

The effect of logistics service on firm financial performance in textile industry: evidence from Da Nang city, Vietnam

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Abstract: The purpose of this study is to understand an effect of the logistics service on firm financial performance in textile industry of Da Nang city, Viet Nam. A questionnaire was developed to survey several critical factors in the logistics services. Factor analysis method was applied to find some major configurations for each influential factor, and multi-regression method was employed to analyze the influence of critical factor on the firm financial performance. The results showed that internal logistics, inbound logistics, outbound logistics, support activities, and cost of logistics have significantly positive relationship with the firm financial performance. Interestingly, the cost of logistics becomes the main factor affecting the firm financial performance in the textile industry.

1. Introduction

Logistical service has been known to be increasingly important to successful supply chain operations. Logistics service creates value by accommodating customers' delivery requirements in a cost effective manner [1]. Moreover, logistics is critical as a source of competitive advantage and as an importance factor improving the firm performance [2, 3, 4].

A vast variety of previous studies has been applied extensively in the supply chain area to examine how logistics service, as a firm resource, can affect the firm performance. Most of these studies focused on capabilities that are well-recognized supply chain imperatives ([5, 6, 7]). However, there is a little attention to directly explore the effect of logistics service on the firm financial performance. Particularly, logistics service has positive influence on the financial performance for retail firms [8]. This result is supported by finding of Shang and Marlow, mentioning that there is a positive relationship between the logistics service and firm performance by using large manufacturing firm samples in Taiwan [9]. In addition, an evidence on the important role of logistics service has also been found in some developing countries, such as Mexico, India, China, and Viet Nam [10, 11].

On the other hand, textile-manufacturing firm recently plays an important role in some emerging markets, such as Viet Nam, and Indonesia. Firms from

South East Asian countries, such as Viet Nam, have experienced low supply chain value. Thus, in order to have an effective and efficient flow of firm performance, these firms need to reduce their manufacture cost, especially for the textile firms. For this reason, it is of particular interest to study the current state of logistics activities, that are determined as the main factors of logistics service affecting the firm performance in the textile industry.

In this study, we focus on the textile industry in Da Nang city, one of the most developing regions in Vietnam. The logistics sector in the Da Nang city is fragmented into 130 players, but 70% of them are first party logistics provider (1PL) and second party logistics provider (2PL) services, and the total logistics costs reached USD 5 billion in the Da Nang City [12]. In Da Nang, most of logistics service firms are small and medium, as a result, their capacities are limited. In addition, a lack of professional training and experience, as well as labor of these firms make them to suffer strong competitiveness with other foreign firms in the same region.

Therefore, in order to improve the service quality, and to be more responsive to market requirements, this study focuses on identifying the critical factors of logistics service significantly affecting the firm performance. In particular, the main purpose of this study is to explore the factors of logistics service that impact the textile firm financial performance in Da Nang city,

Viet Nam. Textile is one of the key successful industry of Da Nang. Moreover, due to the globalization trend, Viet Nam government delivered several policies to promote Da Nang becoming one of the biggest logistics service center in Viet Nam.

This study is organised as follows. Section 2 presents a brief literature review about the study methods and previous results. Section 3 briefly outlines the data collection and methodology. In section 4, we provide a detailed discussion of the results. Finally, the last section discusses the implications of the results and concludes.

2. Literature Review and Hypotheses development

2.1. Firm performance

According to several previous standard studies, the firm financial performance can be divided into three types: operational, financial, and strategic performance [13]. The operational performance is more relative to improvement of the organizational activities, such as logistics cost reduction, on-time delivery, inventory turnover, and cycle time reduction. The firm financial performance is measured based on the relationship between total revenue and cost that can be proxy by profitability, return-on-investment, and return-on-sales [14, 15]. Finally, the strategic performance is the improvement of market goals, such as sales, market share, growth in sales and market share [16]. In this study, we focus on the firm financial performance as dependent variables to evaluate the role of logistics service factors.

