

# Data Mining Application and Qualitative Analysis of the E-Commerce Logistics Trust Degree based on Network Economic Security Perspective

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## **Abstract**

*In recent years, the development of e-commerce market is facing a more serious crisis of trust than the traditional market, because e-commerce has the characteristics as global and virtual. In this paper, the author makes qualitative analysis of the E-commerce logistics trust degree based on network economic security perspective. The network shopping has put forward higher request to the logistics service quality, the result of the empirical analysis proves that the operation variable has a significant positive influence on the satisfaction, so the simple and easy operating environment is very important. The research shows that logistics service quality has a significant positive impact on online purchase behavior. At the same time when the stores enhance the quality of service, it also enhances the core value of the shop.*

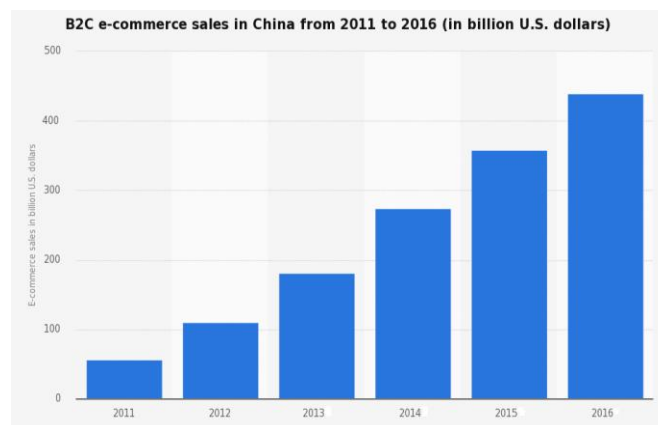
**Keywords:** *E-Commerce, Logistics trust, Network economic, Security perspective*

## **1. Introduction**

Along with the enterprise, family and individual will be regarded as an important medium of Internet communication at the same time, the increasing of Internet users is also used for the enterprise in the media on the Internet has brought infinite business opportunities, many enterprises began to carry out electronic commerce using Internet technology to seek profit [1-2]. In the network environment, the use of electronic means, with the help of computer networks for the purchase, sale and exchange of products, services and information process. In this way, online shopping, online transactions between merchants and online electronic payment and online ticket booking are realized. Electronic commerce and global open, efficient business processes of traditional electronic, digital, electronic flow instead of the logistics, greatly reduce the consumption of resources, reduce transaction costs, and for enterprises to create more business opportunities [3]. On the other hand, e-commerce breakthrough in time and space constraints shorten the transaction, both in time and space, significantly improves the efficiency of. It can be said that this unique e-commerce model to reduce the intermediate links, changing the traditional mode of economic operation, for enterprises to obtain more profitable than traditional trading methods.

With the advent of the information age, we entered a network era. The traditional retail competition has reached a white hot stage, so some businesses seize the network platform to enter the e-commerce market. Compared with the traditional shopping mode, online shopping has some advantages [4-5]. For example, online shopping cheaper, more abundant goods, shopping is also more convenient, as long as the Internet can be operated. With the rise of the Internet and the most widely used, consumers began to use the Internet to buy the required goods, which is not only on the traditional mode of shopping is a challenge, and also put forward new requirements on logistics service quality[6]. Online shopping has been a lot of problems, such as many customers complain about online shopping is not timely delivery, consulting customer service problems did

not respond for a long time, there is no physical store to buy things assured, too few alternatives, *etc.* To improve the overall satisfaction of online shopping, it is very important to improve the satisfaction of logistics service quality of online shopping. The domestic research on the traditional logistics service quality is more, but the research on the logistics service quality of e-commerce, especially the online shopping, the new shopping logistics service quality literature is very few. Most of them are the theoretical research on the quality of online shopping logistics service, or the general evaluation of online shopping satisfaction [7-9]. In this paper, based on previous studies, combined with the particularity of online shopping consumers and e-commerce logistics service quality, this paper puts forward the corresponding evaluation model. The purpose of this paper is to establish a scientific online shopping logistics service customer satisfaction evaluation model, which will provide the basis and advice to improve the competitiveness of online shopping.

