Logistics Service Quality Analysis Based on Gray Correlation Method

Jian Xu

School of Logistics Management, Shenyang University of technology, Shenyang 110023, China

E-mail: xujian2122@163.com

Zhenpeng Cao

Shenyang University of technology, Shenyang 110023, China

E-mail: czp_1982@126.com

Abstract

Logistics belongs to service industry, starting with customer demand, ending with customer satisfaction, but the level of logistics service quality determined the customer's satisfaction .Because logistics service quality is a multi - objective evaluation which contains qualitative and quantitative factors, it is very hard to calculate, so article use Gray Correlation Method to analyze logistics service quality evaluation outcome, this method is a quick and simple analysis method. At last, use an example detailed introduces this method application.

Keywords: Gray Correlation Method Analysis, Logistics service quality, Evaluation

The logistics service quality is the foundations of logistics enterprises, understanding and realizing the service quality deeply, which has important meanings to develop the activity of marketing as to logistics enterprises, level of service quality directly influence customer satisfaction, and customer satisfaction determine enterprise's success or failure.

1. Logistics Service Quality

The foreign scholar has done much research about the impact on customer satisfaction of logistics service quality. The most traditional one is 7Rs theory based on time, place utility. Later proposed "theory taking meeting customer's needs, guaranteeing customer satisfaction and getting enterprise's praise as the activity of the purpose "(Tian, 2001, pp. 4-6).At present, custom-made logistics serve quality research is studied both at home and abroad in recent years, the customer's evaluation is the most basic measurement of the logistics service quality:

The logistics service quality is the target, which the customer perceives. Logistics service quality cannot determine only by enterprise, it must meet the customer's demand and hope, in addition, it is not totally made by objective method, but is mostly customer's subjective understanding.

The logistics service quality is not away from produce and trade course. The output of the logistics serve is a part of logistics service quality which the customer realizes; it is both parties' mutual mechanism.

2. Logistics Service Quality Evaluation

We are discussing the logistics service quality mainly on the basis of customer's appraisal on enterprise's logistics service quality, this article mainly considers on the basis of 6 following respects:

Personnel's quality. Personnel quality means logistics enterprise's marketers could offer the personalized service through the good contact with the customer. Generally speaking, attendants instructive or not and showing understanding customer situation influence the appraisal of service quality.

Information quality. Mean logistics enterprise offer the amount of relevant products information. The information includes the catalogue, products characteristic, etc..

Order the course. Mean efficiency and success rate when logistics enterprise accept and treat the customer order.

Intact intensity of the goods. Mean the intensity that the goods are damaged in the course of providing and delivering. If damage, then logistics enterprises should look for the reason and remedy in time.

The error is dealt with. Mean the treatment after the order carries out mistake. If customer receive wrong goods or goods quality problematic, will demand and correct to the logistics supplier. The wrong treatment of logistics enterprise directly influence appraisal of service quality.

Timeliness. Mean whether the goods reach the appointed place as scheduled. It include the length of fall, book order finish, influence of factor from customer transportation time and error(Wang & Wang, 2004, pp.27-28).

3. Carry on gray related analysis to the result of evaluation

Getting gray systematic theory think people understanding of objective things have a extensive one getting gray, i.e. information incompleteness and uncertainty. The customer is influenced by many kinds of factors to the reflection of the logistics enterprises service satisfaction, and the connection between every factor is not totally fixed. That means customer's understanding of these services is gray too, so literary grace this getting gray related analytic approach to customer evaluation result analyze with a getting gray in the systematic theory.

Gray related analysis is a multifactor statistics analytical method; it is based on sample data of every factor to describe the power, size and order of the relation among the factors with gray related degree. If the sample data tabulate to reflect the situation that two factors change is basically identical, related degree then between them is relatively big; On the contrary, related degree is relatively small.

In evaluation to the logistics service quality, gray related analysis employs and includes the following step six:

3.1Confirm the array of analyzing

On the basis that to qualitative analysis of the problem studied, confirm one because variable and a lot of independent variables. Set up dependent variable to composite reference sequence X′0, every independent variable data composite comparison sequence X′1,n+1 data sequence, as the following matrix:

$$(X'0,X,1\ldots\ldots X,n)=\begin{bmatrix} X'_0(1) & X'_1(1) & \Lambda & \Lambda & X'n(1) \\ X'_0(2) & X'_1(2) & \Lambda & \Lambda & X'n(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ X'_0(N) & X'_1(N) & \Lambda & \Lambda & X'n(N) \end{bmatrix}_{N\times(n+1)}$$

Among them, X′i=(x′i(1),x′i(2),……x′i(N))T i=1,2,……n,N is the length of the variable array

3.2 Have dimensionless method to the variable array

Generally speaking, The primitive variable array has different dimensions or order of magnitude, in order to guarantee the dependability of the analysis result, need to have dimensionless method to the variable array, then every factor array form the following matrix:

$$(X0,X1,\ldots\ldots,Xn)=\begin{bmatrix} X_0(1) & X_1(1) & \Lambda & \Lambda & Xn(1) \\ X_0(2) & X_1(2) & \Lambda & \Lambda & Xn(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ X_0(N) & X_1(N) & \Lambda & \Lambda & Xn(N) \end{bmatrix}_{N\times(n+1)}$$

