Research on the Impact of Sustainable Logistics Service Quality on Consumers' Cross Buying

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Abstract

Through the literature, it is found that contemporary enterprises pay more attention to the sustainable, green and environmental protection logistics service quality provided by logistics service providers, and consumers gradually pay attention to this when making cross purchase. When improving the quality of logistics service, the risks and costs will change compared with the past. Therefore, based on the subjective utility theory, this study establishes a model considering consumer satisfaction and perceived uncertainty. Through questionnaire and field research, the data of 398 questionnaires were analyzed by SPSS and Amos. The results show that perceived uncertainty negatively regulates the relationship between customer satisfaction and cross purchase; Cross purchase is positively affected by sustainable logistics service quality and customer satisfaction. This study confirms the previous research on supplier customer relationship cooperation, which is beneficial to both sides and provides a reference for businesses to improve consumers' cross purchase behavior in the future.

Keywords: *Sustainable Logistics service Quality, customer satisfaction, Perceived uncertainty, cross buying*

1.Introduction

Promoting efficient, effective transportation and storage of goods, information and services is increasingly recognized as practices for promoting sustainable economic development and competitive sustainability in emerging countries (Yuen et al., 2017).In this regard, the company has begun to apply sustainability policies when working with logistics service providers (LSP), as efficient logistics services are considered a competitive advantage by reducing overall costs and emissions and improving the service quality of purchasing companies (Centobelli et al., 2017)【3】.As a result, the LSP increasingly needs to apply sustainability practices in its operational activities, while achieving high-quality service, customer satisfaction, and cost savings. However, if cost minimization remains a key goal in managing logistics services, the service quality level is difficult to quantify, manifested as customer perception over time, the measurement process itself, and the availability of reliable data (Limbourg et al., 2016)【6】.

2.Concept definition and research assumptions

2.1. Sustainable logistics service quality

Bienstock et al., (1997) has developed a suitable and reliable scale to measure the service quality of logistics services. One of the earliest explanations of the concept of logistics quality is Russ and Perrault (1974), who put forward the "7RS" theory, which defines the quality of logistics service, including time, place and function, mainly the service itself. Specifically, 7R is included in several elements of logistics enterprise services: the delivery time of products, the quantity of products and the price to the site can be correct or appropriate, and meet the personalized needs of consumers according to the evaluation of the value of goods and services. Based on previous studies, we present the following SLSQ scales for personal contact quality, sustainable information quality, order status, and timeliness by combining LSQ and SSQ (Ali et al., 2021, Gupta et al., 2018, Jaafar, 2006, Mentzer et al., 1999,2001)【1】with theoretical dimensions. In this study, we hypothesize that the new SLSQ scale positively affects customer satisfaction and propose the following assumptions

accordingly: H1: Sustainable logistics service quality positively affects customer satisfaction.

2.2. Customer satisfaction

In the existing literature, many researchers have demonstrated the importance of logistics service performance as a central point for achieving customer satisfaction (Balci et al., 2019, Bienstock et al., 1997, Dadzie et al., 2005). Verhoef, Framnes & Hoekstm (2001) through an empirical study of the insurance industry found that satisfaction had no effect on customer cross-buying, while the difference in customer satisfaction between enterprises and competitors had no effect on customer cross-buying. However, with the extension of the relationship between the enterprise and customers, the positive impact of satisfaction on customer cross-purchase began to increase. Negabo (2004) found that satisfaction has a weak positive impact on cross purchase intention 【7】. But there are also scholars with different viewpoints. They suggest that explanations of consumer satisfaction cannot rely solely on models in which expectations are inconsistent with actual perceptions. Although good existing service evaluation and customer cross purchase intention, these variables are not important incentives to strengthen the contract condition, for the e-commerce environment, there is a lack of relevant research. Therefore, the following assumptions are proposed: H2: Customer satisfaction positively affects the cross- buying.

2.3. Perceived uncertainty

During purchasing, customers feel uncertain because they cannot anticipate the outcome of their shopping and possible subsequent effects or results. This perception of uncertainty is an anticipated potential loss that affects individual attitudes towards behaviour. The higher the perceived uncertainty related to purchase, the more negative the attitude towards purchase. Quintal, Lee, & Soutar, (2010) 【11】 believes that perceptual uncertainty also affects perceptual behavioural control over actions, with higher perceptual uncertainty related to purchase, less perceptual control over purchases, the higher the perceptual uncertainty about decision outcomes, the greater the negative impact on perceptual control. With high perceived uncertainty, people are likely to try to avoid risk. One of the most commonly used strategies is to rely on past experiences. If satisfied with the past performance of the service personnel, customers will be confident about the future performance, reducing the degree of uncertainty faced (Franzier, 1993).If the buyer does not trust the seller, the lower the risk of developing a new relationship with the alternative supplier may be, thus increasing the possibility of the buyer's conversion behaviour (Foster & Cadogan, 2000) 【5】 .Therefore, the following assumptions are made: H3: Perceptual

uncertainty weakens the relationship between customer satisfaction and cross- buying.