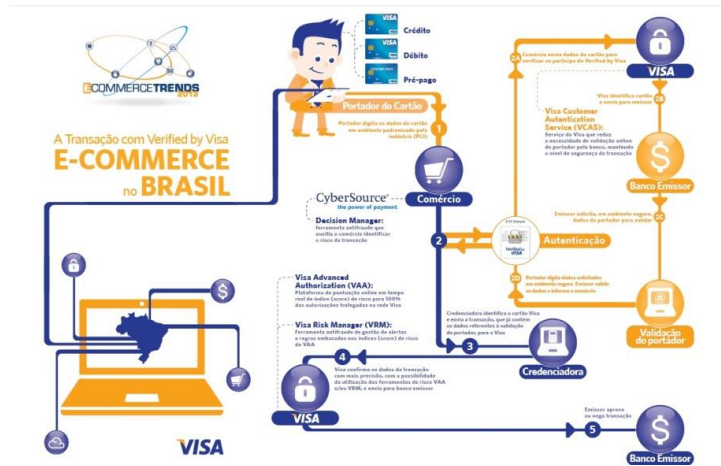


**Figure 1. China's e-commerce development**

## **2. Factors of B2C e-Commerce Trust**

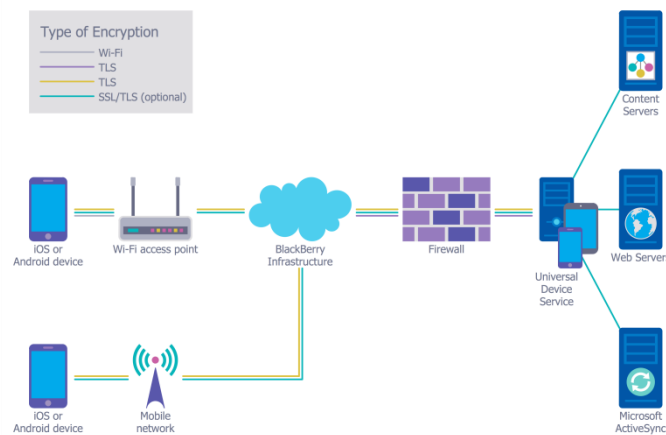
### **2.1. Electronic commerce trust**

E-commerce mode reduces the intermediate links, changing the traditional mode of economic operation, for enterprises to obtain more profitable than traditional trading methods. Therefore, although the electronic commerce also experienced the Internet bubble economy has experienced winter, hope and disappointment experienced the joy and pain of change radically, succinct, but still highly respected businesses, the main reason is that no one can deny the electronic commerce will be a pressing matter of the moment is represent the general trend, how to choose and develop their own path of development [10]. Today, China's attitude towards e-commerce is no longer blind, but is moving towards a pragmatic approach to the development of the business, and the impact of online shopping bottleneck logistics, security, payment and other aspects of unremitting efforts. Compared with the traditional business model, e-commerce is break through the limits of time and space, and effectively for enterprises and individuals to provide a wealth of information resources and business opportunities, simplify the circulation enterprises and enterprises, enterprises and individuals, to minimize the cost of circulation, and effectively improve the competitiveness of enterprise in modern business activities [11]. However, electronic commerce also showed some new characteristics of cross regional, cross-border transactions become more and more easy to product and service more customers, the market increasingly fine division of labor in the transaction process.



**Figure 2. Electronic commerce model**

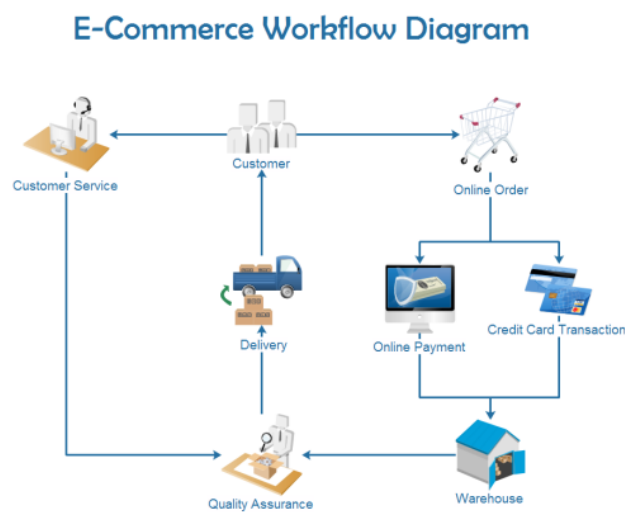
The new intermediary service such as quality assurance, logistics, payment structure and business dispute adjustment intermediary service new must become the enterprise electronic commerce is to provide information to consumers through the website, the website is vulnerable to attacks and cyber threats of economic crime. These characteristics are different from the traditional trading mode, which makes the majority of businesses and consumers have a strong distrust of e-commerce [12]. In addition, the electronic commerce laws and regulations is not perfect, can not be a good solution for e-commerce business disputes, not the implementation of a powerful blow to the party faithful, to be punished, which are exacerbated by the parties to the transaction does not trust degree.



