is difficult to select an objective and impartial expert group. Principal component analysis (PCA) is a dimension reduction statistical method. Since the number of indicators studied in this paper is only 11, this method is not selected temporarily. Entropy method is a mathematical method used to judge the dispersion degree of indicators. A group researchers verified the consistency of this

method and principal component analysis method in studying the development level of agricultural insurance (Lyu et al., 2016). Gui and Xing also used this method to study the cigarette brand specification layout, proving the effectiveness of the method (Gui and Xing, 2020). Therefore, the paper uses the entropy method which is more intuitive and easier to operate.

**4.3 Calculation and Analysis Process**

**4.3.1 Standardization**

Due to different indicator units and different calculation methods, it is necessary to standardize all indicators. In this paper, the extreme value method is used to transform the original data and convert all indicator values into numerical values between 0 and 1. The calculation formula is as follows:

Positive indicators:

$$X_{ij} = \frac{x_{ij} - m_j}{M_j - m_j} \tag{1}$$

Wherein,  $M_j$  is the maximum value in index j,  $m_j$  is the minimum value in index j, and  $x_{ij}$  is the j index value of brand I.

Adverse indicators:

$$X_{ij} = \frac{M_j - x_{ij}}{M_j - m_j} \tag{2}$$

Since some indicators may be 0, in order to ensure the effectiveness of the data analysis, the data is translated as a whole, adding 0.0001 to all indicators.

**4.3.2 Calculation of Information Entropy**

First, calculate the index value proportion of each index:

$$p_{ij} = \frac{x_{ij}}{\sum_i^n x_{ij}} \tag{3}$$

Where n is the number of samples, that is, the number of mature products on sale. Then calculate the entropy value of each index, the entropy value of index number:

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^n p_{ij} * \ln(p_{ij}) \tag{4}$$

Then calculate the difference coefficient:

$$g_j = 1 - e_j \tag{5}$$

And finally determining the weight of each evaluation index:

$$W_j = \frac{g_j}{\sum_{j=1}^m g_j} \tag{6}$$

**4.4 Empirical Analysis Results**

After calculation and analysis, the weight table of the evaluation indexes is obtained (see Table 2). The sum of the weights of all indexes is 1. Due to the large number of indexes, the weight distribution each index is quite different. The first index is the market share, with a weight of 0.4193, and the second index is the price index, with a weight of 0.1952, while the weight of the growth rate is low. From the perspective of the development stage of mature brands, this result basically conforms to the characteristics of this stage, that is, the sales growth tends to be flat, and the market share and price level have a greater impact on their competitiveness. The weight of out of stock rate, satisfaction rate and preference is between 0.0718 and 0.1003, while other indexes are lower than 0.04.

**Table 2: Weight Table of Evaluation Indexes of Cigarette Brand Competitiveness**

Project	Growth rate	Price Index	Degree of preference	Occupancy	dynamic sales rate	over-the-counter listing rate
e	0.9829	0.9000	0.9632	0.7852	0.9916	0.9907
g	0.0171	0.1000	0.0368	0.2148	0.0084	0.0093
W	0.0334	0.1952	0.0718	0.4193	0.0163	0.0181
Project	Repurchasing rate	Adequacy ratio	Brand Positioning	out of stock rate	Satisfying rate	
e	0.9858	0.9891	0.9878	0.9486	0.9627	
g	0.0142	0.0109	0.0122	0.0514	0.0373	
W	0.0277	0.0214	0.0238	0.1003	0.0727	

According to the weight table, multiply the weight by the ratio of the index of each specification to obtain the comprehensive score of competitiveness evaluation of each product specification. Then, rank based on the score, and the comprehensive score formula is as follows:

$$S_i = \sum_{j=1}^m w_j \times p_{ij} \tag{7}$$

Due to the large number of product specifications, this paper only lists the top 15 comprehensive scores of product specifications, as shown in Table 3.

**Table 3: Comprehensive Score and Sorting Table of Product Classification**

Product specification	Composite score	Sort
Huanghelou (soft 1916)	0.0448	1
Hongjinlong (soft boutique)	0.0365	2
Huanghelou (Soft Treasure)	0.0329	3
Huanghelou (Soft Blue)	0.0321	4
Huanghelou (Hard Canyon Soft)	0.0314	5
Hongjinlong (Hard New Version)	0.0295	6
Hongjinlong (Soft Blue jiuzhou Tenglong)	0.0256	7
Chunghwa (soft)	0.0222	8
Hongjinlong (Hard Red Dragon)	0.0206	9
Liquan (new version)	0.0192	10
Baisha (hard)	0.0192	11
Furongwang (Hard)	0.0178	12
Chunghwa (Double Middle Branch)	0.0171	13
Huanghelou (Scene of Hard Snow)	0.0165	14
Septwolves (Love)	0.0165	15

According to the comprehensive score of the final index, it can be seen that the top 15 product specifications are basically those with high local development potential, with a large number of loyal consumer groups and a stable market development trend, proving that the data analysis is accurate and effective.

