

## **Analysis of Loyalty of Store-to-Store Delivery Service System: A Case Study of ezShip.com in Taiwan**

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**Abstract:** Since electronic commerce has observed considerable growth, the C2C model was grow quickly and become more important in Taiwan e-commerce market. Ordering goods on the Internet is obviously becoming a significant market. Convenience stores in Taiwan have integrated e-commerce systems into their logistics systems to develop a new retail delivery model. “ezShip” is the one of the retail delivery systems served by CVS.com. First, this study analyzes the relationship among the logistics service quality, service value, satisfaction and loyalty based on structural equation modeling (SEM). The empirical results demonstrated that the logistics service quality, perceived sacrifice, service value and customer satisfaction are all positive effects of loyalty. Second, we discuss the importance and performance for each logistics service quality criteria by Importance-Performance Analysis (IPA). Finally, we provide some suggestions to the managers of ezShip.com to increase the market share.

**Keywords:** Store-to-Store Delivery Service, Logistics Service Quality, Structural Equation Modeling, ezShip.com

### **1. INTRODUCTION**

Nowadays, the on-line shopping increasingly becomes a fast growing business and serves as a brand-new channel between sellers and buyers, i.e. e-commerce. Buyers can surf on the Internet, browsing any information with few restrictions; for sellers, the electronic stores stand for a new channel to reach to buyers. Urban residents shop online more often than suburban residents, because their inclinations are facilitated with faster Internet connectivity. After decades of technological development, the Internet is now rapidly reshaping industries and changing business models. With increased usage of the World Wide Web (WWW), on-line shopping is becoming a new trading mode and preferred by consumers. Consumers just need to surf on the Internet, browse some information, and then compare the prices of different merchandise and retailers. Compared to brick-and-mortar environments, the Internet retailers have lower operation cost, and they also offer a more flexible and convenient way for consumers to shop. On-line shopping is now established as a major trend for suppliers and consumers. With this growth in electronic commerce (e-commerce), there are more and more consumers ordering goods from on-line auction in Taiwan.

Due to the dramatic growth of e-commerce, online shopping is more and more vibrant.

The way to trade online is not only through business to customer (B2C), but also through customer to customer (C2C). Internet users become the active players in the online C2C market. That is, people can trade with each other by e-commerce system such as online-auction. Because online shopping is not constrained by space and timeliness, various consumers from different place can use it at any time. That lets sellers can expand their market more easily. Compared to traditional trade mode, online shopping involves virtual trade behavior and physical logistics system. An efficient e-commerce system needs a strong support from efficient logistics system in order to send goods or products to customer fast and safely. In Taiwan there are a lot of convenience stores, which facilitates retail delivery (RD) service (shopping on-line and picking up orders at convenience stores). Retail delivery services in Taiwan have had remarkable success. The difference of e-commerce development between Taiwan and other countries is that it provides the new logistics service which is so-called “retail delivery” or “store-to-store service”. It means “shopping in an online store and picking up goods in a convenience store”. There is the highest density of convenience stores in Taiwan. It is easy to get any one of the convenience stores. Besides that, most of the stores in Taiwan provide 24-hours service.

There are three different system of store-to-store delivery service in Taiwan: 7-11, FamilyMart, and ezShip. Where, 7-11 and FamilyMart belong closed system, seller and the buyer can chose the 7-11(or FamilyMart) to finish their delivice process. In contrast, ezShip is an open system, user can choose any convenience store of FamilyMart, OK or Hi-Life to send package, and choose any convenience store of FamilyMart, OK or Hi-Life to pick-up their goods. Besides, ezShip is the first system which consists of information system and three major convenience stores including FamilyMart, OK, Hi-Life to provide integrated logistics service. In order to achieve proficiency, they should maintain reliability and efficiency. For the manager of ezShip, it is important issue to determine the logistics service quality, if they can identify which service quality is important for customer, the information will help the manager build the right marketing strategy to increase logistics service quality. This study aims to use SEM to understand the relationship between logistics service quality, service value, satisfaction and customer loyalty. It is important to understand the crucial factors in a choice of store-to-store delivery service for customers since this can help managers to develop strategies to increase their market share.

## **2. LITERATURE REVIEW**

### **2.1 Equations, Tables and Figures**

Logistics has been considered an aspect of service with which firms can create competitive advantage (Mentzer and Williams, 2001). Logistics service quality is a key factor of marketing, and it can create customer satisfaction. The “Seven Rs” describe the attributes that a company can offer products and services and create utility through logistics service. In other words, part of a product’s marketing offering is the company’s ability to deliver the right amount of right product at the right place at the right time in right condition at the right price with the right information (Mentzer, Flint, and Kent, 1999).

Unlike traditional logistics studies, logistics service studies not only include cycle time, on-time delivery, and inventory availability, but also any handling of individual customer requests beyond traditional service measures. Mentzer *et al.*, (2001) research in logistics service quality states that service quality perceptions are based on the dimensions of order placement and order receipt, and that is a concept of procedure. Furthermore, the authors provided nine concepts to evaluate logistics service quality (Table 1).

Most foreign and Taiwan logistics studies about e-retailing have all focused on home delivery, and develop the scale for measuring home delivery logistics service quality (Mentzer et al., 2001). Recently, Feng and Huang (2006, 2007) aimed at retailing delivery and used AHP and SEM to analyze consumer behavior intention about on-line shopping. They measured logistics service quality on retailing delivery service for on-line shopping by five dimensions: information quality, ordering procedures, timeliness, order condition and discrepancy handling.