**Figure 3. Network Security**

With the development of electronic commerce, the concept of e-commerce trust has been paid more and more attention by scholars and practitioners in the field of e-commerce. Abroad, especially the research on the electronic commerce trust us more in-depth, the theory is relatively mature, the research involves a wide range of e-commerce aspects, such as the electronic commerce website the trust of consumers, the consumer's heart factors, third party trust institutions to influence consumer trust, price factors on the effects of trust and privacy of consumers' trust effect of e-business website usefulness and ease of use of the effects of trust etc.. The research on e-commerce trust theory can be divided into two aspects: on the one hand mainly focuses on the technology caused by the trust, such as technology caused by the security authentication, privacy issues, web site performance, is the earliest start to focus on network security technology research trust.

With the development of e-commerce, more and more people began to shop through the network, along with this new shopping model, causing consumers to pay attention to network security. What is the network security technology to take what measures to ensure the security of network is the trust of network security, the initial research on e-commerce trust on the technical measures to ensure network security. On the other hand, analysis of trust from a non-technical perspective that influence consumer online trust is various, in addition to technology, ethics, policy environment, corporate reputation also influence consumers' trust on the Internet to a great extent. In addition, the protection of consumer privacy is the focus of current research, this is because in the e-commerce transactions, consumers need to provide their name, sex, age, identity card number, personal preferences and other privacy information to businesses, and some businesses will these sensitive information for commitment, even illegal sale to the third party profit, violation of consumer privacy, will seriously affect the consumer online trust. In addition, some scholars combine the risk and trust to analyze the establishment of trust.

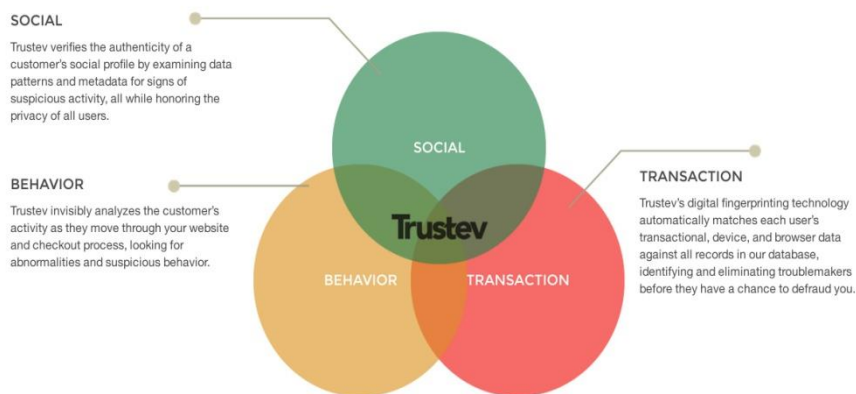


**Figure 4. The process of e-commerce transactions**

## 2.2. Analysis of influencing factors of electricity supplier trust

The development of electronic commerce is based on the development of information and communication technology. The modern information communication technology provides the necessary virtual platform for the development of electronic commerce, provides the possibility for the development of electronic commerce, especially the development of network security technology, can provide basic security for the development of electronic commerce. At present, there are still a series of network factors, such as the low level of computer network application, the narrow popularity of network, the security of network and the security of payment. With the development of e-commerce, although more and more people began to shop through the network, but people still have doubts about this new shopping model, network security is one of the biggest problems. Only to ensure network security, in order to ensure the safety and reliability of online transactions. Therefore, the issue of network security has attracted wide attention, and has become the core research area of e-commerce. As a secure electronic commerce system, communication network, we must first have a safe, reliable, in order to ensure the security of transaction information, then transfer quickly, must ensure that the database server is absolutely safe, to prevent hackers from breaking into the network to steal information

