

## Research Article

### An Empirical Study on Marketing Effectiveness Evaluation of Green Food Industry

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**Abstract:** This study aims to evaluate the marketing effectiveness of green food industry in Hubei Province via fuzzy comprehensive evaluation. Based on the cost basis of analysis of present situation, an evaluation system of marketing effectiveness evaluation on green food industry is established from three aspects, including the industry factor, policy factor and marketing performance factor. And fuzzy comprehensive evaluation method is used to make the quantitative research, analyze the major obstacle to promotion of green marketing. Finally some countermeasures are proposed to promote the marketing effectiveness of green food industry in Hubei Province.

**Keywords:** Evaluation, fuzzy comprehensive evaluation, green food, marketing effectiveness

#### INTRODUCTION

Green food is a safety, quality, nutritious food. Complying with the principles of sustainable development, green food is produced according to specific criteria and methods, identified by the specialized agencies and licensed to the use the logo of green food. Green food is an important achievement in the field of agricultural products and food safety certification in China. As a major agricultural province, Hubei is a land flowing with milk and honey, where green food is rich in resources and green food industry has achieved a great development. But the green food enterprises in Hubei Province encounter many problems in the aspects of marketing, which seriously restrict the further development of green food industry in Hubei Province. Therefore, it has become an important topic to how to improve the marketing level of green food enterprises in the fierce market competition. Many scholars and experts have done a lot of valuable research on the marketing effectiveness evaluation of green food industry using different methods from different angles (Chen, 2010; Le and Yan, 2005; Li and Li, 2013; Hou, 2012). At present, the domestic research of green food marketing is limited to qualitative analysis or simple descriptive statistical analysis and there is less study on the regional characteristics responding to Hubei province and the use of quantitative methods, so this study attempts to break something from the above aspects. From the perspective of the green food, the study builds a marketing effectiveness evaluation index system of green food industry and performs the comprehensive evaluation via the fuzzy comprehensive evaluation and analytic hierarchy process, finally proposes some

countermeasures to promote the development of green food industry in Hubei Province.

#### METHODOLOGY

**Construction of evaluation index system:** Marketing effectiveness evaluation index systems of green food industry is both contact and interacts with each other by a group and it is an organic whole consisting of index factor according to a certain hierarchy. Evaluation system is a link to contact an expert assessment and evaluation object, which is a bridge connecting the evaluation methods with evaluation object (Liang, 2009). Only to perform comprehensively the evaluation system and the indicators, we can produce a reasonable assessment of marketing effectiveness of green food industry as much as possible, to promote the development of green food industry in Hubei Province. Consolidated results of their research, referring to its index system, this study attempts to construct an evaluation system consisting of the three first-level indicators, twelve second-level indicators (Table 1).

**Comprehensive evaluation model via the fuzzy comprehensive evaluation:** By means of Analytic Hierarchy Process (AHP), this study mainly uses the theory of fuzzy comprehensive evaluation to study the evaluation factors and ultimately quantify the value of the way to represent the results of the evaluation. The main steps of the application are shown as the following (Satty, 1980; Xiong *et al.*, 2013; Jiang *et al.*, 2009; Cao, 2008):

- Generating the multi-level analysis of the structure meeting the study requirements

Table 1: Evaluation system of marketing effectiveness of green food industry

First-level indicators	No.	Weight ( $w_i$ )	Second-level indicators	No.
Industry factor	$U_1$	$w_1$	The number of green food enterprises	$u_{11}$
			Average assets of green food enterprises	$u_{12}$
			Certification area of green food enterprises	$u_{13}$
			The average size of green food base	$u_{14}$
			Output value of green food	$u_{15}$
Policy factor	$U_2$	$w_2$	Government support efforts	$u_{21}$
			Market regulation efforts	$u_{22}$
			Market share	$u_{31}$
Marketing performance	$U_3$	$w_3$	Growth rate of sales revenue	$u_{32}$
			Tax rate of asset	$u_{33}$
			The number of well-known brands	$u_{34}$
			Brand reputation	$u_{35}$

- Constructing the comparison judgment matrix  $U$  after comparing the importance of each element on the same level
- Determining the weight among the indicators after calculating separately for each judgment matrix
- Building a collection of reviews rating:

$$V = \{v_1, v_2, \dots, v_m\} \quad (1)$$

- Establishing the judgment matrix  $R_i$
- Performing the fuzzy comprehensive evaluation:

$$S_i = w_i \bullet R_i \quad (2)$$

where,

$w_i$  = The inner weight of the first-level indicators

$R_i$  = The judgment matrix responding to the first-level indicators:

$$A = W \bullet S \quad (3)$$

where,

$W$  = The weight among the first-level indicators

$S$  = The membership of reviews set  $V$  responding to the factor  $U$

$A$  = The total evaluation vector

- Determining the evaluation grade:

$$F = A \bullet V^T \quad (4)$$

where,

$V^T$  = The transpose matrix of a matrix evaluation level value  $V$

### CASE STUDY

Based on the development of green food industry in Hubei Province, a special case is studied as the following several steps.