Table 1. Definitions of the Nine Concepts about LSQ, Mentzer *et al.* (2001)

<b>Logistics Service Quality</b>	<b>Definitions</b>
<b>Personnel contact quality</b>	The customer orientation of the supplier's logistics contact people. Customers care about whether customer service personnel are knowledgeable, empathize with their situation, and help them resolve their problems.
<b>Order release quantities</b>	Product availability. Customers should be the most satisfied when they are able to obtain the quantities they desire.
<b>Information quality</b>	Customers' perceptions of the information provided by the supplier regarding products from which customers may choose.
<b>Ordering procedures</b>	The efficiency and effectiveness of the procedures followed by the supplier.
<b>Order Accuracy</b>	How closely shipments match customers' orders upon arrival.
<b>Order condition</b>	The lack of damage to orders.
<b>Order quality</b>	How well products work, includes how well they conform to product specifications and customers' need.
<b>Order discrepancy handling</b>	How well firms address any discrepancies in orders after the orders arrive.
<b>Timeliness</b>	Whether orders arrive at the customer location when promised. The length of time between order placement and receipt.

## 2.2 Service Value

Zeithaml (1988) described that perceived value is conceptualized as the consumer's overall assessment of the utility of a product based on perceived of what is received and what is given. She also identified four unique definitions of the value construct by an exploratory investigation: (1) Value is low price, (2) Value is whatever I want in a product, (3) Value is equality I get for the price I pay, (4) Value is what I get for what I give. Overall, value is a trade-off between get (benefits) and give up (sacrifices) something, no matter what is given and what is received vary across consumers.

Zeithaml (1988) argued that perceived quality is directly associated with perceived value. Cronin, Brady, Hult, and Tomas (2000) extended Zeithaml's (1988) concept of perceived value and defined it as a function of service quality, sacrifice, and customer characteristics. The customers' perceived value differs from each other because the monetary and

nonmonetary, and their preference and past experiences. Dabholkar, Shepherd, and Thorpe (2000) developed a model of perceived value. The empirical results confirmed that perceived product, service quality, and perceived risk lead to perceived value in a service encounter.

### **2.3 Customer Satisfaction**

The performance of a company leads to customer satisfaction with a product or service (Innis and Londe, 1994). Cardozo (1965) thought customer satisfaction may lead to repeat purchases, accept other products in the same product, and give favorable recommendation. Fornell (1992) also described that customer satisfaction can increase customer loyalty and decrease customer churn, reduce the costs of failing marketing and of new customer creation, improve the effectiveness of advertising, and enhance business reputation.

Satisfaction is associated with fulfilled performance expectations, and there are several definitions for customer satisfaction. Oliver (1980) stated that customer satisfaction is a function of expectations and performance, and furthermore, he described that it is not only from the disconfirmation of measurement but also from the emotions of purchasing experience. Fornell (1996) thought that performance is more important than expectation. Customer satisfaction generally means customer reaction to the state of fulfillment, and customer judgment of the fulfilled state (Oliver, 1999). Overall, customer satisfaction is a person's feelings of pleasure or disappointment resulting from the comparison between perceived and expected product performance. Fornell *et al.* (1996) introduced the American Customers Satisfaction Index (ACSI) model, and the empirical results showed that service quality and service value are antecedents of overall customer satisfaction.

### **2.4 Customer Loyalty**

Customer loyalty is described as a consumer's overall attachment or deep commitment to a product, service, brand, or organization (Oliver, 1999). The difference between customer loyalty and behavior intention is that customer loyalty has with a focus on repeat purchasing. Zeithaml *et al.* (2002) argued that superior service quality leads to favorable behavioral intentions. Cronin *et al.* (2000) described an empirical assessment of the effects of quality, satisfaction, and value on consumers' behavioral intentions in six service industries. They reviewed the literature, and presented three competing models based on different research objectives. The first model called "Value Model" is based on the service value literature, where value is suggested to lead directly to favorable behavioral outcomes. The second one is "Satisfaction Model" which is derived from the satisfaction literature and defines customer satisfaction as the major and direct determinant of behavioral intentions. The third model called "Indirect Model" is come from the literature on relationships between service quality, satisfaction, and behavioral intentions. This model shows that the relationship between service quality and behavioral intention is indirect.

In order to get a more pragmatic understanding of the relationships among service quality, service value, customer satisfaction, and behavioral intentions, Cronin *et al.* (2000) developed the fourth model called "Research Model". They found that service quality, service value, and satisfaction are directly associated with behavioral intention. In addition, service quality and service value are indirectly related to behavioral intentions (i.e.,  $SQ \rightarrow SV \rightarrow BI$ ,  $SQ \rightarrow SAT \rightarrow BI$ , and  $(SV \rightarrow SAT \rightarrow BI)$ ). Harris and Goode (2004) also developed a framework of service quality, trust, value, satisfaction, and loyalty, and tested this model by surveying

customers in two on-line markets, Books.com and Flights.com. Their research supported associations between service quality and value, service quality and satisfaction, value and loyalty, and satisfaction and loyalty.

### 3. Store-to-Store Delivery System

“ezShip” is the first system in Taiwan comprised of information and technology systems, and convenience stores chains and provides an integrated logistics service. The development of this logistics delivery model has provided a great deal of support to the C2C business model. Online stores can offer more delivery options for customers to choose from. Meanwhile, customers can make their own choices about which is the most convenient approach to getting their products. Because the logistical cost of ezShip is lower than for home delivery, and almost the same as that of delivery through the post office, more and more customers are using this system. However, this system still has a lot of risks. That is because the different logistics system used by different convenience store chains need to be combined. Physical logistics systems and information systems need to be combined as well. Moreover, CVS.com<sup>1</sup> promises quick delivery. They promise that “After the products are sent, they will arrive at the selected CS before 6:00 a.m. on the day after tomorrow.” All of these factors complicate the ezShip delivery process and increase the number of potential risks. There are more than ten thousand problematic cases per month on average. Those cases increase their operating costs. Hence, to reduce the risks in system, it is important to understand the process well. Figure 1 illustrates the ezShip delivery process.