With the advent of knowledge economy, an important basis for the development of information technology, e-commerce is gradually becoming the economic activity of modern society based on the overall economic and social development provides a good macro environment for the development of electronic commerce. E-commerce can be said to be a kind of technology, but also a new social concept, but also a new basis for social development. Therefore, hinder the development of electronic commerce is not simply a technical problem, but a decision by the environmental non technical factors of social behavior, social environmental factors can also have a great influence on the electronic commerce consumer trust. The phenomenon of fraud seriously hinders the development of e-commerce. In the online shopping consumer complaints, consumers pay online, but did not receive a few complaints about the goods. May be the following aspects of the problem, the logistics link out of the problem, leading to the buyer can not receive the goods two, the buyer malicious cheat goods three, seller fraud. Through investigation and analysis, the situation of the buyer's malicious fraud is relatively small, mainly because there is a serious information asymmetry in the process of online transactions, while the buyer is in the position of information. In the case of unstable logistics links, this is mainly due to the seller's immoral behavior.



**Figure 5. E-business Trust factor**

With the development of the Internet as a platform for online transactions, online trading makes a huge revolution in commodity trading, not only shorten the time, speed up the transaction, but also greatly reduce the cost of commercial transactions. In the new century, great changes have taken place in the consumption habits of consumers, people may spend more time pursuing service, and strive to save time by buying goods, good service to meet the person rather than through the purchase of goods received to meet. Between logistics and other business activities, which will restrict the effective operation of e-commerce, hindering the enterprises to provide the most satisfactory service to customers, so that customers lose trust in business, eventually turned into traditional and conservative business model. However, in China, due to the late start of e-commerce, logistics distribution system is still not perfect, there are many problems.

- The high cost of e-commerce distribution: The electronic commerce distribution directly in the face of a large number of end consumers, and e-commerce is not subject to time and geographical constraints, degree of consumer goods is in urgent need of timeliness is also different, leading businesses is difficult to form a concentrated, the scale of the flow distribution, logistics and distribution caused by the complicated and trivial tasks, high cost.
- Distribution channel is not perfect: At present, there are three kinds of logistics distribution mode, and each of them has a serious shortage. The first site of their

own financing to build a logistics distribution model. From the customer's online order to the final arrival of the goods in the hands of the user to use one-stop service, independent distribution business, there is no third participants. But the site to invest their own logistics and distribution system, not every business can do.

- Lack of effective management of logistics distribution: The development of any economic activities must rely on the relevant legal system and management system to control and guide, in our country, the legal system of electronic commerce logistics distribution is still almost a blank. Just make some corresponding control measures, and its role is limited. In this legal system and policy, it is easy to delivery is not timely, delivery errors, and even the phenomenon of delivery is not delivered, so that consumers do not trust the business.

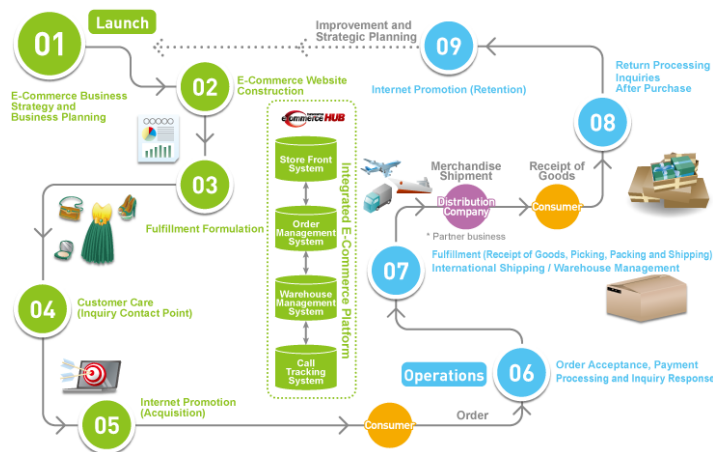


Figure 6. E-commerce logistics distribution system

### 3. Research on Logistics Service Quality based on Internet

#### 3.1. Logistics service quality

In the early time, location, utility based 7Rs theory that the logistics service quality is at the right time, on occasion, at the right price and route to provide products and services for the needs of customers, so that consumers demand activities meet. Of course, up to now, the traditional definition of logistics service quality based on product operation is no longer suitable for the rapid development of logistics demand. SERVAQUAL scale is widely used in the evaluation of logistics service quality. Is put forward in the service industry, service quality evaluation system, it is based on the theory of customer perceived quality service, customer oriented service quality questionnaire assessment tool, it is mainly on service expectation and perception of service quality to determine the use of consumers. They believe that the factors can be divided into five, namely, tangible, reliability, responsiveness, assurance and empathy.