Available initial value France has dimensionless method: Xi(k)=X′i(k)/X′i(k)

3.3 Ask difference array, greatest difference and minimum difference

Calculate and consult several with other absolute difference of corresponding to one of comparative array, then form the following matrix:

$$\begin{bmatrix} \Delta_{01}(1) & \Delta_{02}(1) & \Lambda & \Lambda & \Delta_{0n}(1) \\ \Delta_{01}(2) & \Delta_{02}(2) & \Lambda & \Lambda & \Delta_{0n}(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ \Delta_{01}(n) & \Delta_{01}(n) & \Lambda & \Lambda & \Delta_{01}(n) \end{bmatrix}_{N\times n}$$

$\Delta_{0i}(k)=\left|X_0(k)-X_i(k)\right|$ among them I=1,2,……,n k=1,2,……,N

Absolute difference array most heavy until decimal most difference and minimum difference more the most.

3.4 Calculate related coefficient

Data make as follows varying to absolute difference burst:

$\delta_{0i}(k) = \frac{\Delta(\min) + \rho\Delta(\max)}{\Delta_{0i}(k) + \rho\Delta(\max)}$ Receive related matrix $\begin{bmatrix} \delta_{01}(1) & \delta_{02}(1) & \Lambda & \Lambda & \delta_{0n}(1) \\ \delta_{01}(2) & \delta_{02}(2) & \Lambda & \Lambda & \delta_{0n}(2) \\ \Lambda & \Lambda & \Lambda & \Lambda & \Lambda \\ \delta_{01}(N) & \delta_{02}(N) & \Lambda & \Lambda & \delta_{0n}(N) \end{bmatrix}_{N\times n}$

Type distinguish coefficient ρ in (0, 1) fetching value inside, generally speaking according to the matrix situation of related coefficient, it is more in 0.1 to 0.5 fetching value, ρ little to can improve difference of related coefficient, related coefficientδ0i (k) is a positive number under 1, the smaller Δ 0i (k) is, the bigger δ 0i (k) is, It reflect the i one a comparative array Xi with consulting the array X0 in NO. k related intensity.

3.5 Calculate related degree

Comparative array with consult array related intensity of X0 to come, give through n related coefficient Xi, it can get related degree of Xi and X0 equally to ask: r0i= $\frac{1}{N}\sum_{k=1}^{n}\delta_{0i}(k)$

3.6 Arrange in an order in accordance with related degree

Arrange in an order every comparative array and related degree which consult the array from great to small, related degree heavy, prove comparative array with consult whom array change the more identical situation(Lu & Tan, 2004, pp. 20-21).

Forth. Application of embodiment

Logistics final purpose is to analyze factor influencing customer satisfaction according to result received to evaluation, enterprises improve to these factors, thus improve customer's satisfaction to the logistics service quality. Because of objective reality of difference, in the same to evaluate index can receive different customer satisfaction. Through getting gray related analytic approach can make further analysis to these factor influencing customer satisfaction. Can choose optimum sample data as the array of consulting. On the other hand, because enterprises do not exist in the market isolated, its every activity is closely related to other competitors, the customer gave a mark after comparing other competitors to the judgments of every index of enterprises, so when the result of evaluation of satisfaction to customer carry on gray related analysis, the supreme value of satisfaction, as consulting arrays on every index of choosing every enterprise.

Table 1 4 different enterprise in the the same trade, customer appraise to 6 satisfaction of factor and through calculate getting gray related coefficient finally

Table 1.Gray related coefficient form

enterprise	Personnel's quality	Information quality	Order the course	Intact intensity of the goods	The error is dealt with.	timeliness
δ01	1	1	0.56	0.59	1	1
δ02	0.35	0.59	0.56	0.59	0.42	0.42
δ03	0.2	0.59	0.56	0.33	0.42	0.42
δ04	0.62	0.42	1	1	0.59	0.42

Get gray related degree through calculating: r01=0.879 r02=0.56 r03=0.503 r04=0.72

Related degree can have to arrange from great to small: r01> r04> r02> r03

It combine the gray sizes of degree related it arranges in an order to be and the gray analyses further of coefficients related can see enterprise of 4 pieces have at the test and assessment of one's own advantages at the index for Table 1 With the existing problem: enterprise 1 more outstanding personnel's quality, so has won the customer's approval, customer satisfaction is the highest; enterprise 4 order the course, the intact intensity of the goods is very good, but some other respects should be further improved; enterprise 2 and 3 the problem is more serious, enterprises must take the effective measure to improve, establish the images of enterprises in the market again at once.

It can be found out through the foregoing, carrying on gray related analysis to logistics service quality easy and simple to handle, necessary few and announcing the clear advantage of the question data with high efficiency. In addition can appraise and analyze to a large number of enterprises through the computer, this is a simple and convenient analytical method that can be popularized.

References

Tian, Yu. (2001). Logistics service quality management. *Logistics research*. 5(5).pp.4-6

Wang, Jingfeng & Wang, Xiufan. (2004). Operation analysis of the service quality system of the logistics. Logistics economy. 4. pp. 27-28

Lu, zhijie & Tan, Zheng. (2004). On the basis of the gray related analysis of customer satisfaction evaluation. *Soft science*. (4). pp. 20-21