2.2. The logistics service dimensions and the firm financial performance

In this part, we will provide the relationship between five potential critical factors and firm financial performance. The relationship between each logistics service factor and the firm financial performance is shown in Figure 1.

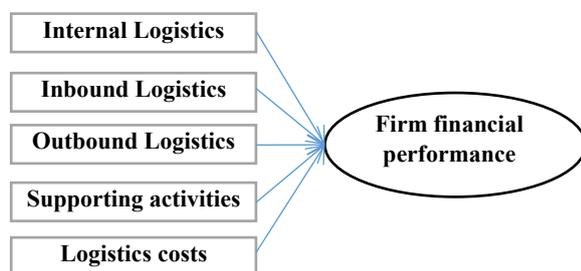


Fig. 1. An effect of logistic service factors on the firm financial performance.

2.3. An effect of the internal logistics

The internal logistics is identified as a task performance process considering the cooperation and effective information share among various departments, as well as

effective internal decision-making [17]. The internal logistics system includes five main components: building design, equipment, systems, staffing, and process design [18]. Additionally, the internal logistics in each firm can be observed as cover tasks, such as internal transport, material handling, storage and packaging [19]. The internal logistics can enhance the efficiency of firm internal activities, improve the operational performance, such as on time delivery and cycle time reduction, to achieve a lower operational cost. Thus, the internal logistics has a positive effect on the firm performance [20]. Therefore, it is hypothesized that:

Hypothesis 1: There is a statistically significant positive relationship between the internal logistic quality and firm financial performance. In other words, high internal logistic quality can lead to high firm financial performance.

2.4. An effect of the inbound logistics

In this part, we demonstrate an effect of the inbound logistics quality effect on the firm financial performance. The inbound logistics is a movement process of all materials, collection, shipments, and inventory management, from providers to purchasing firms [21]. The purpose of inbound logistics services mostly focuses on cost saving, inventory optimization, and customer service [22]. A good transportation and firm system from supply to purchase, or from suppliers to factories, can improve the firm efficient activities [23]. Moreover, the role of warehousing management in the inbound logistics has been mentioned by several studies [24]. They mentioned that an efficiency of inbound logistics service systems could deliver optimal service at controlled costs [25]. Therefore, it is hypothesized that:

Hypothesis 2: There is a statistically significant positive relationship between the input logistics quality and firm financial performance. In other words, high input logistics quality can result in high firm financial performance.

2.5. An effect of the outbound logistics

According to the Council of Supply Chain Management Professionals, outbound logistics is the process related to movement and storage of products, from the final production line to final users [26]. The outbound logistics include the final step of the delivery process. The outbound logistics include four main indicators: inventory management system, distribution system, delivery systems to final customers, demand forecasting, and planning [27]. Therefore, it is hypothesized that:

Hypothesis 3: There is a statistically significant positive relationship between the outbound logistics quality and firm financial performance. In other words, high outbound logistics quality can lead to high firm financial performance.

2.6. An effect of the support activities

The role of support activities in logistics service has been mentioned by numerous standard studies. The support activities include infrastructure, human resource management, technology development, and procurement [28]. These activities are integrating functions that cut across the firm traditional functions, and directly affect the firm performance. The supporting activity system can enhance the customer trust, promote information exchange on the market needs, new product development, and production cost reduction, as well as increase the firm financial performance [29]. Therefore, it is hypothesized that:

Hypothesis 4: There is statistically significant positive relationship between the supporting logistics quality and firm financial performance. In other words, the high supporting logistics quality can also lead to high firm financial performance.

2.7. An effect of the logistics costs

In this section, we focus on the potential cost of logistics service that directly affect the firm financial performance. Whether outsourcing or self-service, businesses always have to spend on the logistics costs [28]. The inventory cost is a major element of total logistics cost [30]. Thus, the more reasonable the logistics cost, the higher the level of business efficiency and vice versa. At textile enterprise, the logistics costs can include transport costs, raw material inventory, inventory cost, cost of order processing and the information system, costly paperwork, delivery and payment. Therefore, it is hypothesized that:

Hypothesis 5: There is a statistically significant positive relationship between the cost of logistics quality and firm financial performance. In other words, the higher the cost logistics quality, the higher firm financial performance.

