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Suppliers Logistics Service Quality Performance and its Effect on Retailers' Behavioral Intentions

Apostolos N. Giovanis[a,]*, Petros Tomaras[b], Dimitris Zondiros[b]

[a] *Dept. of Business Administration, TEI of Athens, Agiou Spiridonos, Egaleo, Athens, GR- 12210, Greece*
[b] *Dept. of Marketing, TEI of Athens, Agiou Spiridonos, Egaleo, Athens, GR- 12210, Greece*

Abstract

Physical distribution service quality is considered as a source of competitive advantage for manufacturers, since it can be viewed as a differentiation factor in the way they are perceived by retailers. Nevertheless, there is neither consensus about its dimensions, nor on how they are related to retailers' behavioral intentions. The aim of this paper is to propose and empirically test a conceptual framework of Logistics Service Quality (LSQ) that combines both process and outcome quality dimensions and to investigate how these dimensions are related to retailers' behavioral intentions comprised of their engagements in word-of-mouth communication and intentions to retain their suppliers. Contrary to previous studies, formative instead of reflective indicators are used to conceptualize logistics service quality dimensions. Partial least squares path modeling was used to analyze the responses of 202 retailers in the construction materials industry, which were collected via personal interviews using a properly designed questionnaire. The results showed empirical support for 1) the two-dimensional approach to conceptualize LSQ and the formative approach for their measurement and 2) the hypothesized effects of proposed LSQ dimensions on retailer's behavioral responses. Implications for practice and directions for future research are then discussed.

Keywords: B2B logistics service quality; behavioral intentions; retention; word-of-mouth; retail; logistics management.

* Corresponding author. Tel.: +30-210-538-5230; fax: +30-210-531-531-4878.
E-mail address: agiovanis@teiath.gr

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1. Introduction

In today's very competitive and rapidly changing business environment where the retailers' power and consumers' demanding level are continuously growing, developing long-term relationships with customers has become very crucial not only to manufacturing companies' success but often to their survival. Previous research studies showed that price is a very significant variable for retailers in selecting their suppliers, however, other variables, such as product and service quality offered, has been showing an increasing weighting in the their purchasing decision processes [30, 32]. Moreover, the advancements in ICT and transportation have increased the retailers' supply sources, making issues concerning product availability, sales support, flexibility and reliability to have equal or bigger impact on the retailers' final decision.

Logistic services provisioning is a fundamental tool for manufacturers' successful performance in terms of increased flexibility, service improvement and cost reduction; the three factors that are necessary for any company to distinguish themselves from their competitors and to compete successfully in today's market conditions [28]. It has been suggested that logistic processes management is possible to obtain differentiated results in customer's satisfaction along with cost reduction [14]. The same author asserts that logistics represents an important option, not only because it increases operational efficiency but because it can positively affect customer's behavioral intentions also [12].

During the last decade, manufacturing companies understood clearly the meaning of client's service for retailing companies, being the variables taken into consideration in their quality perceptions formation process and are influencing their purchasing intent and attitudes. It has been asserted that manufacturing firm's ability to implement operational strategies that help retailers achieve their objectives is the only way to gain their loyalty [12]. In this sense, it is necessary to have a standardized instrument that allows the manufacturer to manage, improve, compare and correct eventual problems in the rendering of services to retailers and in the process of managing the logistic services.

The aim of this paper is to understand how to evaluate the quality of the logistic services rendered by suppliers and assess its impact on the retailers' behavioral intentions.

The paper is organized as follows. In Section 2, the relevant literature is reviewed and the study's hypotheses are introduced. Section 3 deals with the research methodology, while Section 4 presents and discusses analysis results. The final section deliberates on the implication of the study's findings and provides directions for further research.

2. Conceptual Background, Proposed Model and Hypotheses Development

2.1. Logistics Service Quality

LSQ is a scale for measuring logistic service quality. It was developed and validated by [23] using a single large logistic provider firm that provides logistic services to internal customers. These authors have followed the general methodology used by [5] to develop the Physical Distribution Service Quality (PDSQ) scale that measures technical quality. The PDSQ scale has extended by incorporating the functional quality aspects of logistics services [23]. It conceptualized a set of nine constructs including Ordering Procedures (OP), Personnel Contact Quality (PCQ), Information Quality (IQ), Order Discrepancy Handling (ODH), Order Release Quantities (ORQ), Timeliness (T), Order Accuracy (OA), Order Quality (OQ) and Order Condition (OC). LSQ has been formulated as a second-order reflective construct having the previous nine first-order constructs as its dimensions [23].