- 1) **Tangibles:** It includes the actual facilities, equipment, and the appearance of service personnel, etc. For example, the matching of modern service facilities, staff clothing, company facilities and services provided. In the online shopping, it is mainly refers to the customer and business exchange of e-commerce website, it acts as the role of sales staff in the traditional shopping conditions.
- 2) **Reliability:** The ability to perform reliably and accurately. For example, in the online shopping environment, the seller in accordance with the order on time and

reliable to provide customers with the necessary products or services. This indicator is an important aspect of measuring service quality.

- 3) **Responsiveness:** Provide prompt, helpful and timely response to customer. For example, online shopping when the seller to the buyer to respond to the problem in a timely manner, and to inform the customer orders and the exact time of delivery.
- 4) **Assurance:** Knowledge, courtesy and the ability to express confidence and trust. Online shopping environment can be understood as the site can be recommended by the website shopping and shopping process to reflect their ability and knowledge to allow consumers to maintain their confidence.
- 5) **Empathy:** Caring and providing personalized service to customers. Online shopping can be understood as the site to provide personalized services to customers, such as personalized pages and personalized greetings.

Compared with the traditional mode of business operation, the demand for logistics is very high. This is the impact of logistics enterprises will be more and more strengthened. This is because in the e-commerce environment, logistics companies need to undertake more serious tasks: both the virtual store goods to the hands of the buyer, but also from the production enterprises timely purchase. E-commerce logistics will be raised to an unprecedented height.



Figure 7. E-business logistics and inventory management

### 3.2. Electricity suppliers logistics service quality

The foreign study on the service quality of online shopping logistics started relatively early, Griege in the papers mentioned in the supply chain management in electronic commerce is neglected or neglect, and the traditional logistics service is now hindering the development of electronic commerce. He mentioned that the application of the Internet has changed the structure of traditional distribution channels, and encouraged the improvement of logistics and distribution functions. Elliot mentioned that although in recent years, the research on logistics service has been improved, but a large number of literature has not been linked to the quality of e-commerce services and online retail profits. In his article, he emphasizes the positive effect of online service quality on online shopping behavior. In his article, Kennth uses the method of factor analysis to explain that online shopping, product and service quality have a direct impact on customer's

purchasing behavior and loyalty. Rao believes that multi-channel distribution model can make consumers get cheaper, faster and more effective products. And Internet on the distribution channels are influential. However, the degree of influence of different commodities is not the same, specifically through 4 industry demonstration. Arnold mainly studies the ways to attract consumers, especially the potential choice of online shopping, the most important thing is that they can use the minimum search time, the lowest cost of delivery to complete the process. On this basis, the E-S-QUAL scale is proposed, which is designed to meet the environmental requirements of online transactions. He divides the online service transaction into two parts. The first part is the basic E-S-QUAL, also become the core dimension, including four aspects. Respectively: effectiveness, performance, system usability and privacy. Effectiveness refers to the site is easy to enter and use. Performance refers to the site on the order processing and delivery of goods is reliable and timely. System availability refers to the correct and reasonable technical support and security. Confidentiality also refers to security, refers to whether the customer's private information can be kept confidential, whether there is a risk of payment. The second part is E-S-QUAL, the main measure of the goods when there is a problem, the customer need to exchange or refund processing service. The second part can be summarized into the online transaction service. A lot of people really encountered in online shopping goods are not satisfied with the situation, but given the return replacement process is relatively complex, so a few will choose to return or replacement, so do a separate section lists.

## **4. Empirical Analysis**

### **4.1. Model design**

This model mainly refers to, when customers buy goods on the Internet, did not experience the establishment of returned goods or services under the circumstances, we will according to the related theories, this part of the evaluation model named e-service-quality, the online service quality is divided into 3 dimensions, effectiveness, system availability, performance. Customers in online shopping, shopping environment, web page response speed, information disclosure, perfect, quantity, order release speed, accurate time of goods, goods intact degree, and even individuals in the whole process of shopping information privacy, will affect the customer satisfaction of online shopping logistics service. To investigate the relationship between the logistics service quality of online shopping and buying behavior, purchase behavior in this study refers to the consumers have bought goods and pay the money, it should be with the demand and purchasing desire to make the difference, so the establishment of logistics service quality and customer relationship satisfaction is a kind of method is very important. Through the research on the correlation between the quality of logistics service and satisfaction, we can get the conclusion we need. The specific measurement items are shown in Table 1.

