

The Role of Green Logistics in Enhancing Service Trade and Environmental Sustainability: Case Study of DHL Global Forwarding Indonesia

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Abstract: As global environmental concerns rise, interest in green solutions like sustainable transportation is growing. Green logistics, aimed at reducing carbon emissions, is gaining global attention. In Indonesia, poor infrastructure leads to high logistics costs, as highlighted by World Bank data. This study explores how green logistics performance and infrastructure impact firm performance, service quality, services trade, and the environment, focusing on DHL Global Forwarding Indonesia. The research employs a quantitative method using data collected through surveys and analyzed via Structural Equation Modeling with Partial Least Squares (SEM-PLS). The results indicate that green logistics and infrastructure significantly enhance both firm performance and service quality, which in turn positively affect trade in services and contribute to environmental sustainability. However, the mediation role is not yet significant. Future research should examine the long-term impact of green logistics on international trade and explore other factors, like policies and technology, to improve logistics sustainability.

Keywords: *Indonesia, logistics, green logistics, infrastructure, economic development, sustainability*

1. Introduction

The number of people interested in ecological issues is growing these days. This is because the condition of the environment throughout the world is deteriorating daily. An increasing number of people are searching for more environmentally friendly solutions due to the negative consequences of global warming on the environment. Among the many options is selecting the mode of transportation. Without a doubt, substances in the exhaust from cars, trains, ships, airplanes, and other fuel-powered vehicles are hazardous to the environment. World Bank statistics on Indonesia's per capita carbon dioxide emissions show significant fluctuations in emissions between 2010 and 2020 (Marilyn Winata, 2023). Green logistics have evolved because of the extreme environmental damage caused by the massive amounts of carbon gas emissions from vehicle gases. According to research by Marilyn Winata (2023), Although green logistics has been around for a while, its relationship to environmental issues has recently been investigated.

According to research Sergi et al., (2021), The main reason for Indonesia's high logistics costs, as measured by the competitiveness and performance index of logistics, is the country's

inadequate infrastructure, which is considered to be insufficient to facilitate efficient transportation, including traffic. This research focuses primarily on Indonesia. As stated by Ricardianto et al., (2022), It is imperative to upgrade facilities with energy- and environmentally-efficient machinery to ensure sustainability. Green logistics performance is the assessment and application of ecologically responsible and sustainable logistics methods. The idea includes a variety of tactics and measures intended to lessen the negative effects of logistical operations on the environment, such as cutting carbon emissions and making better use of available resources. It has been suggested that commerce in services and the environment are significantly impacted by the effectiveness and efficient infrastructure of green logistics (Gani, 2017). Improved green logistics performance lowers trade costs by getting rid of inefficiencies associated with traditional shipping and handling methods used by businesses. Green logistics refers to efforts to reduce the potential harm that logistics processes can cause, especially during commodity distribution (Hadi et al., 2023). In order to support modern services, facilitate trade and transportation, and improve the logistics industry, the majority of nations are implementing reforms or rebuilding their infrastructure. This suggests that the infrastructure and performance of the green logistics sector are crucial for economic growth (Yingfei et al., 2022). Prior research has demonstrated that export performance and international trade in services and the environment are positively impacted by effective infrastructure and environmentally responsible logistics performance (Mercangoz et al., 2020). The evolution of logistics into a dynamic sector underscores its critical role in facilitating international trade and enhancing economic competitiveness. Central to this evolution is the concept of green logistics and infrastructure upgrades, which emphasize sustainability and environmental responsibility in logistics operations.

From the existing phenomena, there are studies that form the basis of the problems raised from past research. Research conducted Yingfei et al., (2022), shows that in this study each variable, through business performance and service quality, green logistics infrastructure and performance, in particular, has a major positive impact on trade in services and the environment in China. (X. Li et al., 2021a) said that environmental quality is greatly improved by green logistics performance in Europe, East Asia, and Southeast Asia. And also, (Lau, 2011) For example, Japanese HEA manufacturers have implemented Green Logistics throughout the entire supply chain, with relatively good performance in almost all activities surveyed. In contrast, Chinese HEA manufacturers, especially the smaller ones, are focusing primarily on specific downstream activities like packaging with recycled material and consolidation to reduce transportation.

