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Service-oriented catering supply chain performance evaluation model

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Abstract: Catering industry is different from commercial, manufacture, and the pure services industry. In the modern society, it belongs to the third industry. In recent years, China's catering industry always maintains double-digit growth. At the same time, competition of the catering industry has turned to catering supply chain. The modern catering supply chain is service-oriented, not just products supply chain. It includes product service, logistic service, and customer service and so on. So the traditional supply chain performance evaluation is not suitable for the catering industry. With the research on the current situation of catering industry, this paper summarized the characters of the catering supply chain, and then presents the service-oriented catering supply chain and the supply chain performance evaluation model based on the platform of logistics and information. At last, the fuzzy AHP method is used to evaluate the service-oriented catering supply chain.

Keywords: Catering Industry, Service-Oriented Catering Supply Chain, Performance Evaluation Model, the Fuzzy AHP

1. Introduction

With the rapid development of catering industry, the traditional supply chain already cannot meet the requirements of modern catering market. Today's catering industry competition turns into supply chain from the single entity, this determines that the catering enterprises must make corresponding change, the enterprises in the service-oriented catering supply chain need to build a stable partnership. and the enterprises should do benefit sharing, information sharing and so on ,at last all the enterprises in the supply chain will create a win-win situation.

2. The service-oriented catering supply chain

2.1 Definition of the service-oriented catering supply chain

This paper gives definition of service-oriented catering supply chain. The service-oriented catering supply chain is nets chain structure, relying on information platform and logistics platform, combining suppliers, logistics processing and distribution centre, catering enterprises, customer, and providing the logistics service, information service, product service and customer service.

2.2 The characteristics of the service-oriented catering supply chain

The service-oriented catering supply chain and the traditional supply chain have the certain difference; this is due to the particularity of the catering industry. We discuss the features of the service-oriented catering supply chain as follows.

Agility：The consumption of products is at a very fast rate; also the kinds of product are variety. The service-oriented catering supply chain should improve the ability in dealing with variable demand and production flexibility.

Logistics capability： The goods, like fresh fruits and vegetables should be transported by the special vehicles, which equipped with cold chain logistics equipment. So the logistics capability of catering industry service supply chain has higher requirements than any other industry.

Customer satisfaction： Consumers today are not only care about the price of food but also the tasty, safety, quality and nutrition of food. Once appear, food security, food service enterprise on supply chain will get the fatal blow.

Stability: The prices of raw materials are often the fluctuation, and quality always has some unstable factors. And the clients of food service supply chain often wish to avoid risks, they hope the price, quality, variety of food has a stable situation.

Information: Improving the Information level, can effectively prevent "the bullwhip effect". Information detection methods can effectively monitor food in transportation in the process of storage quality.

2.3 Index system construction

The service-oriented catering supply chain performance evaluation is based on the performance of the whole process evaluation, reflects the whole situations of supply chain. Based on the above considerations, combining the catering industry characteristic, this article establishes the service-oriented catering

supply chain performance evaluation of level 3 index systems. Below in figure 1：

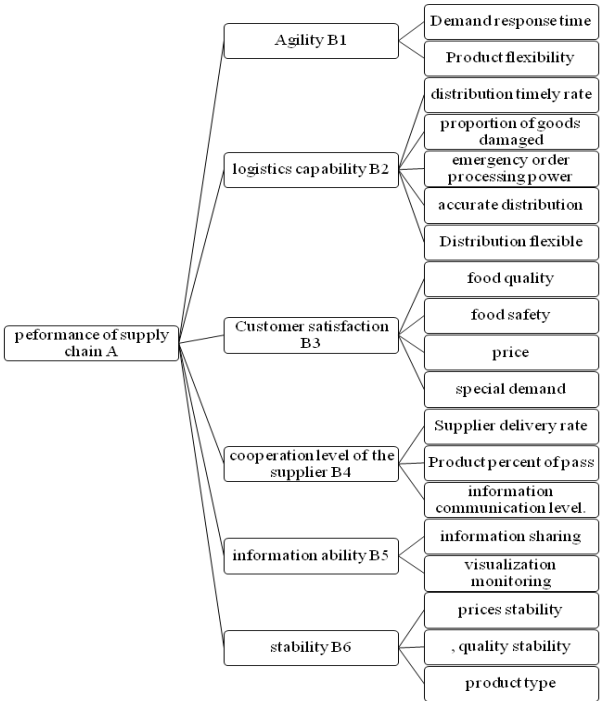

Fig.1. supply chain performance system

2.4 The index system evaluation methods selection

This paper chooses the fuzzy AHP evaluation method to evaluate the catering industry service supply chain performance.

a) The construct judgment matrix

Through comparing the weight of each index, we construct judgment matrix.

Table.1.judgment matrix scalea

scale	explain
1	The same important
3	The former is slightly important than the latter
5	The former is obvious important than the latter
7	The former is extremely important than the latter
9	The former is strong important than the latter
2，4，6，8	Importance Between the scale mentioned above
$B_{ji}=1/B_{ij}$	

b) Calculate the weight of each index

Set maximum characteristic root of judgment matrix A-Bi for λ max, the corresponding eigenvector for W, the W and λ max calculation method is as follows:

Elements Bi in Each line of the judgment matrix multiplies; root product of n; vector normalization ,get the weight vector W .

$$\lambda\max=\sum_{i=1}^{n}\frac{(Bi*W)_i}{n*Wi} \tag{1}$$

c) Consistency test

In order to ensure that error in allowing range, through the consistency test, the judgment matrix is considered effective, or it should be amended.

Calculate Coincidence index Ci: $Ci=\frac{\lambda\max-n}{n-1}$ (2)

Calculate Consistency ratio CR: $C_R=\frac{Ci}{I_R}$ (3)

When CR < 0.1, the judgment matrix is considered effective. Coincidence index of judgment matrix numerical value of IR shows as table 2:

Table.2. Coincidence index of judgment matrix

n	1	2	3	4	5	6	7	8	9
I_R	0	0	0.58	0.9	1.12	1.24	1.32	1.44	1.45

d) The fuzzy matrix evaluation

Factors sets U is consists of factors which have influence on judge object, U= {U1 ,U2 , … ,Un } . Evaluation sets V is consists of judgment results, V = {V1, V2… Vm}.First evaluation stars from the single factor in set U, make sure the membership degree in each factors. Then get n factor assessment set into a general evaluation matrix, usually show as R. Various factors important degree is usually not the same, in order to reflect the degree of each factors important , each factors should give the corresponding weight Wj ,W j = [W1, W2... W n] called factor weight vector.

Then $B = W \bullet R$ （4）

The B normalized to 'B, B' multiplies with fuzzy evaluation vector V, comprehensive evaluation results obtained score for:

$$G = B' \bullet VT \quad (5)$$

And V is obtained according to the comments of the median level.

3. Epilogue

This paper presents the service-oriented catering supply chain model based on the logistics and information platform and discusses the characters of the

service-oriented catering. At the same time, constructs the performance evaluate system. At last, this paper evaluates the service-oriented catering supply chain by the fuzzy hierarchy of comprehensive evaluation method.

The results of evaluation can not only used to own enterprise improvement, but also can be used for selecting different customers, to choose a different model of development. According to different customers, we will have different judgment matrix, and thus get the performance evaluation is not the same. So the customer groups classification based on the performance evaluation is our direction of our works.

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