2.4. Cross-buying

Cross-buying is a narrow field of discussion, focusing on financial definition contract, and a small number of cross-buying behaviour for non-contract retailers. Cross-buying is a customer who buys different products from the same company; selling other goods or services to existing customers from the perspective of the seller is called cross-selling. More and more retailers are trying to increase their relationship with their customers, using their past purchasing experience to provide marketing methods such as promotional plans or product recommendations to form cross-buying. Therefore, in order to stimulate cross-buying, retailers will offer more categories of goods and peripheral services (Evanschitzky, Malhotra, Wangenheimb, & Lemonc, 2017) 【3】 【9】 .This study defines cross-purchase as purchasing additional product / service categories from a company (Verhoef et al., 2001), some of which may be new or unfamiliar to customers.

3. Study design

3.1. Sample and data collection

The data of this study were collected as a questionnaire for consumers in different industries. Online questionnaire distribution and field survey were conducted for 15 days, and a total of 411 questionnaires were recovered. When sorting out the questionnaire, unqualified data such as too fast filling in time, obvious logical errors or missing information were deleted. After removing the questionnaire, 398 effective questionnaires were removed, and the valid questionnaire rate was 96.84%.

3.2. Research tools

On the basis of using mature scales at home and abroad, and the advice of relevant professionals, this study compiled measurement scales of sustainable logistics service quality, customer satisfaction, perceived uncertainty and cross-purchase, and five demographic variables (gender, age, education, monthly income and occupation) as control variables. The questionnaire began with the cover, which included a brief introduction on the nature and purpose of the study. The whole questionnaire uses the Likert five-point scale (1 = very disagree, 5 = very agree). To ensure the reliability and validity of the scale, the questionnaire was revised based on the preliminary findings. The scale of " Sustainable logistics service quality" variable adopts the questionnaire of Ali, Gruchmann, & Melkonyan (2022) 【1】 , with a total of 11 items. The scale of the "customer satisfaction" variable was compiled by Mentzer, Flint, & Hult (2001), with a

total of 4 items. The scale of "perceived uncertainty" variables was mainly borrowed from the scale compiled by Becker & Knudsen (2005) 【2】, and modified for a total of 6 items. The scale for the cross-buying variable adopts the 4-item scale of Ngobo (2004) 【7】.

4.Analysis of the study results

4.1. Descriptive statistical analysis

The basic information data of the questionnaire are as follows:58.8% are male; main age range is 31-50,69.6%; most education is 62.1%; most monthly income range is 4001-12000yuan, 58%; The majority of occupations are service industry (24.1%), civil servants or public institutions (17.8%) and others (32.4%), with a total of 74.3%.

4.2. Reliability analysis

According to the analysis of this study, the values of the variables shown in Table 1 are greater than 0.850. Through the above data show that the questionnaire of this study has credibility, so the data analysis of this study is of reference value.

Table 1: The Cronbach α reliability analysis table

variable	item	Alpha
Sustainable logistics service quality	11	.963
Customers satisfaction	4	.894
Cross-buying	4	.869
Perceived uncertainty	6	.931

4.3. Model fitting index analysis

The fitted index values of the structural model of this study are shown in Table 2： CMIN/DF=1.898<2;

RMSEA=0.048.All values meet the high required reference range, and therefore hypotheses can be tested.

Table 2 Model was fitted to the index Table

Fitting degree reference term	figure	reference ranges
CMIN/DF	1.898	<2
NFI	0.939	>0.9
TLI	0.966	>0.9
CFI	0.970	>0.9
GFI	0.906	>0.85
RMSEA	0.048	<0.08
KMO	0.942	>=0.9

4.4. Correlation analysis

In this study, the correlation between variables and the significance were tested by using Pearson product difference correlation analysis. As shown in Table 3, the correlation coefficient between customer satisfaction and sustainable logistics service quality was0.402**, indicating a significant relationship between customer satisfaction and sustainable logistics service quality. The correlation coefficients between perceived uncertainty and sustainable logistics service quality and customer satisfaction were-0.248** and-0.225**, respectively, indicating a significant relationship between perceived uncertainty and sustainable logistics service quality and customer satisfaction. The correlation coefficients between cross-purchase and sustainable logistics service quality, customer satisfaction and perceived uncertainty were0.422***, 0.399** and-0.205**, respectively, indicating a significant relationship between cross-buying and sustainable logistics service quality, customer satisfaction and perceived uncertainty.

Table 3 Analysis table of the mean, standard deviation, and correlation coefficients of the variables

	Sustainable logistics service quality	customers satisfaction	Perceived uncertainty	Cross-buying
Sustainable logistics service quality	1			
customers satisfaction	.402**	1		
Perceived uncertainty	-.248**	-.225**	1	
Cross-buying	.422**	.399**	-.205**	1
Mean	.1111	.0254	.0658	.1642
S.D.	.0665	.0270	.0170	.1236

***. Significant correlation was observed at the 0.01 level (bilateral).

**. Significant correlation was observed at the 0.05 level (bilateral).

4.5. Regression analysis

This study uses regression analysis to examine whether customer satisfaction plays an intermediary role between the quality of sustainable logistics services and cross-purchase. As shown in Table 4, the role of perceived uncertainty in the relationship between customer satisfaction and cross-buying was examined. When the product term of customer satisfaction and cross-purchase was entered in the regression model, the effect on the perceived uncertainty was positively significant (P= -0.188, p < 0.01).

