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Determinant service quality factors for green logistics service providers of cross-border trade

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Abstract

The respondents of this research were 384 of logistics service providers located at cross border areas of Malaysia, Laos, Cambodia and Myanmar. Stratified random sampling is used on samples through the structured questionnaires and regression. Finding of this research revealed that by practicing on green and service quality will improve on the logistics performance as well as quality of the overall logistics businesses. It also suggests that the logistics service providers should

deliver on the Green Quality at cross-border trade activities. This research is able to support on logistics providers and understand on the importance of green logistics service quality.

Keywords: Cross-border trade; Service Quality; Logistics Service Providers; Transport and warehouse and performance.

Factores determinantes de la calidad del servicio para los proveedores de servicios de logística verde del comercio transfronterizo.

Resumen

Los encuestados de esta investigación fueron 384 proveedores de servicios de logística ubicados en áreas transfronterizas de Malasia, Laos, Camboya y Myanmar. El muestreo aleatorio estratificado se utiliza en muestras a través de cuestionarios estructurados y regresión. El hallazgo de esta investigación reveló que al practicar en verde y la calidad del servicio mejorará el desempeño logístico, así como la calidad de los negocios de logística en general. También sugiere que los proveedores de servicios logísticos deben cumplir con la Calidad Verde en las actividades comerciales transfronterizas. Esta investigación puede respaldar a los proveedores de logística y comprender la importancia de la calidad del servicio de logística verde.

Palabras clave: Comercio transfronterizo; Calidad del servicio; Proveedores de servicios de logística; Transporte y almacén y rendimiento.

1. INTRODUCTION

The service quality of green logistics service providers in Thailand is getting heightens international attention affecting cross-border trades in terms of transport and warehouses (ANSARI & KANT, 2017). It also revealed on pollution problems created by cross-border trade logistics wastes had contributed to environmental pollution. The study also explored the framework development status for sustainability in supply chain management involving logistics. LAKSHMIMEERA & PALANISAMY (2013) revealed on logistics service providers in developing the different types of solutions and plans to maintain and improve the sustainability at cross-border trade by applying green concepts in supply chain activities such as using renewable energy resources. TUFAIL et al (2019) refers as the Novel approach of quantifying energy security in terms of economic, environmental and supply risk factors.

Otherwise, pollution able to be transferred to another neighbouring nation through cross-border trade logistics services (DORANTES et al., 2019). It also revealed on the relevance of green practices worldwide and emphasized on the importance of cross-border pollution through cross-border trade logistics which involved in transportation and warehouses. ABADULLAH (2017) suggests that green logistics service quality influences customer satisfaction and supported by FERNANDES et al (2018); FANG & ZHANG (2018). Cross-border trade growth involved logistics activities that facilitate import and export of cargo and also human mobility, accessibility and connectivity between the neighbouring nations (ZHOU et al., 2018). Transportation need an appropriate infrastructure for vehicles'

mobility and permissible emissions causing atmospheric pollution. Better infrastructure on specific mechanism for the vehicles are able to reduce pollution in future.

Thailand has trade agreement with other countries in the European Union, China and the Mekong river nations such as Laos, Myanmar and Cambodia involving logistics for economic development to provide mobility, connectivity and accessibility (KAMALIAN, 2013). KIM (2012) refers to the ASEAN Economic Community (AEC) by 2020 will expand Thailand cross-border trade for the movement of goods, people and services. The increasing mobility of goods, people and services in Thailand will bring benefits to Thailand, and negatively with pollution issues such as CO², NO² emissions, waste management and other forms of pollution to Thailand (LEE, 2013; ALI et. al., 2020). Ensuring that, Thailand government had developed plans and policy to improve the environmental quality for sustainable development (LIMBOURG et al., 2016).

Thailand had formulated The National Economic and Social Development (NESD) Plan every 5 years to set up the direction for the society, cross-border trade and government policy (JERMSITTIPARSERT et al., 2019). The latest NESD plan - 11th NESD plan had focused on green economy policy while the next plan until 2030 will focused on the sustainable development (IRENA, 2017). Logistics is important for cross-border trade in Thailand to connect Thailand to other trading countries in the world (KHAN et al., 2019). Transport and logistics involve in various modes of transportation namely road, sea, rail, air and pipeline transport.

Logistics Service Providers (LSP) either unimodal transport or multi-modal transport plays an important role in Thailand’s global supply chain especially in cross-border trade (PIYATHANAVONG et al., 2019).

National Economic and Social Development Board (NESDB) classifies LSP in Thailand into several categories by service activities namely transportation, warehouses, packaging and materials handling (ZHANG et al., 2019). Competitive advantage of the LSP can be achieved by continuously improving the logistics service quality and following the new trend in logistics industry.

4. THEORETICAL FRAMEWORK

The theoretical framework of this research is adapted from Logistics Service Quality Theory by SIRIWAN (2015). The adapted Logistics Service Quality Theory is depicted in Figure 1.

