Research on the Construction of B2c e-Commerce Express Logistics Service Quality Evaluation System

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ABSTRACT. *With the development of economy, the progress of science and technology, electronic commerce is penetrated into all fields of people's life at a fast speed; it brings a revolution to the traditional way to trade and pulls the appearance of the express logistics enterprise. E-commerce and express have become industries closely related to each other in a new economic era. On the one hand, by relying on express realized leap-forward development, e-commerce has become an increasingly important role in the field of circulation of consumption; on the other hand, e-commerce has become an important power that drives express service growth. Express logistics service is a very important link in the electronic commerce system, but at present, the level of express logistics service as a whole is not high, restricted by various problems, thus it is necessary to set up a scientific evaluation system, standardize e-commerce express logistics market, improve the express logistics enterprise's core competitiveness, thus improve the consumer shopping experience, also provide ideas for e-commerce shopping website. In this paper, the method of theoretical analysis and empirical analysis, qualitative analysis and quantitative analysis combining are used in the research. In theory, this paper take logistics service quality management, e-commerce knowledge express logistics service quality as the foundation, draw lessons from SERVQUAL service quality evaluation model and LSQ logistics service quality evaluation model set up by domestic and foreign relevant scholars; by combining with the characteristics of B2C e-commerce express logistics service chain and the express service industry standards, establish the B2C e-commerce express logistics service quality evaluation system; In case analysis, use the established evaluation system to do express logistics service quality analysis.*

KEYWORDS: *B2b mode, C2c mode, E-commence logistics, Service quality evaluation, Rough set, Grey system theory*

1. Introduction

1.1 Meaning and Evaluation of the Service Quality

1.1.1 Meaning of Quality of Service

About the meaning of the service quality research, studies of foreign scholars can be roughly divided into the following stages:

First stage: the early stage. This stage the scholars gave relevant definition on the basic concept of quality of service. The optimal cross-sectional study in this stage is proposed by Finland global economic management college professor Gronroos, the concept is one of the most representatives and most widely accepted.

Second stage: progress stage. In this stage, the scholars have made definition of the main dimensions of the quality of service. [1]For example, Armistead (1988) suggested that service quality includes five aspects: Organization (scope of services, the company image), Person (instrument of service personnel, service attitude, etc.), Process (service swifter), Equipment and products. Japanese scholars Sugimoto Calvin (1989) suggested that service Quality is divided into: Interior Quality (quality customers can't see the), Hard Quality (results of service quality), Soft Quality (service process quality), Reaction Speed (service time and swiftness) and Psychological Quality (polite response and hospitality of servers).

1.1.2 Service Quality Evaluation

(1) Customer perception of service quality model

In the model, the customer perception of service quality is divided into the technical quality and functional quality, technical quality is to point to what kind of service, function refers to how to provide quality services (procedural characteristics); Customer perception gap model is by comparing the difference between the customer perception and customer expectation, to evaluate the quality of service. To represent the customer expectations, with P E to represent the customer perception, when $P < E$, seasonal customers pleasantly surprised service quality; When $P = E$, it is to make the customer satisfied service; When $P > E$, it is to make customers feel disappointed the quality of service.

The significance of this model is extraordinary, it process this characteristic of the quality of service to do the research, makes the enterprise not only should pay attention to the result of the service and value service way, clear planning how to improve the quality of the service process. Customer perceived service quality; a comprehensive model is shown in figure 1.
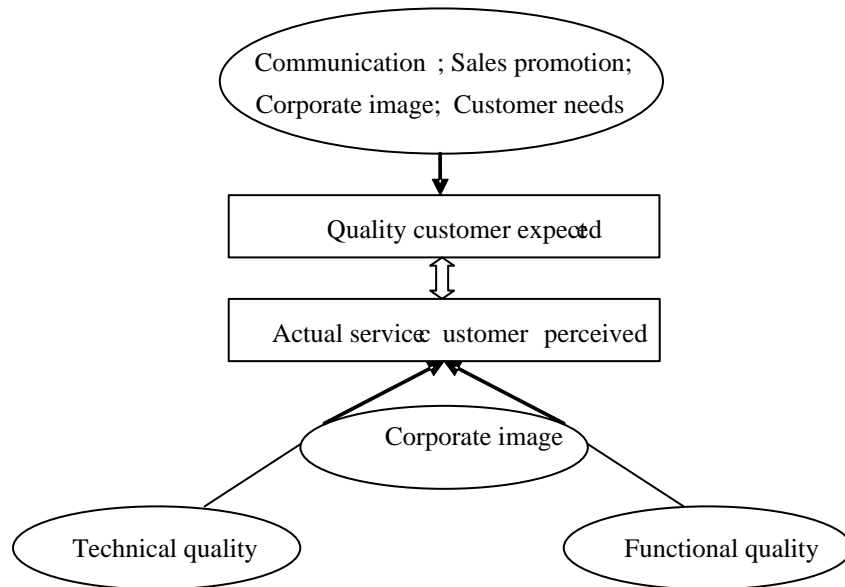
Fig.1 Composite Model of Service Quality Customer Perceived