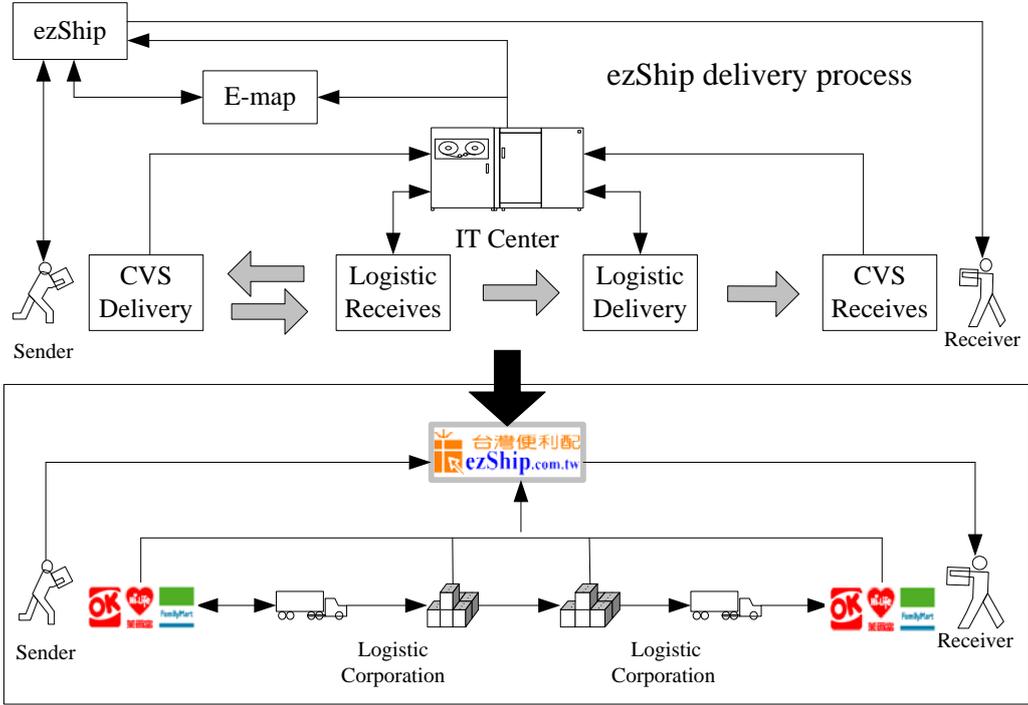


Figure 1. ezShip delivery process

### 4. RESEARCH DESIGN

<sup>1</sup> CVS.com, which is a joint venture run by three convenience store chains including Family Mart, OK, and Hi-Life.

## 4.1 Conceptual Framework

According to research background and motivation, the purposes of this study are to integrate relevant literature and to develop a comprehensive research framework to identify the relationships among key constructs. Figure 2 shows the conceptual framework of this study.

The literature review shows that all of the research constructs such as logistics service quality, service value, customer satisfaction, and customer loyalty have direct effects on each other. The comprehensive model of four service evaluation models proposed by Cronin, Brady, Brand, Hightower and Shemwell (2005) is used to depict the antecedents to customer loyalty. Based on literature review and the conceptual framework, numerous hypotheses were developed in this study:

- H1: Logistics service quality of store-to-store retailing delivery has a significant positive effect on customer satisfaction.
- H2: Logistics service quality of store-to-store retailing delivery has a significant positive effect on service value
- H3: Logistics service quality of store-to-store retailing delivery has a significant positive effect on loyalty
- H4: Service value has a significant positive effect on customer satisfaction.
- H5: Customer satisfaction has a significant positive effect on loyalty.
- H6: Service value has a significant positive effect on loyalty.

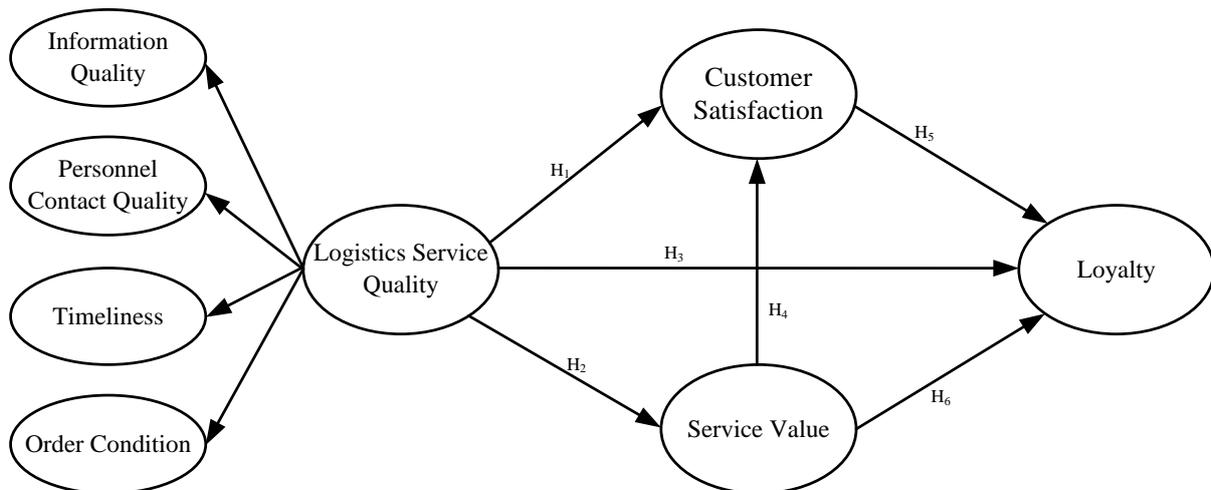


Figure 2. Conceptual Framework

## 3.2 Construct Measurement

For the purposes of this study, the following seven major constructs are defined in this section: (1) Logistics Service Quality, (2) Service Value, (3) Customer Satisfaction, and (4) Customer Loyalty. The measurement items of these constructs are adopted and modified according to previous researches, and all of them using Likert 5-point scales rating from “strongly disagree = 1” to “strongly agree = 5”.