**Calculation the weight among the indicators via AHP:** According to the above methods and principles, combined with the actual situation of certain green food enterprises, the AHP model of simulation experiments

is easily built and judgment matrices are established and calculated, so weights among the index are shown in the following outcome:

$$w = (0.45 \ 0.40 \ 0.15)$$

$$w_1 = (0.10 \ 0.40 \ 0.20 \ 0.15 \ 0.15)$$

$$w_2 = (0.50 \ 0.50)$$

$$w_3 = (0.45 \ 0.15 \ 0.10 \ 0.10 \ 0.20)$$

**Building a collection of reviews rating:** According to the purpose of marketing effectiveness evaluation of green food industry, a collection of reviews rating is established below:

$$V = (v_1, v_2, v_3, v_4, v_5) = (\text{Strong, good, middle, weak, very weak})$$

**Establishing the judgment matrices:** Based on the evaluation rating given rater, the membership is established; and the three judge matrices are shown as the following:

$$R_1 = \begin{pmatrix} 0.25 & 0.25 & 0.30 & 0.10 & 0.10 \\ 0.20 & 0.20 & 0.35 & 0.15 & 0.10 \\ 0.15 & 0.30 & 0.25 & 0.25 & 0.05 \\ 0.25 & 0.20 & 0.20 & 0.25 & 0.10 \\ 0.20 & 0.25 & 0.35 & 0.10 & 0.10 \end{pmatrix}$$

$$R_2 = \begin{pmatrix} 0.45 & 0.25 & 0.10 & 0.10 & 0.10 \\ 0.20 & 0.25 & 0.35 & 0.10 & 0.10 \end{pmatrix}$$

$$R_3 = \begin{pmatrix} 0.25 & 0.25 & 0.30 & 0.10 & 0.10 \\ 0.30 & 0.20 & 0.30 & 0.10 & 0.10 \\ 0.20 & 0.30 & 0.30 & 0.15 & 0.05 \\ 0.25 & 0.30 & 0.25 & 0.15 & 0.05 \\ 0.25 & 0.30 & 0.30 & 0.10 & 0.05 \end{pmatrix}$$

**Performing the fuzzy comprehensive evaluation:**

$$S_1 = w_1 * R_1 = (0.2025 \ 0.2325 \ 0.3025 \ 0.1725 \ 0.0900)$$

$$S_2 = w_2 * R_2 = (0.3250 \ 0.2500 \ 0.2250 \ 0.1000 \ 0.1000)$$

Table 2: The classification evaluation

Review score	90-100	80-90	70-80	60-70	0-60
Rating	Strong	Good	Middle	Weak	Very weak

$$S_3 = w_3 * R_3 = (0.2275 \quad 0.2325 \quad 0.2650 \quad 0.1000 \quad 0.0750)$$

$$S = \begin{pmatrix} 0.2025 & 0.2325 & 0.3025 & 0.1725 & 0.0900 \\ 0.3250 & 0.2500 & 0.2250 & 0.1000 & 0.1000 \\ 0.2275 & 0.2325 & 0.2650 & 0.1000 & 0.0750 \end{pmatrix}$$

and,

$$W = w_0 = (0.45 \quad 0.40 \quad 0.15)$$

$$A = w_0 * S = (0.2553 \quad 0.2395 \quad 0.2659 \quad 0.1326 \quad 0.0918)$$

**Determining the evaluation grade and outcome analysis:** According to the Table 2, the represent score of each grade level are median as a judge and the evaluation outcome set is as follows:

$$V = (95, 85, 75, 65, 30)$$

Therefore, Evaluation scores of each second-indicator were as follows:

$$F_1 = 75.600$$

$$F_2 = 78.500$$

$$F_3 = 70.000$$

$$F = A * V^T = 75.92$$

Compared with the standard score in Table 2, the grade of three first-level indicators is all in the middle grade; finally the total evaluation score is in the middle grade, which is consistent with the practice.

### SOME COUNTERMEASURES

According to the case study above and current development of green food industry, some countermeasures are put forward as follows.

**To increase policy support:** All localities of all provinces should turn the development of green food industry into an important content of the quality and safety of construction of agricultural products.

**To strengthen quality supervision:** According to the relevant laws and regulations of the country, the government should perform its regulatory functions of the quality and safety of agricultural products,

strengthen the whole regulatory, vigorously carry out inspection, sampling, inspection case series monitoring measures, prevent the occurrence of agricultural product quality safety accident and establish and maintenance the influence of green food brand.

**To optimize product structure:** According to the different consumer groups, enterprises should take the market as the guidance to develop green food. And enterprises should actively develop green food farming and intensive processing, so as to optimize the structure of products, increase product added value.

**To development green marketing:** All government and functions departments should actively build green marketing platform for enterprises, organize the green food enterprise and supermarkets, stores, docking to cooperative, encourage and support the green food enterprises to participate in domestic and international green food exhibition activities and work together to foster green food professional market, accelerate brand development of green food industry.

### CONCLUSION

In this study, an evaluation system of marketing effectiveness of green food industry is established from three aspects. A model of fuzzy comprehensive evaluation is used to analyze the marketing effectiveness of green food industry in Hubei Province. And the result of an empirical analysis proved to be valid. And four countermeasures are proposed to promote the development of green food industry in China.

### ACKNOWLEDGMENT

The study is supported by the in-depth business plan of action funded projects of the 2014 Hubei Provincial College Young Teachers Grant No. XD2014668, the humanities and social science research project of the 2014 Hubei Provincial Department of Education Grant No. 14Y069 and the scientific research project of the 2013 Hubei Polytechnic University Grant No. 13xjr17Q.

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