However, this model also has disadvantages. Although proposed the expectation and perception gap to measure the results of the service level, there is no detailed dimension.

(2) E-service electronic service quality gap model perception

Gaps of quality gap model perception E-service contain 4: design, communication, information gap, gap between mass transfers. [2]Design gaps are caused by the understanding of e-commerce service quality between the design and operation of the site and company; Communication gap is made up of website marketing and website design and running; Information gap is caused by the discrepancies between E-service quality of service features and the understanding of the electronic service quality by company; Mass transfer gap is composed of website marketing and E-service quality of service characteristics.

The model also reflects that under the electronic commerce environment, technical strength is more powerful than that of people, the way and the factors influencing the customer perceived service quality has changed too. E-service gap model is shown in figure 2.
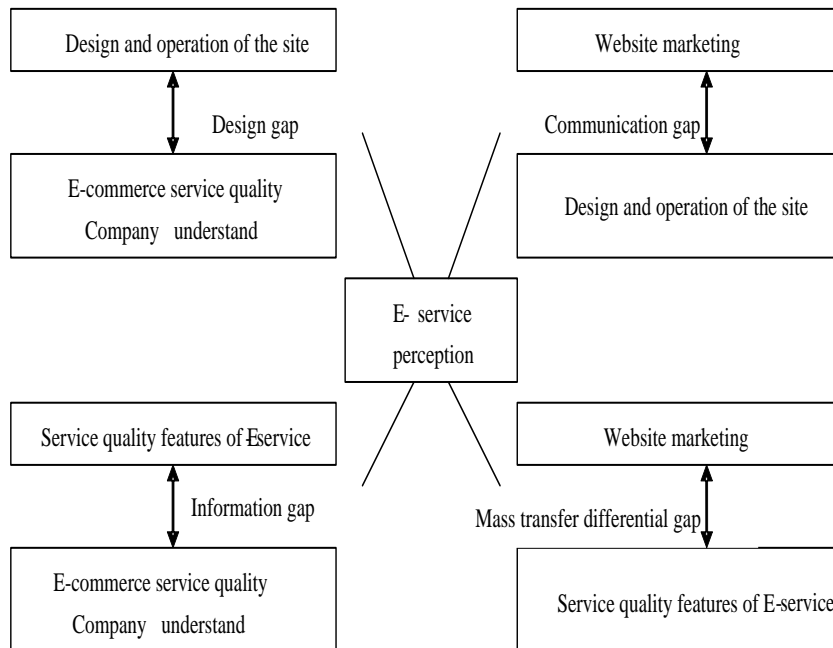
Fig.2 E-Service Gap Model

1.2 Logistics Service Quality Management

1.2.1 Content of the Logistics Service Quality Management

Logistics service quality management in simple terms includes the following contents:

(1) Quality management of the item: in the process of transfer or circulation, if items are in good condition and given into the hands of customers;

(2) Quality management of logistics: it is composition of service in the process of each link, each type of work and the work quality of each position; if resources in the process of are reasonably configured, is enough to complete the task efficiency;

(3) Quality management of logistics project: process, process design, the combination of equipment, conform to the condition of the logistics facilities, including organization, reasonable working system and so on, these are part of the capacity of logistics service quality management.

1.2.2 Factors Influencing the Quality of the Logistics Service

Factors that influence logistics service quality is based on the main content of the

logistics service quality management thus can be briefly summarized as several factors:

(1)Personnel elements: knowledge, ability and quality, patience and a sense of responsibility of employees are the most important factor, because every key link in the whole process of logistics services such as communication, process orders, sent the goods to the hands of customers, remedial service error are mainly done by people, one link failure will affect the customer experience and satisfaction levels of service [3].