In this case, DHL Global Forwarding Indonesia has implemented green logistics itself. Such activities may include distribution, transportation, warehousing, reverse logistics, product packaging, internal management, and collaboration with consumers. DHL Global Forwarding Indonesia, is a prominent global provider of international services. One of the foreign service companies situated in Tangerang's Soekarno Hatta neighborhood. with its proficiency as a land,

air, and marine freight shipping corporation. (Siallagan et al., 2023). One of the three categories of companies that make up DHL Global Forwarding Indonesia, which was initially founded in Germany, has its own delivery capacity and is involved in providing services. Being an import and export service provider, the company encounters several difficulties in keeping clients, particularly given the growing pool of providers who are capable of handling the operation. The more customers there are, the more opportunities there are for service providers to enhance their offerings in order to stay competitive, ensure business continuity, and attract and keep customers.

The study focuses on how each component affects Indonesian logistics firms, specifically DHL Indonesia. This study aims to enhance understanding of the factors impacting the country's service trade and business success. Policymakers and industry professionals are also expected to gain insights from the study regarding the significance of sustainable trade in services and green logistics performance in the Indonesian economy.

2. Literature review

2.1. Green Logistics Performance

According to Gunawan et al., (2023) Green logistics is the idea of transforming all logistical operations into ones that are more ecologically friendly while maintaining appropriate efficacy and efficiency with the environment. According to Lau, (2011) Utilizing recycled components for remanufacturing or eco-friendly materials in production not only reduces production costs but also minimizes environmental impact. In the transportation industry, consolidating orders and optimizing routes and schedules lead to lower fuel consumption and reduced distribution frequency. The adoption of alternative energy sources or more fuel-efficient vehicles directly cuts greenhouse gas emissions. This study in line with Alfaridi Nasution et al., (2024) Greenhouse gas emissions can be efficiently reduced by implementing sustainable measures, such as the use of renewable energy, efficient waste management, and environmentally friendly industrial practices, in an effort to lessen the impact of global warming on industry. According to Rehman Khan et al., (2018), The green logistics performance serves as a vital indicator of economic growth. Since the 2000s, several companies have successfully integrated green logistics practices, driving economic expansion. This underscores the dual impact of green logistic enhancing environmental sustainability while making a substantial contribution to economic activity.

From the studies mentioned, it can be concluded that green logistics is an essential strategy for optimizing environmentally friendly logistical operations. This approach not only reduces production costs but also minimizes negative environmental impacts. The success of green logistics is pivotal in maintaining environmental sustainability while simultaneously driving economic growth.

2.2. Infrastructure

According to Fajar et al., (2023), infrastructure plays a crucial role in its logistical performance of an country, with many countries enhancing their economies by investing in improved infrastructure. The logistics sector primarily revolves around transportation and storage, necessitating robust infrastructure such as roads, railways, seaports, airports, and advanced information and communication technologies to foster a more favorable business environment. According to Putri et al., (2024), To advance the economy of a country, the infrastructure sector is very important, therefore it requires a contribution by the government to pay attention to areas that are lacking in terms of infrastructure. According to N. E. Putri et al., (2021), Infrastructure plays a crucial role in a nation's economic sustainability and progress. Effective planning and development of infrastructure can boost productivity, reduce transaction costs, and enhance the quality of life by providing better access to transportation, clean water, sanitation, and energy.

From the three studies, it can be concluded that infrastructure is key to enhancing logistics performance and driving a country's economic growth. Strong infrastructure supports transportation, storage, and communication technologies, all vital for a robust economy. Conversely, poor infrastructure hampers productivity and slows growth. Therefore, effective infrastructure planning and development boost productivity, reduce costs, and improve quality of life, fostering sustainable economic growth.

2.3. Service Trade and Environment

According to Bamieh et al., (2022), service trade refers to the exchange of services between countries or regions, including activities such as consulting, financial services, education, healthcare, and information technology. It involves both the import and export of services. According to Zaninović et al., (2021), Enhanced logistics performance positively influences international trade, including service trade. Studies indicate that variations in the Logistics Performance Index (LPI) between trading partners can impact trade volumes. According to Park et al., (2023), research, the performance of logistics positively influences trade. According to Li et al., (2021), The environment is crucial to protect due to the negative impacts that unsustainable logistics activities can have. It is difficult to manage logistics' economic performance and environmental quality at the same time, but environmental sustainability must be implemented if sustainable development is to be achieved. Green logistics can be an effective strategy to enhance economic growth while maintaining environmental quality.