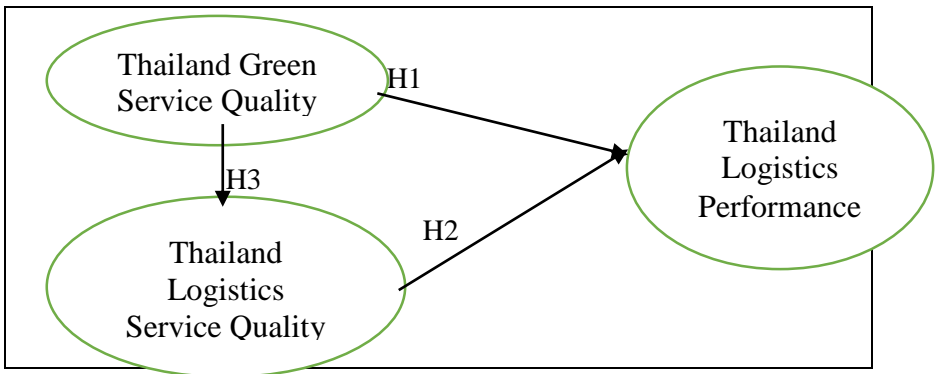


Figure 1: Theoretical framework with hypotheses H1, H2 and H3

Adapted from Siriwan (2015)

H1: Thailand green service quality has positive effect on Thailand logistics performance

H2: Thailand logistics service quality has positive effect on Thailand logistics performance

H3: Thailand green service quality has positive effect on Thailand logistics quality

5. RESEARCH METHODOLOGY

The respondents for this research are Thailand logistics service providers (LSP) in several industries namely electronic components, automotive components, plastic moulding, textile production and food manufacturing. Validated questionnaire with 5-point Likert scale adapted from SIRIWAN (2015) has been used to collect data from 384 respondents as suggested by KREJCIE & MORGAN (1970). Stratified sampling technique has been used to sample respondents from the logistics service providers operating at North-South cross-border trade route and East-West cross-border trade route covering logistics services in Greater Mekong Sub-region and Malaysia border. The logistics service providers' list was prepared from Thai Transportation and Logistics Association and Export-Import Transportation Guide.

The questionnaires were divided into three (4) sections namely twenty-eight (28) scale items measuring Thailand Green Service Quality (TGSQ), twenty-four (24) scale items measuring Thailand

Logistics Service Quality (TLSQ), five (5) scale items measuring Thailand Logistics Performance (TLP) and seven (7) questions about their logistics company. The number of logistics service providers from the two sources was 470 companies. The self-completion questionnaire was conducted by self-administered, supervised and via email. The questionnaires distributed were in Thai language. Phone calls were made to the Logistics Managers or higher management positions requesting for research participations.

6. RESULTS AND FINDINGS

6.1. Response Rate and Respondent Demographic

Missing data and non-engaged responses were considered as not fit for analysis. Missing data and non-engaged responses were detected using Excel software functions. The response rates were depicted in Table 1.

Items	No. of distributed questionnaires	No. of returned questionnaires	Questionnaires fit for analysis
Electronics	92	80 (86.96%)	70
Automotive	98	97 (98.98%)	85
Food	97	93 (95.88%)	81
Plastic	90	82 (91.11%)	72
Textile	93	88 (94.62%)	76

Total	470	440 (93.62%)	384
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Table 1: Questionnaires Response Rates

The response rate of 93.62% is consistent with other research using personal approach (ABAIDULLAH, 2017). Respondents' demographic is depicted in Table 2.

Variables	Stratified Sampling	Frequency	Percentage %
Gender	Male	196	51.00
	Female	188	49.00
Age	25 – 34	96	25.00
	35 – 44	96	25.00
	45 – 54	96	25.00
	55 and above	96	25.00
Occupation	Director	145	37.80
	Logistic Manager	125	32.55
	Finance Manager	114	29.65
Types of Company using LSPs	Electronic	94	20.00
	Automotive	95	20.21
	Food	96	20.43

	Plastic	91	19.36
	Textile	94	20.00

Table 2: Respondents Demographic

6.2. Reliability Test

Reliability test for the scale items was reliable supported by satisfactory Cronbach’s Alpha of 0.926 above the cut-off level of 0.70 as proposed by ABAIDULLAH (2017).

6.3. Normality Test, Outlier and Multicollinearity

Normality test on the dataset was conducted using skewness and kurtosis tests. The dataset is normal because the critical ratios of skewness and kurtosis were in the range of ± 2.58 significant at $p = 1\%$ and ± 1.96 significant at $p = 5\%$ and also Kolmogorov-Smirnov and Shapiro-Wilk tests depict that p-value is within the suggested range indicating that the data were normally distributed (ABAIDULLAH, 2017). The Normal Probability Plot (Normal Q-Q Plot) reveals that the dataset is normally distributed because most of the data was on the straight line except a few scattered away from the straight line. Mahalanobis d^2 test with cut-off value less than 0.05 was used to test outlier and outlier deletion has been conducted to improve the robustness of multivariate analysis (HAIR, 2013). The determinant of the sample covariance matrix was 0.000 indicating the existence of weak multicollinearity in the dataset which is expected for multivariate data weak correlations (HAIR, 2013; ABAIDULLAH, 2017).