### 3.2.1 Logistics Service Quality

Logistics service quality is customers’ quality evaluations of delivery, and it is similar to the definition of outcome quality by Collier and Bienstocks (2006), customers’ evaluations of

how the products or services are delivered. Then logistics service quality in this study is defined as how the package are delivered after the seller have send the package, and that is the logistics service quality about retailing delivery service provided by the ezShip.com. To measure customers' perception of logistics service quality, 11 questionnaire items are adopted and modified according to the studies of Mentzer, Flint, and Hult (2001), Collier and Bienstocks (2006), and Feng and Huang (2006, 2007). These 11 items are categorized into four dimensions described as follows: (1) Information Quality, the information provided by the store-to-store delivery service provider regarding delivery is sufficient and accurate; (2) Timeliness, whether the package are received within the expected amount of time; (3) Order Condition, how closely the package or services match customers' send, and the lack of damage to the goods; (4) Personnel Contact Quality, whether the staff of convenience stores are knowledgeable and have a good manner. Table 2 displays the questionnaire items for logistics service quality.

### 3.2.2 Service Value

Following Zeithaml (1988), service value in this study is defined as the overall assessment of utility of package based on perceived of what is received and what is given, and this is a trade-off between benefits and sacrifices. To measure customers' perception of service value, 3 questionnaire items are employed, and these items are adopted based on the study of Parasuraman (1997). Table 2 displays the questionnaire items for service value.

### 3.2.3 Customer Satisfaction

Following Oliver (1980), customer satisfaction in this study is defined as customers' overall evaluation of their feelings after sending package by the ezShip.com. There are 3 questionnaire items used to measure customers' perception of satisfaction, and these items are according to the studies of Cronin *et al.* (2000). Table 2 displays the questionnaire items for customer satisfaction.

### 3.2.4 Customer Loyalty

According to Oliver (1999), customer loyalty in this study is defined as the overall attachment or deep commitment to the ezShip.com, including repeat purchasing and recommendation. In addition, the 4 questionnaire items are used to measure customers' perception of loyalty, and these items are based on the studies of Collier and Bienstocks (2006) and Parasuraman, Zeithaml, and Malhotra (2005). Table 2 displays the questionnaire items for customer loyalty.

Table 2. Definitions of the Nine Concepts about LSQ, Mentzer *et al.* (2001)

Constructs	Measurement Items	Literature Based
Logistics Service Quality	● Information Quality	Mentzer, Flint, and Hult (2001), Collier and Bienstock (2006), Feng and Huang (2006)
	1. The e-map interface lets me choose a pick-up point conveniently.	
	2. It gives me numerous options to choose the pick-up point.	
	3. The information of convenience stores on the e-map is accurate.	
	● Order Condition	
	1. Damage rarely occurs during transportation of my package	
2. The package I received are undamaged.		

Table 2 (con.). Definitions of the Nine Concepts about LSQ, Mentzer *et al.* (2001)

Constructs	Measurement Items	Literature Based
Logistics Service Quality	● Timeliness	
	1. The logistics information is processed quickly.	
	2. Time between ordering and receiving is short.	
	3. Package always arrive on the date promised.	Mentzer, Flint, and Hult (2001), Collier and Bienstock (2006), Feng and Huang (2006)
	● Personnel Contact Quality	
	1. When I pick up, the convenience store staff can quickly find the package I send.	
	2. When I pick up, the convenience store staffs have good manners.	
	3. The convenience store staffs have good manners even though they are busy.	
Service Value	1. I think that the service provided by this store-to-store retailing delivery service compared to the price I had to pay is acceptable.	
	2. I think that it is more worthwhile to use this store-to-store retailing delivery service than others.	Dodds <i>et al.</i> (1991)
	3. Compared to the price, I think the service provided by this store-to-store retailing delivery service is very valuable.	
Customer Satisfaction	1. In general, the service from ezShip conformed to my expectations.	
	2. In general, I am satisfied with the service that ezShip provided.	Cronin <i>et al.</i> (2000)
	3. Using on the service from ezShip is a wise decision.	
Customer Loyalty	1. I will recommend eZship.com delivery service to my friends.	
	2. I am willing to try other business service provide by ezShip.	Collier and Bienstock (2006)
	3. Compare to other store-to-store retailing delivery service, I prefer eZship.	

## 5. RESEARCH ANALYSIS AND RESULTS

### 5.1 Descriptive Analysis

In our study, a Web-based survey was employed. In total, 406 cases were gathered in June 2014. Table3 present characteristics of the total sample, according to the Table3 shows, more than 77% of the respondents are female, and most of the sample is 19-40 years old (32.8%) and less than 1% of the respondents are over 51 years old. Most respondents (71.5%) are single, and most respondents (66%) have a College/University degree. Furthermore, more than half of the respondents are students or employees of a company, and more than 55% of the respondents live in northern Taiwan.