**4.5 Result Application and Output**

Based on the previous analysis results, a brand competitiveness evaluation system for tobacco commercial enterprises is constructed, which involves 3 dimensions and 11 indexes. Assign scores for each dimension based on a percentage system, with a development potential

dimension weighting of 30 points, a market ability dimension weighting of 50 points, and a basic ability dimension weighting of 20 points. According to the measurement and calculation results of each index, it is assigned a value, and each weight value is rounded; meanwhile, in combination with the general experience in the construction of the index system, the index weight is generally not higher than 30%, so the index weight shall be adjusted appropriately (see Table 4 for details). In the actual operation, tobacco commercial enterprises can establish the segmented interval scores of each evaluation index according to the brand development strategy and marketing management target, achieving precise management of brand evaluation.

Table 4: Evaluation System of Cigarette Brand Competitiveness				
Dimensions	Index	Original weight	Adjust weight	Data source
Development potential (30 points)	Growth rate	3	3	Sales data
	Price Index	20	20	Information acquisition system
	Degree of preference	7	7	Market research
Market ability (50 points)	Market share	40	30	Sales data
	dynamic sales rate	2	5	Information acquisition system
	over-the-counter listing rate	2	5	Sales data
	Repurchasing rate	3	5	Sales data
	Adequacy ratio	3	5	Sales data
Basic ability (20 points)	Key Brands	3	3	Industry documents
	out of stock rate	10	10	Market research
	Demand satisfaction rate	7	7	Market research

**5. CONCLUSIONS**

On the basis of previous research, this paper sorts out various indexes that affect the competitiveness of cigarette brands and constructs a brand competitiveness evaluation system. The research results show that the competitiveness of mature brands includes three aspects: development potential, market ability and basic ability, among which market share, price index, out of stock rate, preference and demand satisfaction ratio have higher weight. Based on the conclusions of the study, the following recommendations are proposed.

**5.1 Focus on Promoting Brand Concentration**

The results of this study show that market share is the index with the highest weight, which has the greatest impact on brand competitiveness. Therefore, when cultivating mature brands, tobacco commercial enterprises should focus on promoting the development strategy of "big brands, big markets, and big enterprises", actively integrating into the "136 and 345" brand development plan, further reducing the sales specifications, focusing on improving the brand concentration, focusing on the core brands, and continuously expanding scale.

**5.2 Focus on Stabilizing Market Conditions**

Market price is the basic guarantee for customers to make profits. Mature brands can provide stable operating profits for customers due to their large sales volume. Therefore, in the maintenance of mature brands, it is necessary to pay high attention to the market price index, strictly implement the price adjustment policies, maintain strong prices of mature brands and boost the confidence of retail customers. in business operations.

**5.3 Focus on Maintaining the Balance between Supply and Demand**

The high out of stock rate has to some extent affected the stability of brand development. Tobacco commercial companies should strengthen the analysis of brand out of stock and demand satisfaction, increase supply guarantee efforts, accurately grasp the balance point between out of stock rate and satisfaction, find a reasonable range for the stable operation of various product specifications, and promote healthy and sustainable development of the brand through supply and demand balance.

**REFERENCES**

Chengsong, J., 2018. Research on Constructing a Comprehensive Evaluation System for Cigarette Brands by City level Tobacco Companies. *Contemporary Economics*, 03.

Guiyan, Z., Luning, X., and Jianhua, Z., 2015. Research on Cigarette Brand Competitiveness Based on CBI Theory. *China Management Informatization*, (18), Pp. 120-121.

Jinan, X., 2005. Research on Brand Competitiveness. *Economy & Management publishing house*.

Kaiyu, L., haibo, S., Qian, Z., 2016. Analysis of Regional Agricultural Insurance Development Level Based on Principal Component Analysis and Entropy Method: Data from Provincial Level in China from 2008 to 2013. *Journal of Agrotechnical Economics*, 03.

Lian, G., and Zhelin, X., 2020. Discussion on the Distribution of Cigarette Brand Specifications in Market Oriented Reform--Quantitative Evaluation of Cigarette Brand Competitiveness Index Based on Entropy Method. *Commercial Modernization*, 24, Pp. 9-12.

Peng, H., Jushui, G., Xianghui, Q., 2015. Market-based comprehensive evaluation system of cigarette brand competitiveness. *Acta Tabacaria Sinica*, 01, Pp. 100-102.

Qi, W., and Mingyang, Y., 2007. Theoretical Exploration on the Hierarchy Evaluation Model of Brand Competitiveness. *Marketing Herald*, (6).

Shengquan, H., and Lamei, J., 2009. Research on the Evaluation of China's Cigarette Brand Competitiveness Based on AHP. *Entrepreneur World*, 12, Pp. 41-42.

Yan, J., and Dahai, D., 2008. Definition, Generation and Evaluation of Brand Competitiveness from a Consumer Perspective. *East China Economic Management*, 22 (4).

Yang, Y., 2010. Comprehensive Evaluation Model of Key Cigarette Brand Competitiveness Based on Multiple Evaluation Indexes. *Modern Business*, 14, Pp. 86-87.