Lately, [4] and [6] have used the Nordic perspective of service quality conceptualization to consider separately the logistics outcome quality (LOQ), which refers to determining the extent to which the promised core benefit or outcome is delivered, and the logistics process quality (LPQ) which is addressing the service delivery process

[20, 25]. They argued that the separation of LOQ and LPQ service quality dimensions in a comprehensive model is a significant step in advancing the sophistication of our understanding of how customer perceptions of service quality are formed. Moreover, they argue that customers' LPQ evaluation will impact their LOQ evaluation, as a good outcome experience will be biased by a positive process evaluation [10].

The LPQ dimensions delineated in the model are Contact Quality (CQ), Information Quality (IQ), Procedural Quality (PQ), and Discrepancy Handling (DH). These are similar to the process dimensions investigated and validated in the model proposed by [23], except the omitted process dimension of ORQ, because they were concerned that there is an overlap between this dimension and the LOQ dimension of availability.

The LOQ construct consists of the three dimensions validated in PDSQ: Timeliness (T), Availability (PA); and Condition (OC), along with the dimension of Order Accuracy (OA). They omitted the LOQ dimension of OQ found in MFH's model because they found a conceptual overlapping between OA and OQ.

In [4] and [6], both LPQ and LOQ constructs were measured as reflective second-order constructs meaning that changes in the underlying construct are hypothesized to cause changes in the indicators [21]. Contrary to previous conceptualizations [4], [6], [18] of LSQ dimensions, this study proposes the conceptualization of LSQ dimensions as formative constructs representing the assumption that it is the indicators that cause changes to the LSQ dimensions. This is also supported by the studies of [10] and [22].

2.2. Behavioral intentions

Behavioral intention, frequently measured as conative loyalty, is an important goal in marketing. Customer loyalty is assessed by both attitudinal and behavioral measures. The attitudinal measure of customer loyalty refers to the specific desire to continue a relationship with a service provider while the behavioral perspective refers to the concept of repeat patronage. In practice, behavioral loyalty is difficult to measure and most researchers employ the notion of behavioral-intentions [31]. The variables Intention to Re-purchase (RI) and Willingness to Recommend to Others (WOM) have been used as indicators of behavioral intentions in service related fields [7, 3, 24].

Establishing a link between service quality and customer behavioral intentions is an important task for researchers and practitioners. However, the relationships between specific service quality dimensions and behavioral intentions are not yet clear due to the different service quality models used and the different contexts of the published studies [29]. In numerous research efforts, it has been found that quality of service affected behavioral intentions [1, 9]. According to the findings of [11] and [3], service quality positively affects repurchase intentions and positive recommendations.

Based on the above discussion the following hypotheses, which are also depicted in the proposed model illustrated in Figure 1 (see the Appendix), are going to be tested:

H1: Logistics process quality performance positively affects logistics outcome quality performance
H2: Logistics process quality performance positively affects repurchase intentions
H3: Logistics outcome quality performance positively affects repurchase intentions
H4: Logistics process quality performance positively affects favorable word-of-mouth communication
H5: Logistics outcome quality performance positively affects favorable word-of-mouth communication

3. Research Methodology

3.1. Scale development

Empirical data for assessing the proposed LSQ scale's properties and for testing suggested hypotheses were collected through a self-administered questionnaire that was constructed on the theoretical grounds of existing related literature. More specifically, LSQ dimensions were assessed on adapted items borrowed from [4] and [6].

Repurchase intentions and word-of-mouth items were drawn from used and validated measures proposed in [28] and [19] respectively. Likert scales anchored at (1) 'strongly disagree' and (5) 'strongly agree' were used for all items to ensure statistical variability. Finally, a series of classification variables were included such as company size, respondent's duties and company yearly revenues.