3. Methodology and data collection

A survey was conducted to collect data in this study. The sampling frame was primarily constructed from one of the best and biggest channel of enterprises' information in Vietnam, which aims at trade promotion and business connection (<http://yellowpagesvn.com>). Information of all firms are provided, such as company background, addresses, contact numbers, and email. The mailing list comprised of 100 firms in the textile industry of Da Nang. In this study, the questionnaires were directly sent to each firm in the sample list from June to October of 2017. The questionnaire, which was preceded by a cover letter on the letterhead of the authors' institutions, employed both fixed-alternative and opened-ended response questions.

The questionnaire were divided into two main parts: demographic questions, and respondent's attitude. For the demographic questions, we provided some

information related to the respondent's business sector, their designation, and work experience. The respondent's attitude is measured using a five-point likert scale, ranging from 1, representing "strongly disagree", to 5, representing "strongly agree." In order to improve the liability of our samples, we conducted a pilot test within a small group of academics and logistics service companies to ensure the language clarity and validity of the measurement constructs.

Among the 90 obtained responses, 81 valid replies were used for further analysis. The valid response rate was 78.6%. As for years in business, 66.7% of the respondents started their works between five and 10 years prior to the survey time, 28.4% and 4.9% engaged in business between 11 and 15 years, as well as between 16 and 20 years prior to the survey time, respectively. A comparison of early (those responding to the first calling) and late (those responding to the second calling) respondents was carried out to test for non-response bias [31]. The t-test analyzing 27 resource items and 5 performance items indicated that there was no significant difference between the early and late respondents in all items. Moreover, a variable comparison, including firm size, firm status (ownership), and business duration, between the early and late respondents were conducted by using t-tests. The results revealed no significant differences. Therefore, non-response bias is not expected to be a problem.

The financial indicator variables are described and explained in the Table 1 below.

Table 1: Firm Financial Performance Indicator Variables

Variable	Explanation
ROA	- Arithmetic Average of the last three years of Return on Assets for firm. - (Net Income before Preferred Dividends + (Interest Expense on Debt-Interest Capitalized) / Last Year's Total Assets.
ROE	- Arithmetic Average of the last three years of Return on Equity Per-Share for firm. - Earnings Per Share / Last Year's Book Value Per Share.
ROIC	- Arithmetic average of the last three years of Return on Invested Capital for firm. - (Net Income before Preferred Dividends + Interest Expense on Debt – Interest Capitalized) / ((Last Year's Total Capital + Last Year's Short Term Debt & Current Portion of Long Term Debt)+(Current Year's Total Capital + Current Year's Short Term Debt & Current Portion of Long Term Debt)/2).
NI	- Net Income Growth; Represents the fiscal period income or loss reported by a company after subtracting expenses and losses from all revenues and gains for firm. - ((Net Income / Net Income)^(1/5))-1.

4. Analysis and Findings

4.1. Factor analysis

The measured scales were submitted to exploratory factor analysis. Varimax rotation was used as its common application, in addition, it can minimize the number of variables having high loadings on each factor, as well as can simplify the factor interpretation. Factors with eigenvalues greater than 1.0 are summarized in Table 2. The logistics service factors can be classified into five critical factors: Internal logistics, Inbound logistics, Outbound logistics, Support activities, and Logistics costs. The results are shown in Table 2.