(2)Facilities elements: advanced equipment maintenance, information systems, information technology, etc., all theses are related to the efficiency of logistics services. For example, domestic brands S.F. Express delivery company, it is one of the few domestic express delivery company with an aircraft equipment, it is also one of the few domestic can launch a service "today to send, tomorrow to the company", the timeliness making customer satisfied.

(3)Environmental elements: policy system of environment, economic environment, etc. The support of national policy is very important. For example, the logistics industry has been rated as one of the top ten revitalization industries, which reflects the national policy guidance, bound to increase investment, so there will be more to the flow of talent, capital, the development of the industry will be smoother, making the service provider to provide better services. [4]The economic environment is also very important, take the development of e-commerce for example, which stimulates the development of the express logistics.

1.3 Express Logistics Services

1.3.1 Meaning and Process of Logistics Express

(1) Meaning of the express logistics: express logistics refers to that the courier service company provide a quick posting express mail, transport and distribution with clear address, deliver goods intact to the requirements of the recipient site according to the time limit stipulated by both parties, the place, and finally obtain the recipient personally sign for services.

(2) Process of the express logistics: express company get order online or by phone, collect through posting, the network, at the door, classifying received package, encapsulation, and package transportation to logistics center, carries on the sorting and delivery to the courier again, until the customer sign for it. Express logistics process is shown in figure 3.
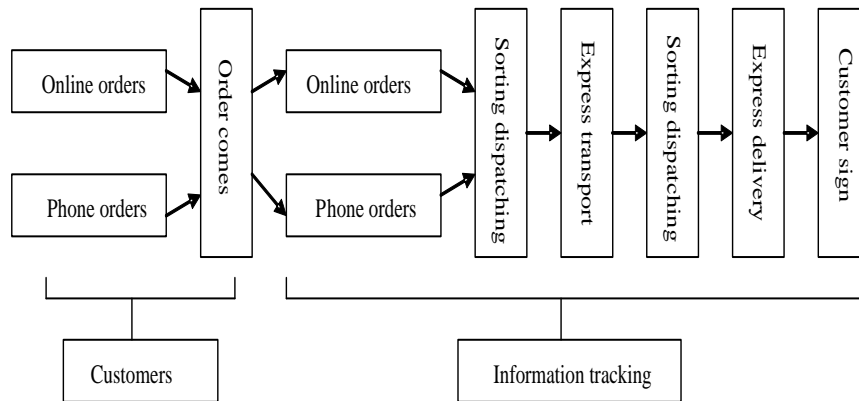
Fig.3 Express Logistics Flow Chart

2. Extension Analysis Method

2.1 Development of Extenics

Extenics is a new discipline created by the scholars in China, it uses formal model to analyze the possibility of expanding and the law of the development innovation, thus forming the method to solve the problem of contradiction. [5]Extenics topic is raised in 1976, the journal of the scientific search for publication in 1983 of the extenics pioneer published the article "extension set and incompatible problems"; the matter-element model and its application published in 1994 by scholars marked the birth of extenics in our country. In the next three decades, a large number of professional scholars devoted to the construction and research of extenics, not only got innovation and breakthrough research results in the theory and method research, but also had many success stories, multi-type in the field of practical application. Applications of extenics and related theory have caused extensive concern of academic circles at home and abroad.

2.2 Primitive Theory Analysis Method

Primitive theory is the core content of extenics, it mainly includes: first, analyzes the relationship between the basic element to describe things and relationship, generally referred to as the things elements, items elements and relationship element; second, discusses extensibility and the extension transformation rule of the basic element; third, determine the quantitative and qualitative combination analysis extension model.[6] Based on B2C e-commerce logistics service quality evaluation research, this paper mainly uses the elementary theory of matter-element analysis of the model and its expanding principle to solve the problem.

2.2.1 Extension Analysis of Matter Element

(1) Definition of matter element

Take O_m as object, c_m as characteristics; orderly triples composed of value v_m of O_m about c_m:

$$M = (O_m, c_m, v_m) \qquad (1)$$

In this paper, we study the object of O for B2C e-commerce logistics service, features of c as the factors that affect customer evaluation of logistics service, v for value.