The prediction test by convenience sampling, mainly through email, online shopping crowd to send 2000 questionnaires, 1732 questionnaires in total, of which 625 valid questionnaires, the effective questionnaire recovery rate was 81.1%. With the experience of online shopping accounted for the total number of valid questionnaires of 87%, this figure is far higher than the number of online shopping in China ratio, reason is that this questionnaire is transmitted via email, generally using email, there are Internet surfing habits, and habits of people, mostly have online shopping experience.



**Table 1. Index design**

First order index	Second order index	content
Logistics service quality	Validity	Shopping site information comprehensive
		Website system can send orders effectively
	Availability of system	Through the site can quickly complete the transaction
		Simple page operation
	Performance	When I order can be shipped quickly
	The seller of goods online is credible	
customer satisfaction	Satisfaction degree	Satisfied with the products and services
		The entire online shopping process is very convenient
	loyalty	Will be positive evaluation of this shop
		To purchase this product, this shop is my first choice
	Trust degree	I believe the ability of the shopping website
		I think the online store is reliable

First of all, we can compare the statistical variables of customer satisfaction and customer loyalty, the population, compared the correlation between customer trust, we can seek the demographic variables on online shopping behavior whether there is any effect. Table 2 correlation coefficient table.

**Table 2. The effect of population variables correlation coefficient**

factor	SEX	EDU	AGE	NET	WAGE	SAT	LOY	TRU
Gender	1							
Education	-.072	1						
Age	-.059	.025	1					
Net age	-.046	.116	.023	1				
income	.085	.121**	.146*	.041	1			
Satisfaction (SAT)	.103	.048	-.074	.157*	.062	1		
Loyalty (LOY)	.091	-.012	-.069	.152*	.147	.046	1	
Trust (TRU)	.056	-.015	-.016	.125	.101	.061	.576*	1

#### 4.2. Structural equation test

The correlation analysis of the variables is carried out before the model checking. Correlation analysis is a preliminary test of hypothesis. Generally speaking, there is a high correlation between the variables in the hypothesis, and the correlation is statistically significant. The correlation coefficients between the variables are given in Table 3. It can be seen that there is statistical significance between the groups. The basic assumptions are verified.

**Table 3. Phase of the relationship**

variable	Validity	Availability of system	Performance	Satisfaction degree	loyalty	Trust degree
Validity	1					
Availability of system	.612*	1				
Performance	.879*	.381	1			
Satisfaction degree	.910*	.752*	.286	1		
loyalty	.729**	.610*	.329*	.442**	1	
Trust degree	.862*	.603**	.589**	.638*	.543*	1

However, the statistical analysis of the hypothesis of correlation analysis does not mean that the structural model test. So continue to do structural equation model test. Find the value of RMSEA beyond the scope stipulated in the model, according to the MI value of the modification of the model, the modified model RMSEA decreased significantly, in line with the requirement of the model, while the GFI and AGFI values are still not significantly improved. It may be that the capacity of the test sample is not very good, but it is also possible that the questionnaire is in the form of an online survey. The results and conclusions of this model are still accepted here.

**Table 4. Inspection of the model**

path	Estimate	S.E.	C.R.	P
Satisfaction<-- validity	.154	.102	1.763	.012
Satisfaction <--system availability	.618	.183	2.145	.000
Trust <-- Performance	.232	.134	3.143	.036
Degree of trust <--satisfaction	.357	.096	4.237	.000
Loyalty<--degree of satisfaction	.518	.127	2.116	.023
Loyalty<--degree of trust	.431	.148	2.683	.000