6.4. Descriptive Statistics

Descriptive analyses were conducted on measuring scales of Thailand Green Service Quality (TGSQ), Thailand Logistics Service Quality (TLSQ) and Thailand Logistics Performance (TLP). Almost all items have median of 4 (Agree) and median of all items were above the midpoint of the Likert scale of 3 (Neutral). The result suggested that majority of the respondents agreed with the positive statements of all items. The mean and standard deviation of the measuring scale items are presented in [Table 3](#).

TGSQ Code	Measuring Scale Items	Mean	Standard Deviation
GQ1	Fuel costs decreased by alternative fuels like bio-diesel, hybrid energy and NGV	3.85	0.63
GQ2	Improving the corporate image of your customers and company's reputation from using alternative fuels	3.50	0.45
GQ3	Decreasing product availability from using alternative fuels	2.40	0.38
GQ4	Decreasing CO ₂ emissions from using environmental friendly vehicle technologies	3.80	0.75
GQ5	Your company's technological innovation increased by implementing	2.75	0.55

	vehicle technologies		
GQ6	Your company's fixed costs increased by implementing vehicle technologies	2.45	0.60
GQ7	Increasing product availability from alternative transportation modes	2.60	0.43
GQ8	Increasing the flexibility of product size from alternative transportation modes	2.85	0.67
GQ9	Transportation costs decreased by alternative transportation modes	4.00	0.56
GQ10	Your staff is fully trained on environmental and safety issues	3.45	0.32
GQ11	Reduction of accident rates due to staff trained in environmental and safety issues	3.95	0.74
GQ12	CO ₂ emissions reduced by staff trained on environmental and safety issues	2.55	0.51
GQ13	Distribution network improved by implementing green logistics	2.30	0.68
GQ14	Lead times reduced by implementing a design of green logistics system	2.45	0.70
GQ15	Increasing product availability from implementing a design of green logistics system	2.75	0.53
GQ16	Availability increased by implementing by implementing green logistics	2.60	0.65

GQ17	Effective transportation affecting consolidation	3.95	0.74
GQ18	Back haul is reduced by affective transportation	4.00	0.68
GQ19	Enhancing environmental knowledge sharing between your company and your customers	3.00	0.51
GQ20	Achieving environmental targets between your company and your customers	3.50	0.55
GQ21	Increasing environmental issues collaborate with your customers	3.60	0.73
GQ22	Back haul is reduced by collaborating with your customers	3.95	0.43
GQ23	Decreasing waste within your operations and processes	4.00	0.54
GQ24	Complying with environmental regulations	3.95	0.39
GQ25	Operational efficiency increased by implementing environmental management system	3.50	0.77
GQ26	CO ₂ emissions reduced by awareness of your stakeholders	3.90	0.65
GQ27	Environmental impacts in your company changed particularly staff	3.50	0.53

	environmental education and safety		
GQ28	Increasing awareness of your stakeholders' green impact	3.65	0.68

Five-point scale: 1 = strongly disagree; 5 = strongly agree

Table 3: Mean and standard deviation of TGSQ with 28 items

The mean of TGSQ items were above the midpoint 3 which is mean = 3.31 and standard deviation = 0.584 suggested that on average respondents agreed with the positive TGSQ statements. However, there are TGSQ measuring scale items with mean below midpoint 3 suggesting respondents disagreed with the positive TGSQ statements to these items.

7. CONCLUSION

The positive relationship between Thailand green service quality and Thailand logistics performance for logistics service providers in Thailand for cross-border trade is supported. Logistics service providers for cross-border trade in Thailand acknowledged the importance of green service quality concept that affects their logistics performance. Furthermore, other factors relevant to Thailand logistics service quality also affect Thailand logistics performance. Thailand logistics service providers perceived that Thailand green service quality is superior to normal logistics service quality. The relationship between Thailand green service quality, Thailand logistics service quality with Thailand logistics performance in the cross-border trade

activities is well supported in this research. Establishing the relationship is important for Thailand logistics service providers in cross-border trade activities to enhance environmental related activities in providing cross-border trade logistics services. Cross-border trade is an important economic activity in Thailand because Thailand borders Malaysia, Myanmar, Cambodia and Laos. Cross-border trade involving logistics of transportation, warehousing and other aspects of logistics plays important roles in the Greater Mekong Sub-region (GMS) involving China and Vietnam. Thailand green logistics services will not only benefit Thailand but also all cross-border trade partners of Thailand.

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