Based on the studies above Service trade involves cross-border services like consulting. Better logistics boost trade, and green logistics supports economic growth while protecting the environment.

2.4. Firm's Performance

According to Rahayu & Sari, (2018), firm performance serves as a measure to evaluate how effectively management has achieved the organization's goals within a specific timeframe.

According to Partiwi et al., (2022), The significance of firm performance lies in its ability to showcase the success of a firm in reaching its objectives. It represents the outcomes achieved by the company through various processes over a specific period, aligned with the standards set by the organization, all aimed at maximizing profit. According to Mutie et al., (2020), Strong firm performance plays a crucial role in achieving sustainability. Adopting green logistics practices enhances the firm economic performance, which in turn boosts overall corporate success and supports sustainability by increasing efficiency and minimizing environmental impact.

According to the sources, firm performance is a key metric for evaluating how well management achieves organizational goals within a set timeframe. It reflects the results of the company's efforts in meeting its standards and maximizing profit. Strong performance is essential for sustainability, and adopting green logistics not only improves economic outcomes but also supports sustainability by enhancing efficiency and reducing environmental impact.

2.5. Service Quality

According to Nurul Ichsan & Karim, (2021) Good service is defined as service that meets the quality standards set by the institution or service user company, effectively satisfying those who receive it. According to Kusumo Bintoro et al., (2023), Reputation management and providing high-quality services are essential to retaining client trust. Businesses are seeking to surpass one another more and more as rivalry among them heats up. In order to maintain their competitiveness, cultivate customer connections, and turn a profit, they work hard to provide outstanding service and maintain a solid reputation. According To (Samosir et al., 2024), In many different industry areas, consumer happiness and business performance have long been linked to quality service. Based on the three studies, good service is defined as service that meets the standards set by the institution or company and ensures customer satisfaction. Additionally, a company's reputation and service quality are critical for retaining customer trust. In a highly competitive business environment, companies must emphasize delivering exceptional service and maintaining a strong reputation to remain competitive, foster client relationships, and secure profitability.

Conceptual Framework

From a theoretical perspective, the literature review in this article aims to thoroughly review related articles, analyze the relationship between variables, and formulate a conceptual research plan based on the research results.

The connection between green logistics performance with service trade and environmental impact.

Based on the findings of research by Wang et al., (2018) and Khan et al., (2020) there is a correlation with green logistics performance, trade in services, and environmental impact. Wang suggests that the effective implementation of green logistics enhances environmental sustainability while boosting competitiveness in the global services trade market. Khan's research indicates that green logistics not only increases efficiency and competitiveness in service trade but also plays a crucial role in environmental protection.

H1 : Green logistics performance positively and significantly impacts service trade and the environment.

The connection between infrastructure with service trade and environment

According to research by Ibrahim et al., (2022) and Gajera & Kazi, (2023) there is a connection between infrastructure, service trade, and the environment. Ibrahim highlights that infrastructure improvements enhance service trade by boosting efficiency and accessibility. Similarly, Gajera's & Kazi research suggests that infrastructure not only increases efficiency and accessibility in service trade but also has an impact on the environment.

H2 : Infrastructure positively and significantly impacts service trade and the environment.

The connection between green logistic performance and firm performance

Based on the results of Mutie et al., (2020) and Karaman et al., (2020) there is a relationship between green logistics performance and firm performance. The study by Mutie has been noted that the adoption of green logistics enhances economic performance, which in turn boosts overall firm performance. Then karaman's Research indicates a strong correlation between the performance of green logistics and the overall performance of a company..

H3 : Green logistics performance positively and significantly impacts firm performance.

The connection between green logistic performance and service quality

According to research by Li & Chen, (2022) and Pichit et al., (2020) there is a link between green logistics performance (GLP) and service quality. Li and Chen found that sustainable logistics significantly influences service quality and customer satisfaction. These

findings align with Pichit's research, show a significant link between green logistics performance and the overall success of a company.