Table 4 Regulatory Test

Variable	Cross buying					
Model	Model1		Model2		Model3	
Variable	Beta	p	Beta	p	Beta	p
Sex	0.02	0.696	0.026	0.589	0.01	0.828
Age	0.03	0.571	-0.024	0.62	-0.021	0.658
Education	0.062	0.284	0.027	0.607	0.029	0.57
Monthly income	-0.037	0.526	-0.062	0.248	-0.065	0.214
Occupation	0.053	0.296	0.007	0.875	0.013	0.78
Customer satisfaction			0.373	0	0.355	0
Perceived uncertainty			-0.129	0.007	-0.142	0.003
Customer satisfaction with x perceived uncertainty					-0.188	0
R2	0.007		0.179		0.213	
△R2	0.007		0.171		0.035	
F	0.591	0.707	12.117	0	13.195	0

As shown in Table 5, β=0.425***(P<0.001), the change rate was 0.177; In model 3, the regression analysis of sustainable logistics service quality, customer satisfaction and cross-buying was carried out. It was found that the β values of sustainable logistics service quality, customer satisfaction and cross-buying were 0.316***(P<0.001), 0.273 *** (P<0.001), and the change was 0.061, It shows that customer satisfaction has a positive influence on cross-buying. Meanwhile, β=0.425***(P<0.001), indicating that customer satisfaction plays an intermediary role in sustainable logistics service quality and cross-buying. In model 5, β=0.400***(P<0.001), the change is 0.157, indicating that sustainable logistics service quality has a positive impact on customer satisfaction.

Table 5 The hypothesis test table

Model	Cross-buying								Customers satisfaction			
	1		2		3		4		5			
	Beta	p	Beta	p	Beta	p	Beta	p	Beta	p		
Sustainable logistics service quality			0.425	0.000	0.316	0.000			0.4	0.000		
customers satisfaction					0.273	0						
R2	0.007		0.184		0.245		0.029		0.186			
△R2	0.007		0.177		0.061		0.029		0.157			
F	0.591	0.707	14.738	0	18.079	0	2.337	0.041	14.89	0		

5.Conclusion

Through literature exploration, the study constructed a theoretical model of sustainable logistics service quality, customer satisfaction and cross-buying, and takes a sample of employees from different positions in the industry as the research object and collected data through questionnaire for regression analysis. The results show that: (1) the quality of sustainable logistics service has a positive impact on customer satisfaction. (2) Perceptual uncertainty has a negative adjustment effect in the relationship between customer satisfaction and cross-buying. (3) Customer satisfaction has a positive impact on cross-buying. (4) Customer satisfaction plays an intermediary role in sustainable logistics service quality and cross-buying. The results have important implications for the quality of sustainable logistics services, customer satisfaction, and theory and practice related to cross-buying. From a management perspective, the findings provide an overall picture of environmental aspects, social aspects related to employee health and safety, as well as community and economic aspects. Encouraging logistics services companies and other companies to adopt these practices will reduce pressure on the environment and reduce overall pollution. Therefore, our study confirms previous research on supplier-customer relationship collaboration, which benefits both parties and improves the overall quality of logistics services. Carter & Dresner (2001) emphasizes that long-term collaboration between parties is critical for building sustainable partnerships, valuing customers, and improving overall performance. Based on their research, we can show that these activities need to be accompanied by additional trust and dependency-building ways, for example, through long-term contractual agreements, to achieve a sustained competitive advantage.

This study provides valuable information, especially for logistics and procurement managers, to promote organizational change in internal and multinational companies. However, this study has the following limitations: (1)our research must consider a limited number of structures. Other dimensions can be added to SLSQ. Scale adjustment provides a future research direction. (2)The analysis is limited to evaluating previously defined or hypothetical relationships by testing assumptions, rather than discovering unexpected patterns. However, the preliminary analysis does not show that the inherent structure of the existing data is different from that of the model. (3)Our research design is based on the assumptions derived from it. Studies designed to replicate this heterogeneous environment can use multi group analysis or finite hybrid methods. However, promising research routes can adopt homogeneous industrial sectors in different countries or replicate research in other countries. (4)This study uses SLSQ scale from the perspective of management, and only focuses on the contents that can be further explored from this perspective.

Finally, this study found that the follow-up research can be improved from three aspects: (1)expand the number of samples and the coverage of the questionnaire. For example, in order to ensure the credibility and representativeness of the data, the sample size of follow-up research should be appropriately increased, and the balanced sample size of respondents' occupation and age should be maintained as much as possible. (2)Other variables of the study were added. If the control variables can be included in the model, the impact of individual differences of consumers on the research problem will be analysed, taking into account the individual differences between respondents. (3)Conduct more detailed research according to the product type. The quality of cross-border logistics products can be further studied according to different categories of e-commerce products.

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