One thing has multiple characteristics, the array constituted by n characteristics $c_{m1}, c_{m2}, ... c_{mn}$ of O_m, and the corresponding value $v_{mi}(i = 1, 2, ... n)$:

$$M = \begin{bmatrix} O_{m,}, & c_{m1}, & v_{m1} \\ & c_{m2}, & v_{m2} \\ & ... & ... \\ & c_{mn}, & v_{mn} \end{bmatrix} = \begin{bmatrix} M_1 \\ M_2 \\ ... \\ M_n \end{bmatrix} \qquad (2)$$

The value of content about some characteristics, as the change of time t, can be described by dynamic matter-element:

$$M(t) = (O_m(t), c_m, v_m(t)) \qquad (3)$$

(2) Matter-element model of the problem:

The matter-element is used to describe the problems in the real world, which is the matter-element model. Set problem $P = G * L$, matter-element G said the purpose to achieve, namely goal matter-element, matter-element L said the existing conditions, namely conditions of the matter-element, matter-element model can be divided into the unknown problems and line problem, this article studies the issues of knowledge [7].

In Matter-element model in the learning goal problems, matter-element G, knowledge can be the object of content O, can also be a feature c or value v.

In this study, set the goal of the matter-element as follows:

$$G_x = (O_x, c_x, v_x) \qquad (4)$$

Among them, the value v is service satisfaction of customer, which is object of the problem.

Condition of the matter-element is as follows:

$$L_y = (O_y, c_y, v_y) \qquad (5)$$

2.2.2 Expansion Analysis Principle

Expand the analysis principle of primitives including divergent principle of analysis and correlation analysis, contains the analysis principle and extension analysis theory. In this paper, the B2C e-commerce logistics service quality evaluation in the study of analysis methods are mainly adopted by the divergence analysis, correlation analysis, and contains the analysis.

(1) Divergence analysis principle

Something object can have multiple features, at the same time, a feature or quantity can be more than one object has, this nature is called primitive divergent.[8] Divergence means starting from a primitive analysis principle, according to different rules, spread to get the corresponding element of non-empty set.

(1) Principle 1. An object has a number of characteristics, namely one object multiple characteristics. Remembered as:

$$B = (O, c, v) \dashv \{O, c_1, v_1), O, c_2, v_2), ...(O, c_1, v_1)\}$$
$$= \{O, c_i, v_i), i = 1, 2, ..., n\} \qquad (6)$$

(2) Principle 2. Objects with the same characteristics are more than one, namely one characteristic, multiple objects. Remembered as:

$$B = (O, c, v) \dashv \{O_1, c, v_1), O_2, c, v_2), ...(O_n, c, v_n)\}$$
$$= \{O_i, c, v_i), i = 1, 2, ..., n\} \qquad (7)$$

When this principle is used to dealing with contradictions, if a primitive cannot solve the problem of contradiction, we can consider solving contradiction problems to other objects with its primitive characteristics.

(2) Correlation analysis principle

Correlation analysis is to analyze the relationship between basic elements he by the method of formal method. If there are a certain dependencies among a primitive with other primitive about the characteristics of a certain evaluation value, or a fundamental or group characteristics between the values of the primitive about some evaluation, it is called a relation.[9] Primitive relation is generally defined as: given two motifs $\{B_1\}$ and $\{B_2\}$, if for any $B_1 \in \{B_1\}$, then there are at least a $B_2 \in \{B_2\}$, make B_1 corresponding with B_2, said $\{B_1\}$ and $\{B_2\}$ is relevant, as $\{B_1\} \cong \{B_2\}$.

3. B2c Electrical Contractor Logistics Service Extension Evaluation Model

Nonlinear extension synthetic evaluation method put forward in this paper, when applied in the B2C e-commerce logistics service quality evaluation, through the establishment of reasonable correlation functions, not only provide the level of logistics service quality evaluation for a B2C e-commerce merchants, at the same time can also provide logistics service quality rank evaluation for multiple B2C e-commerce businesses. [10]Process of B2C e-commerce logistics service quality evaluation model modeling based on the theory of extenics is as follows:

3.1 Determine the Evaluation Matter-Element

Assuming factors that influencing of B2C e-commerce logistics service evaluation is of n, B2C e-commerce businesses need to take level evaluation of m, and then the evaluation matter-element R_i can be described by the following ND matter-element.