Table 3. Profiles of the Sample

Classification	Frequency	Percentage (%)
Gender		
Male	91	22.4
Female	315	77.6
Age		
Less than 18 years old	68	16.7
19 - 22 years old	56	13.8
23 - 29 years old	133	32.8

Table 3. (con.) Profiles of the Sample

Classification	Frequency	Percentage (%)
Marital Status		
Single	295	72.7
Married (have kids)	89	21.9
Married (no kids)	22	5.4
Education		
Junior high school or less	19	4.7
Senior high school	71	17.5
College/University	268	66.0
Graduate school or more	48	11.8
Occupation		
Student	129	31.8
Housekeeping	15	3.7
Soldier	14	0.4
Government Employee	17	4.2
Teacher	15	3.7
Professional	20	4.9
Freelancer	14	3.4
Employee of A Company	94	23.2
Manufacturing	19	4.7
Information Technologist	16	3.9
Retailing	11	2.7
Others	54	13.3
Area		
Northern Taiwan	224	55.2
Central Taiwan	75	18.5
Southern Taiwan	88	21.7
Eastern Taiwan and Others	19	4.6

## 5.2 Reliability and Validity Analyses

Reliability refers to the consistency of a measure, whereas internal consistency is that the individual items of a scale should be measuring the same construct and be highly interrelated. The most commonly ways of testing internal consistency are computing Cronbach's alpha and item-to-total correlation. When the item-to-total correlation is above 0.4 and the reliability coefficient alpha value is above 0.7, the items demonstrate high internal consistency and hence reliability of each dimension (Nunnally and Bernstein, 1994). Table 4 shows the internal consistency for all research constructs. All items within a factor or a construct have a high coefficient of item-to-total correlation (0.693 – 0.898), and this suggests a high degree of internal consistency for each dimension. Furthermore, the Cronbach's alpha value of each construct is high (0.851 – 0.944), which confirms the consistency of the measurement variables. Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. In addition to the reliability test, the validity for the variables was explored by confirmatory factor analysis (CFA). Table 5 and Table 6 shows the internal consistency for all research constructs, including logistics service quality, service value, satisfaction and loyalty.

Table 4. Results of Reliability Tests

Items	Description	Item-to-Total Correlation	Cronbach's alpha
Logistics Service Quality (LSQ) – Information Quality			
LSQ <sub>11</sub>	The e-map interface lets me choose a pick-up point conveniently.	0.854	0.915
LSQ <sub>12</sub>	It gives me numerous options to choose the pick-up point.	0.863	
LSQ <sub>13</sub>	The information of convenience stores on the e-map is accurate.	0.772	
Logistics Service Quality (LSQ) – Timeliness			
LSQ <sub>21</sub>	The logistics information is processed quickly.	0.693	0.857
LSQ <sub>22</sub>	Time between ordering and receiving is short.	0.824	
LSQ <sub>23</sub>	Package always arrive on the date promised.	0.702	
Logistics Service Quality (LSQ) – Order Condition			
LSQ <sub>31</sub>	Damage rarely occurs during transportation of my package.	0.796	0.886
LSQ <sub>32</sub>	The package I received are undamaged.	0.796	
Logistics Service Quality (LSQ) – Personnel Contact Quality			
LSQ <sub>41</sub>	When I pick up, the convenience store staff can quickly find the package I ordered.	0.721	0.901
LSQ <sub>42</sub>	When I pick up, the convenience store staffs have good manners.	0.859	
LSQ <sub>43</sub>	The convenience store staffs have good manners even though they are busy.	0.833	
Service Value (VAL)			
VAL <sub>1</sub>	I think that the service provided by this store-to-store retailing delivery service compared to the price I had to pay is acceptable.	0.760	0.899
VAL <sub>2</sub>	I think that it is more worthwhile to use this store-to-store retailing delivery service than others.	0.802	
VAL <sub>3</sub>	Compared to the price, I think the service provided by this store-to-store retailing delivery service is very valuable.	0.843	
Customer Satisfaction (SAT)			
SAT <sub>1</sub>	In general, the service from ezShip conformed to my expectations.	0.879	0.944
SAT <sub>2</sub>	In general, I am satisfied with the service that ezShip provided.	0.898	
SAT <sub>3</sub>	Using on the service from ezShip is a wise decision.	0.872	
Customer Loyalty (LOY)			
LOY <sub>1</sub>	I will recommend eZship.com delivery service to my friends.	0.767	0.851
LOY <sub>2</sub>	I am willing to try other business service provide by ezShip.	0.665	
LOY <sub>3</sub>	Compare to other store-to-store retailing delivery service, I prefer eZship.	0.765	

There were four factors including information quality, timeliness, order condition, and personnel contact quality. A second-order CFA is used for validity analysis. Table 5 depicts the path diagram of this second-order CFA for logistic service quality. The fit measure of RMR is below the recommended cutoff value of 0.05. Although the values of GFI and AGFI

are less than 0.9, the NFI, NNFI, and CFI values are greater than 0.9. Thus the measurement model fits the data well. Table 5 also demonstrates that all standardized factor loadings are greater than 0.6, and all items are significant at the 0.01 level. Standardized factor loading and t-value are estimated to display validity, and the average variance extracted is also estimated to display validity. If the item is significant at the 0.01 level and the average variance extracted is greater than 0.5, the convergent validity can be assessed.