Table 2: Factor analysis results for the five critical factors

Variables	Factor loading				
	1	2	3	4	5
Internal logistic					
Material inventory is suitable	0.796				
Cooperation activities among departments in the company are smooth	0.877				
Enterprises have sufficient resources on transport, human resources, warehouses, and yards to serve the production and business activities.	0.903				
Inbound logistic					
Material transportation process for production is favorable		0.822			
Ordering materials is easy		0.758			
Order time and material transportation ensure the production progress		0.844			
The company has good relationships with raw material suppliers		0.836			
Product defect (such as technical defect, packing defect, faulty quantity, missing product) occur rarely when dealing with raw material suppliers.		0.776			
Outbound logistics					
Packing process and product delivery are convenient			0.798		
Packing and product storage is well done			0.838		
On time delivery			0.881		
Good relationship between company and its business partners			0.829		
A little of mistakes (such as the number of products, product patterns) in delivery			0.630		
Supporting activities					
Information on clients and business partners is updated regularly				0.822	
Processing order process is efficient				0.869	
Handling complaint process is quick				0.824	
Procedure of goods delivery and payment is convenient and easy				0.689	
The company reaches customers' needs in terms of product specifications, delivery time, and location				0.810	
Finding professional logistic service providers is easy				0.821	
Logistics costs					
Transportation cost is suitable					0.815

Cost of raw material inventory is suitable					0.762
Cost of product inventory is suitable					0.829
Costs of order processing and information system are suitable					0.826
Costs of paperwork, delivery and payment are suitable					0.766
Costs of renting warehouse, checking products are suitable					0.768
Eigenvalue	5.094	4.323	3.619	2.199	1.813
Variance explained	21.226	18.013	15.080	9.164	7.555
Cumulative Variance explained	71.03%				
Cronbach's alpha for each dimension	0.724	0.839	0.886	0.868	0.888

Based on the factor analysis results, construct validity of this study could be confirmed. The reliability analysis was also conducted. It can be seen from the Table 2 that the smallest Cronbach's alpha value is 0.724. This overall reliability is 0.84. It implies that the sampling results are reliable.

In the next, we provide the correlations between the logistics service factors and the firm financial performance. In this study, FFP denotes the firm financial performance, LNB represents the internal logistic, LIN is the inbound logistic, LOU indicates the inbound logistic, LSE is the supporting activities, and LCO represents the logistic cost. The results are shown in Table 3.

Table 3: Correlation analysis results

Variables	FFP	LNB	LIN	LOU	LSE	LCO
FFP	1					
LNB	0.380**	1				
LIN	0.267*	0.006	1			
LOU	0.257*	0.205	0.206	1		
LSE	0.557**	0.107	0.280*	0.030	1	
LCO	0.613**	0.268*	-0.105	-0.036	0.257*	1

*: $p < 0.05$ **: $p < 0.01$

The correlation matrix provides initial evidence on our hypotheses: these logistics factors are positively associated with the firm financial performance. In other words, a high correlation was found between the FFP and LSE, LCO. The others were not highly correlated.

4.2. Multiple regression analysis

In order to understand an effect of the logistics service factors on the firm financial performance, multiple regression analysis was utilized. Based on the factor analysis results, we defined the dependent variables as the firm financial performance, such as the ROA, ROE, ROIC, and NI. The independent variables include the internal logistics, inbound logistics, outbound logistics, support activities, and logistics costs. Moreover, we also used other variables, such as the number of employees, capital size, and company age, as control variables in the

multiple regression analysis. The regression model can be written as below:

$$\text{Firm financial performance} = \alpha + \beta_1 * \text{Internal logistics} + \beta_2 * \text{Inbound logistics} + \beta_3 * \text{Outbound Logistics} + \beta_4 * \text{Support activities} + \beta_5 * \text{Logistics costs}.$$

To increase the liability of our results, prior to running the multiple regression model, we examined satisfaction of the regression assumptions of homoscedasticity, linearity, normality, independence of residuals, and the absence of multi-collinearity. Based on plot of residuals versus the predicted values, an achievement of the homoscedasticity and residual independence for our sample data could be confirmed. The other assumptions were also satisfied. In particular, we conducted the normality of residuals by using the Anderson – Darling test. We found that the test statistic A square was 0.43 (p-value > 0.1), suggesting that the normality assumptions were satisfied. For checking the multi-collinearity, we utilized the Variance Inflation Factor (VIF), which are shown in Table 4. The results showed that all VIF values are less than 10, indicating that the multi-collinearity effect in the multiple regression could not occur. Moreover, the evidence of autocorrelation test for residuals are also provided. The main results of the multiple regression are shown in Table 4:

Table 4: Multiple regression results

Dependent variables: Firm financial performance					
Predictors	Model 1		Model 2		VIF
	Coefficient β	t-statistic	Coefficient β	t-statistic	
Control variables					
Company age	0.004	0.372	0.002	0.214	1.172
Number of employee	0.021	0.521	0.017	0.921	1.054
Size	0.009	1.820	0.005	1.712	1.212
Critical factors					
Internal logistics			0.167	2.346	1.135
Inbound logistics			0.180	2.493	1.173
Outbound logistics			0.193	2.770	1.099
Support activities			0.354	4.860	1.195
Logistics costs			0.504	6.931	1.190
R^2	0.041		0.667		
Adj. R^2	0.032		0.645		
F	0.504		6.117****		
Durbin-Watson value	2.001			2.042	

From the model 1 of Table 4, it can be clearly seen that the size variable is positive (0.009) and statistically significant within t-statistic is 1.820, which means that the large firms tend to be have outperformance compared to the smaller firms. The others two control variables are positive and insignificant. When moving to model 2 of Table 4, the size effect also remains higher effect level. Importantly, all the five critical logistics service factors are statistically significant positive. In fact, the coefficient of the internal logistics is 0.167 within t-statistic 2.346, the coefficient of the inbound logistics is 0.180 within t-statistic 2.493, that of the outbound logistics is 0.193 within t-statistic 2.770, that of support activities is 0.354 within t-statistic 4.860, and that of logistics cost is 0.504 within t-statistic 6.931.

The results from the model 2 suggested that the larger firms could also contribute to enhancement of the logistics service and firm financial performance. Interestingly, the acceptability of our hypothesis was found, indicating that the five critical logistic factors positively affect the firm financial performance. Among these five factors, the logistics costs became a main factor successfully contributing to the firm financial performance. This result is consistent with Juuso Töyli, reporting that when firms get more attention on logistics service, they might gain competitive advantage relatively easy by focusing more on the logistics performance, at least in a short-term [19].

5. Conclusion

This study examined the effect of logistics service on the firm financial performance in the textile industry sample in Da Nang city, Viet Nam. The model suggested that a five-dimension conceptualization of the logistics service factor can affect the firm financial performance that use data from the logistics service customer to assess the critical elements. The results indicated that the five main factors, such as the internal logistics, inbound logistics, outbound logistics, support activities, and cost of logistics, were statistically significant positive relation to the firm financial performance. In addition, among the five factors of logistics service, the logistics cost became the main factor affecting the firm financial performance in the textile industry. In particular, the total costs are higher than average. An explanation could be because the textile firms have to utilize the outsourcing logistics services, thus, in case they conduct the services by themselves, the outsourcing costs could be higher. Based on the results from this study, we suggest that the firms can improve their information systems by training to enhance their employee professional skills. They should also apply technical innovation to their logistics service for capacity improvement.

This study contributes to the existing literature by exploring the composition of the logistics service quality and investigating its impact on the firm financial performance in the textile sector. In consideration the values of this study, some points need to be considered: firstly, this study concerns only the textile industry, secondly, the results can be affected by the firm location. Despite these limitations, this study provides some valuable insights from theoretical and practical perspectives. As such, this finding is unique for the textile sector because it introduced and empirically validated the measurement of logistics service quality in the textile industry.

Finally, future studies should assess a direct relationship between the logistics service and firm performance for large data sample and different kind of industries in Viet Nam, as well as include more factors, such as external and situational factors affecting the

logistics service. In addition, future studies should also investigate an impact of relationship length on the interrelationships identified in the model.

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