3.2. Data collection and sample profile

The research focuses on retailers' behavioral intentions as a result of order fulfillment and delivery services performance provided by industrial distributors in the construction material industry. The sample was chosen from the total population of construction material retailers operating in the Attica prefecture of Greece. A cross-sectional sample was randomly chosen from the total listing. The questionnaire was given to 400 retailers by 20 well trained university students. Responses were collected from 222 retailers served by 14 different suppliers. This represents approximately a 56% response rate. Cases with missing values were subsequently dropped from the analysis, resulting in a usable database of 202 responses, or 51% of those originally contacted.

Most respondents (84%) reported their position as one related to purchasing activities. 72% reported their titles as senior managers, middle managers or business owners. 19% of the retailers in the sample reported less than 10 employees, 42% between 11 to 20 employees, 26% between 21 and 30 and 13% more than 30 employees. Finally, 71% of the respondents reported annual revenues up to 1 million Euros, 18% between 1 million to 10 million Euros and 10% between 10 million to 50 million Euros.

4. Data Analysis and Results

The method of partial least squares (PLS) analysis [17], an implementation of structural equation modeling (SEM), was applied to test the measurement model through determining the internal consistency, reliability and construct validity of the multiple-item scales used to operationalise its variables. PLS is a component-based SEM technique capable of testing the psychometric properties of scales used to estimate the parameters of structural models [16].

Data analysis employed a two-phase approach in order to assess the reliability and validity of measures before using them in the research model. The first phase includes the measurement model analysis while the second, examines the structural relationships among latent constructs.

4.1. Measurement model assessment

Testing the measurement model involves estimation of internal consistency, convergent and discriminant validity of the study constructs, indicating the strength measures used to test the model [16]. As shown in Table 1, all reliability measures (i.e. Cronbach's alpha and Composite Reliability - CR) are well above the recommended level of 0.70 indicating adequate internal consistency [17].

As it can also be seen in Table 1, latent constructs show adequate convergent validity. Based on [15], convergent validity is adequate when constructs present an Average Variance Extracted (AVE) greater than or equal to 0.5. Convergent validity can also be verified when items loading on their associated factors are well above 0.7, which is true in our case [17].

Table 2 reflects the discriminant validity of constructs, by indicating inter-construct correlations and the square root of AVE on the diagonal. All values on the diagonal are greater than those in corresponding rows meaning that all measurement variables load more highly on their own constructs than on other constructs [15]. Thus, logistics service evaluation is explained sufficiently by the revealed latent variables' structure (convergent validity), and this structure includes all unique manifest variables (discriminant validity).

Table 1. Manifest variables' descriptive statistics and constructs' psychometric properties

Construct	Items	Mean	Std. deviation	Std. loadings	Std. error	Critical ratio	Cronbach's alpha	CR	AVE
Procedural Quality (PQ)	PQ1	3.795	0.976	0.873	0.018	49.028	0.702	0.867	0.765
	PQ2	4.035	0.827	0.876	0.016	55.109			
Contact Quality (CQ)	CQ1	4.310	0.703	0.824	0.022	37.111	0.768	0.866	0.680
	CQ2	4.445	0.614	0.775	0.036	21.540			
	CQ3	4.310	0.731	0.872	0.016	55.631			
Information Quality (IQ)	IQ1	3.865	0.739	0.708	0.050	14.078	0.773	0.869	0.683
	IQ2	3.970	0.974	0.866	0.043	20.248			
	IQ3	3.590	0.895	0.902	0.014	62.538			
Discrepancy Handling (DH)	DH1	3.665	0.723	0.709	0.038	18.078	0.678	0.825	0.612
	DH2	3.435	0.752	0.798	0.039	20.386			
	DH3	3.620	0.810	0.846	0.025	33.199			
Product Availability (PA)	PA1	3.525	0.800	0.728	0.041	17.923	0.812	0.877	0.638
	PA2	3.500	0.849	0.714	0.078	9.179			
	PA3	3.845	0.928	0.894	0.013	67.239			
	PA3	3.665	0.844	0.843	0.031	27.003			
Order Accuracy (OA)	OA1	4.445	0.669	0.850	0.020	42.308	0.794	0.867	0.611
	OA2	4.270	0.753	0.892	0.015	58.815			
	OA3	3.230	0.698	0.767	0.048	15.921			
	OA4	3.040	0.692	0.681	0.065	8.930			
Timeliness (T)	T1	4.155	0.625	0.813	0.027	30.552	0.704	0.836	0.625
	T2	3.950	0.669	0.765	0.039	19.720			
	T3	3.700	0.728	0.794	0.029	27.405			
Order Condition (OC)	OC1	2.855	0.595	0.644	0.123	5.217	0.705	0.800	0.572
	OC2	2.570	0.667	0.862	0.057	15.132			
	OC3	2.750	0.719	0.747	0.149	5.031			
Repurchase Intentions (RI)	LOY1	4.255	0.707	0.776	0.025	30.625	0.727	0.846	0.645
	LOY2	4.195	0.589	0.877	0.016	54.985			
	LOY3	3.950	0.747	0.752	0.036	20.776			
Word-of- Mouth (WOM)	WOM1	4.180	0.712	0.891	0.015	61.325	0.916	0.947	0.857
	WOM2	4.070	0.696	0.938	0.012	79.153			
	WOM3	4.030	0.685	0.948	0.009	106.015			