Table 5. Results of Reliability Tests (Logistics Service Quality)

Factor	Loading	Item	Loading	Construct Validity	Average Variance Extracted	Composite Reliability
Information Quality	0.61	LSQ <sub>11</sub>	0.86**	0.871	0.693	0.865
		LSQ <sub>12</sub>	0.88**			0.884
		LSQ <sub>13</sub>	0.75**			0.689
Timeliness	0.92	LSQ <sub>21</sub>	0.89**	0.836	0.634	0.608
		LSQ <sub>12</sub>	0.83**			0.740
		LSQ <sub>13</sub>	0.65**			0.706
Order Condition	0.83	LSQ <sub>31</sub>	0.75**	0.793	0.563	0.828
		LSQ <sub>32</sub>	0.84**			0.723
Personnel Contact Quality	0.69	LSQ <sub>41</sub>	0.65**	0.834	0.626	0.578
		LSQ <sub>42</sub>	0.76**			0.884
		LSQ <sub>43</sub>	0.81**			0.828

- Not relevant; \*\* Significant at 1% level; \* Significant at 5% level.

Other constructs such as service value, customer satisfaction, and customer loyalty were examined by first-order CFA. Table 6 demonstrates that all standardized factor loadings are greater than 0.7, and all items are significant at the 0.01 level. Composite reliability values for all constructs are greater than 0.5, and all values of average variance extracted are greater than 0.6.

Table 6. Results of Reliability Tests

Factor	Item	Loading	Construct Validity	Average Variance Extracted	Composite Reliability
Service Value	VAL <sub>1</sub>	0.79**	0.901	0.752	0.624
	VAL <sub>2</sub>	0.89**			0.792
	VAL <sub>3</sub>	0.91**			0.828
Customer Satisfaction	SAT <sub>1</sub>	0.92**	0.944	0.849	0.846
	SAT <sub>2</sub>	0.93**			0.865
	SAT <sub>3</sub>	0.91**			0.828
Customer Loyalty	LOY <sub>1</sub>	0.90**	0.865	0.683	0.810
	LOY <sub>2</sub>	0.72**			0.518
	LOY <sub>3</sub>	0.85**			0.723

- Not relevant; \*\* Significant at 1% level; \* Significant at 5% level.

### 5.3 SEM and Path Analyses

The purpose of this study is to examine the relationships among logistics service quality, service value, customer satisfaction, and customer loyalty in the context of ezShip. To achieve these goals, structural equation modeling (SEM) was performed using AMOS to test the

hypotheses in the research model. Table 7 describe all the criteria of model fit index. The chi-square value for our sample is significant at the 0.00 level, and the chi-square/df is 2.68 which is below the limit of 5.00. The criteria of RMR and RMSEA value are all below the threshold value of 0.05 and 0.08. Other fit indices like GFI, AGFI, NFI, NNFI, and CFI are greater than the recommended level of 0.9. These results also show that the model is good fit the sample data (see Table 7).

Table 7. Overall Model Fit of Research Model

Fit Measures	Criteria	Results	Acceptability
Chi-square (df)	$P > 0.05$	158.24 (59) $P = 0.00$	Accepted
Chi-square/df	$< 5.00$	2.68	Accepted
RMR	$< 0.05$	0.014	Accepted
RMSEA	$< 0.08$	0.025	Accepted
GFI	$> 0.9$	0.940	Accepted
AGFI	$> 0.9$	0.910	Accepted
NFI	$> 0.9$	0.980	Accepted
NNFI	$> 0.9$	0.990	Accepted
CFI	$> 0.9$	0.990	Accepted

There are six direct paths in the research model. Table 8 and Fig 3 shows the results of these paths for our samples. In our research sample, except for the paths of logistics service quality to customer satisfaction, service value and customer loyalty, each relationship between paired constructs is positive and significant. As for the service value, it has a significant positive effect on customer satisfaction as well as customer loyalty. Fig 3 also the path of customer satisfaction is positive the customer loyalty.

Table 8. Path Results of Research Model

	Standardized Estimate	t-value
Logistics Service Quality → Service Value	0.46**	8.22
Logistics Service Quality → Customer Satisfaction	0.07*	2.08
Logistics Service Quality → Customer Loyalty	0.08*	2.19
Service Value → Customer Satisfaction	0.91**	18.90
Service Value → Customer Loyalty	0.37**	2.98
Customer Satisfaction → Customer Loyalty	0.52**	4.19

- Not relevant; \*\* Significant at 1% level; \* Significant at 5% level.

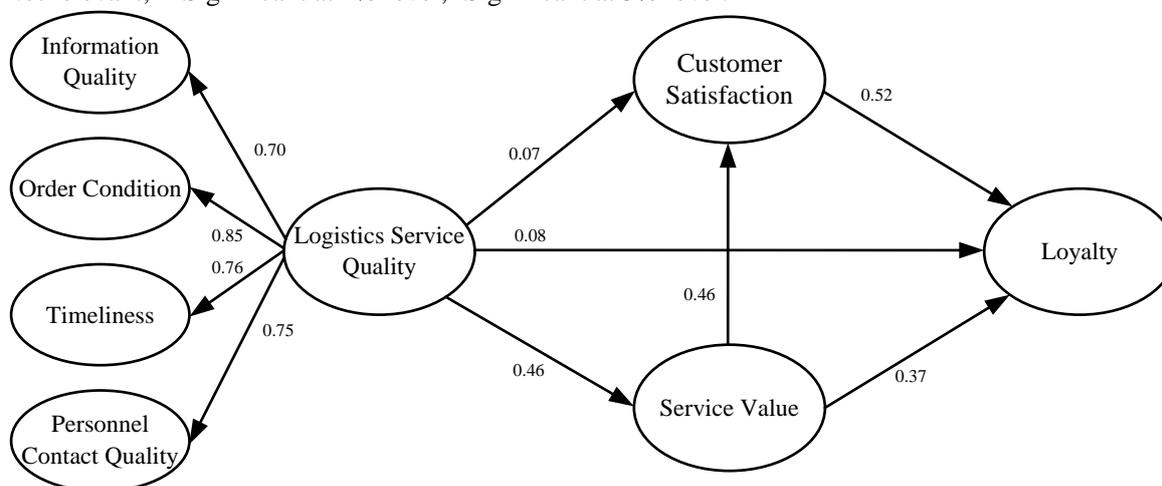


Figure 3. Path Results of Research Model

Three different kinds of effects including direct effect, indirect effect, and total effect between research constructs were analyzed. Total effect is the sum of direct and indirect effects. And Table 9 shows these three kinds of effects between the constructs for our research sample.