H4: Green logistic performance positively and significant impact on service quality

The connection infrastructure and firm performance

Based on the findings of research by Tuong et al., (2019) and Ha Thi Thu (2021) there is a connection between infrastructure and firm performance. Tuong's study revealed that enhancing infrastructure can effectively enhance overall company performance. This is in line with HA THI THUN's research, which also demonstrates that the quality of infrastructure impacts company performance.

H5: Infrastructure positively and significant impact on firm performance

The connection infrastructure and service quality

According to the research findings by Pink Berlianto, (2022) and Fachruddin et al., (2022) there is a connection between infrastructure and service quality. from Pink Berlianto's research improving and maintaining good infrastructure will contribute to overall service quality. Fachruddin argues that maintaining infrastructure quality will improve service quality.

H6: infrastructure positively and significant impact on service quality

The connection of firm performance and service trade and environment

Huda et al., (2018) found that improved company performance, influenced by internal, industry, and external factors, is essential for increasing efficiency and competitiveness in the service sector, while also benefiting the environment.

H7: Firm performance positively and significant impact on service trade and environment

The connection of service quality and service trade and environment

Research by Irmanita, (2024) demonstrates that enhancing service quality positively impacts the service trade; conversely, unsatisfactory service quality can adversely affect customers.

H8: service quality positively and significant impact on service trade and environment

firm performance as mediation

Yudi Fernandoa, (2019), found that the green logistics sector has a positive impact on company performance, and that infrastructure development can support companies in achieving sustainability.

H9 : Firm performance mediates the relationship between green logistics performance and service trade & environment.

H10 : Firm performance mediates the relationship between infrastructure and service trade & environment.

service quality as mediation

Pink Berlianto, (2022) stated that good infrastructure can improve service quality so that infrastructure needs to be well maintained. Richey et al., (2005) stated that the quality of environmentally friendly logistics services can help companies meet customer demand.

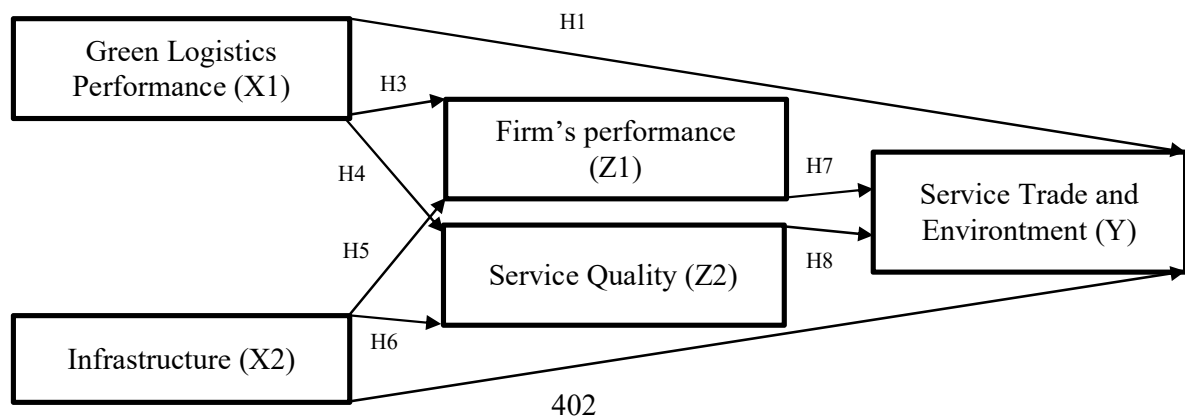
H11 : Service quality mediates the relationship between green logistics performance and service trade & environment.

H12 : Service quality mediates the relationship between infrastructure and service trade & environment.

Hypothesis

Hypothesis is a temporary conclusion that has a basis in observation and available data, hypothesis is used as a basis for testing a phenomenon or existing ideas. In the hypothesis there are several important components, namely temporary conjectures, relationships between variables and truth tests (Yam & Taufik, 2021).