Table 2. Discriminant validity assessment

	WOM	RI	OC	T	OA	PA	DH	IQ	CQ	PQ
Word-of- Mouth	***0.926***									
Repurchase intentions	0.486	***0.803***								
Order condition	0.026	0.068	***0.756***							
Timeliness	0.565	0.508	0.151	***0.791***						
Order accuracy	0.625	0.558	0.215	0.618	***0.782***					
Product availability	0.264	0.582	0.145	0.320	0.349	***0.799***				
Discrepancy handling	0.295	0.556	0.455	0.373	0.423	0.513	***0.782***			
Information quality	0.349	0.523	0.149	0.340	0.300	0.242	0.334	***0.826***		
Contact quality	0.391	0.313	0.159	0.488	0.420	0.217	0.495	0.254	***0.825***	
Procedural quality	0.471	0.614	0.207	0.324	0.456	0.480	0.416	0.430	0.483	***0.874***

4.2. Second-order constructs assessment

In this study, the second-order constructs of LPQ and LOQ was measured with the factor score of its first-order constructs, because the relevant first order constructs have unequal number of indicators, ranging from two to four [8].

The measurement quality of the formative second-order constructs was tested in two steps [8, 13]. In the first step, the correlations between the first-order constructs of each LSQ dimension were examined. The correlations between first-order constructs of LOQ range from 0.254 to 0.495 and those between first-order constructs of LPQ range from 0.254 to 0.495. These results support the hypotheses that LOQ and LPQ are better represented as

formative second-order constructs and not as reflective ones since a reflective second-order construct would show extremely high correlation among its lower-order constructs (≥ 0.8) [26]. In the second step, the significance of the relationships between LOQ and LPQ and their first-order dimensions were assessed. According to Table 3, all first-order dimensions except OC for LOQ and CQ for LPQ were found to have significant path coefficients (PLS weights).

The variance inflation factor (VIF) for the first-order factors of each second-order construct was then computed to assess multicollinearity. VIF values greater then or equal to 10 would indicate the existence of excessive multicollinearity and raise doubts about the validity of the formative measurements [13]. As it is shown seen in Table 3, there is no multicollinearity between the first-order constructs of LOQ and the same is valid for the first-order constructs of LPQ since their VIF values vary from 1.055 to 1.722 and from 1.272 to 1.541 respectively.

Not significant indicators for both LSQ dimensions will be retained as it is recommended by [21], since formative constructs' indicators are not interchangeable and dropping non-significant indicators may omit a unique part of the content domain.