First, we describe the direct effects, as shows in Table 9, the logistics service quality, service value, and customer satisfaction have direct effect on customer loyalty (0.08, 0.37, 0.52), and logistics service quality also has direct positive effects on service value (0.46). Besides, customer satisfaction exhibits a stronger direct influence on customer satisfaction than logistics service quality and service value do ( $0.52 > 0.08$ ;  $0.52 > 0.37$ ). Moreover, service value has greater impact on customer satisfaction than logistics service quality do ( $0.91 > 0.07$ ).

Table 9 also shows the indirect effects analysis, logistics service quality and service value have indirect effects on customer loyalty via customer satisfaction value (i.e.,  $LSQ \rightarrow SAT \rightarrow LOY$ ;  $VAL \rightarrow SAT \rightarrow LOY$ ). And logistics service quality has indirect effects on customer loyalty through service value and (or) customer satisfaction (i.e.,  $LSQ \rightarrow VAL \rightarrow SAT \rightarrow LOY$ ;  $LSQ \rightarrow VAL \rightarrow LOY$ ).

According Table 9, we can find the indirect effects of logistics service quality and service value on customer loyalty are 0.424 and 0.473. The indirect effects of logistics service quality on customer loyalty are aggregation of standardized coefficients from 3 indirect routes: (1)  $LSQ \rightarrow VAL \rightarrow LOY$  (0.1702); (2)  $LSQ \rightarrow SAT \rightarrow LOY$  (0.0364); (3)  $LSQ \rightarrow VAL \rightarrow SAT \rightarrow LOY$  (0.2176). Therefore, the indirect effects of logistics service quality on customer loyalty are 0.424. In addition, the indirect effects of service value on customer loyalty are 0.473 ( $VAL \rightarrow SAT \rightarrow LOY$ ).

Finally, we summaries the total effect of the customer loyalty. In regard to the impact on customer loyalty, service value (0.843) has superior total effect effects than logistics service quality (0.504) and customer satisfaction (0.504). Likewise, service value (0.91) exhibit higher total effects on customer satisfaction than logistics service quality (0.488). These findings highlight the importance of the intermediate role of service value and customer satisfaction in the research model. If we focus on the customer loyalty, the most important factor which play the most important role is the service value, the second important factor is customer satisfaction. As for the logistics service play the core service concept of the store-to-store retailing delivery service, and the logistics service quality also have direct and indirect effects on customer loyalty, it is worth for manager in-depth analysis.

Table 9. Path Results of Research Model

Constructs	Direct Effects	Indirect Effects	Total Effects
<b>Logistics Service Quality</b>			
Service Value	0.46	-	0.460
Customer Satisfaction	0.07	0.418 ( $0.46 \times 0.91$ ) 0.1702 ( $0.46 \times 0.37$ )	0.488
Customer Loyalty	0.08	0.0364 ( $0.07 \times 0.52$ ) 0.2176 ( $0.46 \times 0.91 \times 0.52$ )	0.504
<b>Service Value</b>			
Customer Satisfaction	0.91	-	0.910
Customer Loyalty	0.37	0.473 ( $0.91 \times 0.52$ )	0.843
<b>Customer Satisfaction</b>			
Customer Loyalty	0.52	-	0.52

## 5.4 IPA Analyses

Importance-Performance Analysis (IPA) is a simple and useful technique for identifying those attributes of a product or service that are most in need of improvement or that are candidates for possible cost-saving conditions without significant detriment to overall quality. The application of IPA, introduced by Martilla and James (1977) is well documented and has shown the capability to provide service managers with valuable information for both satisfaction measurement and the efficient allocation of resources in an easily applicable format.

IP maps highlight the relative positions of attributes in matrix format, with the importance values on the vertical axis and performance values on the horizontal axis. Logistics service quality questionnaire items are classified into quadrants as shown in the graph (see Fig. 4): quadrant I (over-emphasized area), quadrant II (maintenance reinforcement area), quadrant III (improvement reinforcement area) and quadrant IV (secondary improvement area).

Figures 4 show the IP maps of logistics service quality for our case. As shown in Figure 4, most of the logistics service quality items fall in I (LSQ<sub>11</sub>, LSQ<sub>12</sub>, LSQ<sub>13</sub>) and quadrant IV (LSQ<sub>21</sub>, LSQ<sub>41</sub>, LSQ<sub>42</sub>, LSQ<sub>43</sub>), and only a one is in quadrants III (LSQ<sub>22</sub>). For the quadrant II (maintenance reinforcement area), there are the LSQ<sub>23</sub>, LSQ<sub>31</sub> and LSQ<sub>32</sub>.

According to the Fig. 4, the ezShip.com's advantage of logistics service are the LSQ<sub>23</sub> (Package always arrive on the date promised), LSQ<sub>31</sub> (Damage rarely occurs during transportation of my package), and LSQ<sub>32</sub> (The package I received are undamaged). Therefore, ezShip.com should maintain the advantage of quadrant II, and their resource allocation should be changed from quadrant I (LSQ<sub>11</sub>: The e-map interface lets me choose a pick-up point conveniently, LSQ<sub>12</sub>: It gives me numerous options to choose the pick-up point, and LSQ<sub>13</sub>: The information of convenience stores on the e-map is accurate) to quadrant III (LSQ<sub>22</sub>: Time between ordering and receiving is short).