$$R_i = (N_i, C, V) = (N_i, c_j, v_{ij}) = \begin{bmatrix} N_i & c_1 & v_{i1} \\ & c_2 & v_{i2} \\ & ... & ... \\ & c_n & v_{in} \end{bmatrix}$$

$$(i = 1, 2, ..., m; j = 1, 2, ..., n) \qquad (8)$$

3.2 Determine the Classical Domain and Domain

Assuming that for B2C e-commerce logistics service quality evaluation there is l level, classic matter-element to be evaluation objects is:

$$R_{ot} = (N_{ot}, c, v_{ot}) = \begin{bmatrix} N_{ot} & c_1 & c_{ot1} \\ & c_2 & v_{ot2} \\ & ... & ... \\ & c_n & v_{otn} \end{bmatrix} = \begin{bmatrix} N_{ot} & c_1 & <a_{ot1}, b_{ot1}> \\ & c_2 & <a_{ot2}, b_{ot2}> \\ & ... & ... \\ & c_n & <a_{otn}, b_{otn}> \end{bmatrix}$$

$$(t = 1, 2, ..., l) \qquad (9)$$

Matter-element matrix that composed of the classical matter-element adding things can change into the classical matter-element and characteristics are remembered as:

$$R_p = (N_p, c, v_p) = \begin{bmatrix} N_p & c_1 & c_{p1} \\ & c_2 & v_{p2} \\ & ... & ... \\ & c_n & v_{pn} \end{bmatrix} = \begin{bmatrix} N_p & c_1 & <a_{p1}, b_{p1}> \\ & c_2 & <a_{p2}, b_{p2}> \\ & ... & ... \\ & c_n & <a_{pn}, b_{pn}> \end{bmatrix}$$

(10)

3.3 Ensure the Matter-Element to Review

For things to review P, data or results collected can be represented in the form of a matter-element, namely:

$$R = (P, c, v) = \begin{bmatrix} P & c_1 & v_1 \\ & c_2 & v_2 \\ & ... & ... \\ & c_n & v_n \end{bmatrix} \quad (11)$$

Summary

With the rapid development of electronic commerce, express logistics enterprises sprang up. When number of courier companies increases, at the same time, a series of service quality problems also gradually highlights, for example, express delivery business management is not standard, there isn't a set of perfect and standardized management mechanism, logistics process tracking is very difficult, so in order to standardize e-commerce express delivery market, enhance the core competition of the express logistics enterprise and strengthen the management of e-commerce supply chain, we must establish a set of scientific evaluation system, so that we can help to make express logistics enterprises realize what are the disadvantages of their service, which can also work as the evaluation standard of express logistics service. This article research results build B2C e-commerce express logistics service quality evaluation system. The evaluation system take the SERVQUAL and LSQ logistics service quality evaluation model evaluation system for reference, combine with the characteristics of the electronic commerce environment and the electronic commerce express logistics service chain, consult the post office issued the express industry service standards, which is built in a comprehensive way and tested by SPSS software, relatively scientific. In order not to make the evaluation index system looks empty, we also add means for each indicator. Research of this paper is mainly based on the theory of extenics. By combing with the characteristics of B2C e-commerce logistics service in China, this paper set up evaluation index system, build the evaluation mathematical model, and proposes a quantitative evaluation method of B2C e-commerce logistics service quality, which are validated by the application examples. When establishing index system, this article establishes

matter-element model through the diamond pattern of thinking, combination with the primitive theory of extenics and expanding analysis method, and establishes B2C e-commerce logistics service quality assessment index system of three layers by using the expansion of the matter-element analysis multiple characteristics. The first layer, namely layer targets, is B2C e-commerce logistics service quality; the second and third layer is the secondary indexes. Primary index is respectively transparency, completeness, reliability, timeliness, economy and empathic, secondary index is the lower index of the primary index, consisting of 28 indicators.

References

[1] Elliot R(2007). Linking e-service quality and markups: The role of imperfect information in the supply chain [J]. Journal of Operations Management, no.25, pp.14-41.

[2] Martin Griege(2003). Electronic market places: A literature review and a call for supply chain management research. European Journal of Operational Research, vol. 144, pp. 280-294.

[3] Kent N. Gourdin(200). Global Logistics Management-A Competitive Advantage for the New Millennium. Blackwell Publishers Lid.

[4] Charles C. PoLder, Michael J, Bauer(2000). E-Supply Chain. Barrett-Koehler Publishers Inc.

[5] Haul Lee, Seungin Whang(2002). Winning the last mile of E-Commence. McGraw. Hill Companies, Inc, pp.106-121.

[6] Ceng Xiangpei(2007). China's private Courier enterprise's competitiveness analysis. Beijing: foreign economic and trade university.

[7] Huiskonen J, Pirttila T(2002). Lateral Coordination in A Logistics Outsourcing Relationship [J]. International Journal of Production Economics, vol. 78, no.2, pp.177-184.

[8] Sun Canyu(2010). Third party logistics service quality evaluation and selection research. Xihua University.