The model test confirms the assumption that operability has a significant positive effect on satisfaction. Consistent with the research findings of scholars, the availability of network system has a positive impact on customer satisfaction. E-commerce, especially in the online purchase of products, there is a simple and easy to operate the site environment is very important, it can make customers feel useful, and therefore improve the satisfaction of online shopping. The model further validates our hypothesis that the performance has a significant positive effect on satisfaction. Performance as an important part of the logistics service quality, from the customer order on the Internet, to the final receipt of the goods, it is the content coverage. From the purchase to the distribution of the logistics business reflects the level of the nature of a business, in order to satisfy the customer satisfaction of a store's entire shopping activities, improve performance is a priority. Through the path detection of the above model, it is found that there is no direct positive impact on the degree of trust and the operability of the model. This may be because the operation and performance of the two antecedent variables through influence satisfaction profile influence trust. Some scholars had said antecedents and results have significant positive correlation between variables, if the mediating variables between the two, may make the effect associated with the original decline. Therefore, in the theoretical model of this study, due to the emergence of the mediating variables of satisfaction, the positive relationship between operability and performance is not significant, and the original hypothesis is not supported. Satisfaction has a significant positive impact on trust. According to social exchange theory as to be trusted to act in a consistent with the

expectations of the way when the trustor, trustee will be accepted by the trustor, the trust is established. For example, when a customer in a shop online shopping has been satisfied with the structure, it will naturally change the shop to establish a trust.

## 5. Conclusions

Because of the global and virtual characteristics of e-commerce, the development of e-commerce market is facing a more serious crisis of trust than traditional market. To solve the problem of trust between consumers and enterprises is to promote the rapid development of e-commerce, the establishment of good faith and orderly e-commerce transaction environment. The reason why people do not trust online businesses, the most fundamental reason is that the development of e-commerce platform based network has not been popular, but also can not guarantee the security of network transactions. Therefore, the government should expand the investment and construction of network infrastructure, so that the network covers a large area in the world, computers and networks have been widely spread. This paper establishes a multi-dimensional model of logistics service quality under the environment of electronic shopping, and divides into two kinds of situations to verify the reliability of multi dimension model of online shopping logistics service quality and the fitting degree of the structure.

The research shows that logistics service quality has a significant positive impact on online purchase behavior. At the same time when the stores to enhance the quality of service but also enhance the core value of the shop. However, to improve the quality of logistics services must be caused by the increase in the operating costs of the shop, especially when the customer returns more serious problem. Online businesses in order to reduce the unnecessary cost in the supply chain and transportation expenses, low cost enables online merchants to focus on improving their core competitiveness, most shopping sites are the logistics outsourcing. But because of the third party logistics enterprise service is not in place, often affect the customer satisfaction of the seller, so the establishment of incentive mechanism between an online store and third party logistics enterprises is an effective way .

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## References

- [1] Z. Huang and M. Benyoucef, "From e-commerce to social commerce: A close look at design features", *Electronic Commerce Research and Applications*, vol.12, no.4, (2013), pp. 246-259.
- [2] C. Zhang and X. Chen, "Use of Multimedia in Gross Infective Pathogen Experimental Teaching", *Procedia Engineering*, vol.37, (2012), pp. 64-67.
- [3] A. Shleifer, R. W. Vishny, "A survey of corporate governance", *The journal of finance*, vol. 52, (1997), pp. 737-783.
- [4] A. Edmans, "Governance through trading and intervention: A theory of multiple blockholders", *Review of Financial Studies*, vol. 7, (2011), pp. 2395-2428.
- [5] F. Johannes, "The Costs of Urbanization in Developing Countries", *Economic Development and Cultural Change*, vol.30, (1982), pp. 625-648.
- [6] C. James, J. Davis and V. Henderson, "Evidence on the political economy of the urbanization process", *Journal of Urban Economics*, vol.53, (2003), pp. 98-125.
- [7] R. Aghion, "Incomplete contracts and the theory of the firm: What have we learned over the past 25 years?", *The Journal of Economic Perspectives*, vol. 25, (2011), pp. 181-197.
- [8] V. Acharya, "Corporate governance and value creation: Evidence from private equity", *Review of Financial Studies*, vol. 26, (2013), pp. 368-402.
- [9] T. Jenkinson and C. Mayer, "The assessment: corporate governance and corporate control", *Oxford Review of Economic Policy*, vol. 8, (2012), pp. 1-10.

- [10] V. Bebchuk, "The state of corporate governance research", *Review of Financial Studies*, vol. 23, **(2010)**, pp. 939-961.
- [11] G. Nini and C. Smith, "Creditor control rights, corporate governance, and firm value", *Review of Financial Studies*, vol. 25, **(2012)**, pp. 1713-1761.
- [12] R. Kaplan, "Using the balanced scorecard as a strategic management system", *Harvard business review*, vol. 74, **(1996)**, pp. 75-85.