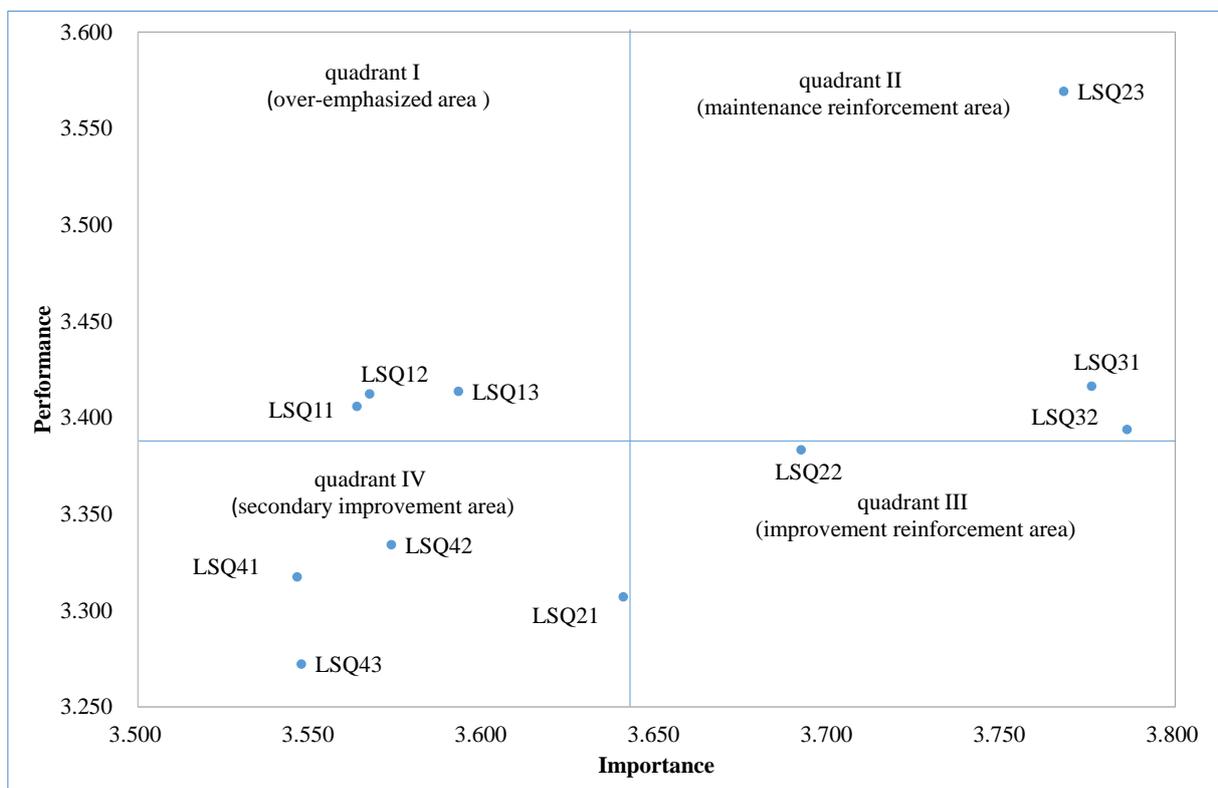


Figure 4. IP Map

## 6. CONCLUSION AND SUGGESTIONS

Store-to-Store delivery service system is one the main retailing delivery service for on-line auction commerce (C2C) in Taiwan. The goal of this study was to identify potential components of store-to-store delivery service quality regarding ezShip.com. We has presented a relationship model between logistics service quality, service value, satisfaction, and loyalty for the users of online auction. Based on the confirmatory factor analysis, the LSQ scale developed in this study adequately fit the data. According to SEM analysis, the service value, satisfaction, and logistics service quality have positive effects on customer loyalty. Furthermore, service value and logistics service quality not only has direct effect on customer loyalty, but also indirect effect on customer loyalty by satisfaction. Furthermore, SEM analysis provided support that logistics service quality dimensions are indirect effect on customer loyalty by service value.

The findings have both managerial and research implication. For managers of ezShip.com, the logistics service quality of retailing delivery service for ezShip.com is composed of four concepts, including information quality, timeliness, order condition, and personnel contact quality. The results of this study have implications for managers of store-to-store retailing delivery system of eZship.com. When customers use store-to-store retailing delivery service, they will concern with “Time between ordering and receiving is short (LSQ<sub>22</sub>)”, “Package always arrive on the date promised (LSQ<sub>23</sub>)”, “Damage rarely occurs during transportation of my package (LSQ<sub>31</sub>)”, and “The package I received are undamaged (LSQ<sub>32</sub>)”. Additionally, the Importance-Performance analysis of logistics service quality for ezShip.com were also examined, the key results for ezShip.com are that the store-to-store retailing delivery provider should focus on “Package always arrive on the date promised”, “Damage rarely occurs during transportation of my package”, and “The package I received are undamaged”.

Past research indicates that the link between customer satisfaction and customer loyalty is not straightforward. Oliva *et al.* (1992) demonstrated that extremely satisfied customers are much more likely to remain loyal to firm than those who are merely satisfied. According to Oliva *et al.* (1992) and Huang (2008), the relationship between satisfaction and customer loyalty is both linear and nonlinear, to investigate the system with respecting to transitional, discontinuous behavior, and the catastrophe theory is a powerful mathematical tool to analyze the nonlinear system. We suggested that other researchers could consider the catastrophe theory and other nonlinear techniques, especially when standard approaches do not adequately capture the underlying dynamics.

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