Table 3. Second-order constructs assessment

Second-order construct: Outcome Quality					Second-order construct: Process Quality				
First-order construct	Outer weight	Standard error	Critical ratio	VIF	First-order construct	Outer weight	Standard error	Critical ratio	VIF
OC	0.067	0.048	1.411	1.055	DH	0.363	0.082	4.418	1.447
T	0.310	0.084	3.672	1.653	IQ	0.285	0.086	3.310	1.272
OA	0.543	0.075	7.253	1.722	CQ	0.106	0.098	1.091	1.511
PA	0.425	0.056	7.628	1.168	PQ	0.546	0.086	6.363	1.541

4.3. Structural model assessment and hypotheses testing

The significance of paths included into the proposed model was tested using a bootstrap resample procedure with 500 replications. Smart-PLS software was used to conduct the PLS analysis [27]. In assessing the PLS model, the squared multiple correlations (R^2) of all endogenous latent variables were initially examined and the significance of the structural paths was evaluated. The assessment of the proposed SEM is presented in Table 4 where the standardized path coefficients, representing the direct effects of the constructs, their statistical significance, and the proportion of explained variance for each endogenous construct are given. All hypothesized relationships are confirmed since all related path coefficients were found statistically significant ($p < 0.05$).

The proposed model accounted for 41.4% of the variance in technical/outcome quality, 61.4% of the variance in repurchase intentions, and 41.4% of the variance in word-of-mouth. The relatively high values of coefficients of determination (R^2) indicate that sizeable portions of variance in endogenous variables are explained by the chosen independent variables.

Table 4. Assessment of the structural equation model

Effect	Std. coefficient	Standard error	t-value	p-value	R^2	Hypothesis validation
OQ → PQ	0.643	0.054	11.815	0.000	0.414	H1 confirmed
PQ → RI	0.465	0.058	8.043	0.000	0.614	H2 conformed
OQ → RI	0.399	0.058	6.903	0.000		H3 confirmed
PQ → WOM	0.171	0.071	2.403	0.017	0.414	H4 confirmed
OQ → WOM	0.520	0.071	7.300	0.000		H5 confirmed

Conclusions

The objective of this paper was to develop and empirically test a conceptual framework of how retailers are evaluating LSQ and how this is affecting their repurchase intentions and willingness to recommend. The proposed framework in this study provides a reliable and valid conceptualization of LSQ consisting of two second-order dimensions: process and outcome quality. The findings suggest that retailers evaluate the process elements of LSQ by assessing supplier's procedural quality, discrepancy handling procedures and information quality. Process quality, in turn, influences their perceptions about the transactions' outcome quality.

As far as the effects of LSQ dimensions to retailers' repurchase intentions, the logistics process quality was found to be the main driver followed by outcome quality. This is in accordance with [20] findings, who suggested that process elements of service quality are potentially more important than outcome elements in determining service quality outcomes, such as customer satisfaction and loyalty, because they are difficult to be differentiating factors among competitors.

Regarding retailers' willingness to recommend, the findings revealed that it is dominated by their perception about logistics outcome quality and, then, by their perceptions about process quality. Given that positive referrals are critical in new customers' acquisition strategy within the service industry, suppliers has to ensure orders' accuracy, product availability and timeliness delivery by investing in modern inventory management systems.

Finally, in contrast with all previous studies in the field which have conceptualized LSQ dimensions as an attitude that is based on reflective judgments, this study proposed LSQ dimensions to be measured as formative constructs. While one indicator for its LSQ dimension was found to be insignificant (and this may be attributed to the industry under investigation), this kind of conceptualization seems to be appropriate to evaluate LSQ.

Although this study expands the knowledge on how LSQ dimensions are conceptualized and measured from retailers, additional research has to be conducted in the field using different samples concerning different products (e.g. FMCG, other durable goods etc.) to check the robustness of the findings. Moreover, relationship quality constructs (i.e., satisfaction, trust and commitment) could be considered in future studies to understand how LSQ aspects and relationship quality components affect retailers' behavior.

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Appendix A. Proposed model

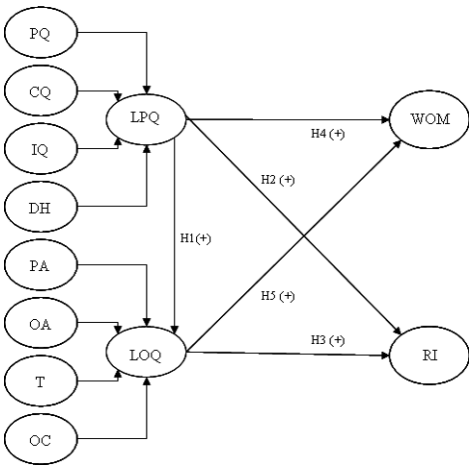

Fig. 1. Proposed model