Here is the concept framework for the hypothesis:



H2

Fig 1. Conceptual Framework

Based on the figure, it can be concluded that :

- H1** : Green logistics performance positively and significantly impacts service trade and the environment.
- H2** : Infrastructure positively and significantly impacts service trade and the environment.
- H3** : Green logistics performance positively and significantly impacts firm performance.
- H4** : Green logistics performance positively and significantly impacts service quality.
- H5** : Infrastructure positively and significantly impacts firm performance.
- H6** : Infrastructure positively and significantly impacts service quality.
- H7** : Firm performance positively and significantly impacts service trade and the environment.
- H8** : Service quality positively and significantly impacts service trade and the environment.
- H9** : Firm performance mediates the relationship between green logistics performance and service trade & environment.
- H10** : Firm performance mediates the relationship between infrastructure and service trade & environment.
- H11** : Service quality mediates the relationship between green logistics performance and service trade & environment.
- H12** : Service quality mediates the relationship between infrastructure and service trade & environment.

3. Research method

This study uses a quantitative approach to measure and analyze the relationship between green logistics, infrastructure, firm performance, service quality, service trade and environment. This method was chosen because it allows for clear, data-driven results and helps test the impact of different factors at DHL Global Forwarding Indonesia. The study was conducted at the DHL office located at Tangerang's Soekarno-Hatta Airport from June to August 2024. The population of this study are Employees working at DHL Global Forwarding Indonesia, located in Soekarno-Hatta, Tangerang. Purposive sampling is used to select respondents who have specific knowledge and understanding related to green logistics with a sample size of 50 respondents selected for the research. The characteristics from this research include the following :

Table 1. Characteristics Sample

	Frequency (%)
Gender	
Male	33 (66%)

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Female	17 (34%)
Position	
Staff	47 (94%)
Supervisor	2 (4%)
Manager	1 (2%)

Source : Data questionnaire

The Cohen Manion and Morrison table was used to determine the sample size for this study. The population column is on the left in this table, while the study's 90% confidence level is in the second column with sub-columns alpha (α) 0.1, 0.05, and 0.01 (from left to right). Similarly, the next columns. As the study's target group consisted of 49 individuals, 50 responses were needed at this point to get a 99% confidence level with an alpha (α) value of 0.01.

Population	Confidence level 90 per cent			Confidence level 95 per cent			Confidence level 99 per cent		
	Confidence interval	Confidence interval	Confidence interval	Confidence interval	Confidence interval	Confidence interval	Confidence interval	Confidence interval	
30	27	28	29	28	29	29	29	30	
50	42	45	47	44	46	48	46	48	
75	59	64	68	63	67	70	70	72	
100	73	81	86	79	86	91	87	95	
120	83	94	104	91	100	108	102	108	
150	97	111	125	108	120	132	122	131	
200	115	136	158	132	150	168	154	168	
250	130	157	188	151	176	203	182	201	
300	143	176	215	168	200	234	207	233	
350	153	192	239	183	221	264	229	262	
400	162	206	262	196	240	291	250	291	
450	170	219	282	207	257	317	268	314	
500	176	230	301	217	273	340	285	337	
600	187	249	335	234	300	384	315	393	
650	192	257	350	241	312	404	328	410	
700	196	265	364	248	323	423	341	418	
800	203	278	389	260	343	457	363	452	
900	209	289	411	269	360	488	382	462	
1,000	214	298	431	278	375	516	399	509	
1,100	218	307	448	285	388	542	414	534	
1,200	222	314	464	291	400	565	427	556	
1,300	225	321	478	297	411	586	439	572	
1,400	228	326	491	301	420	606	450	586	
1,500	230	331	503	306	429	624	460	613	
2,000	240	351	549	322	462	696	498	683	
2,500	246	364	581	333	484	749	524	733	
3,000	258	392	637	357	536	879	586	870	
7,500	263	403	687	365	556	934	610	917	
10,000	265	408	703	370	566	964	622	939	
20,000	269	417	729	377	583	1,013	642	993	
30,000	270	419	738	379	588	1,030	649	1,002	
40,000	270	421	742	381	591	1,039	653	1,011	
50,000	271	422	745	381	593	1,045	655	1,016	
100,000	272	424	751	383	597	1,056	659	1,026	
150,000	272	424	752	383	598	1,060	661	1,030	
200,000	272	424	753	383	598	1,061	661	1,031	
250,000	272	425	754	384	599	1,063	662	1,031	
500,000	272	425	755	384	600	1,065	663	1,031	
1,000,000	272	425	756	384	600	1,066	663	1,031	

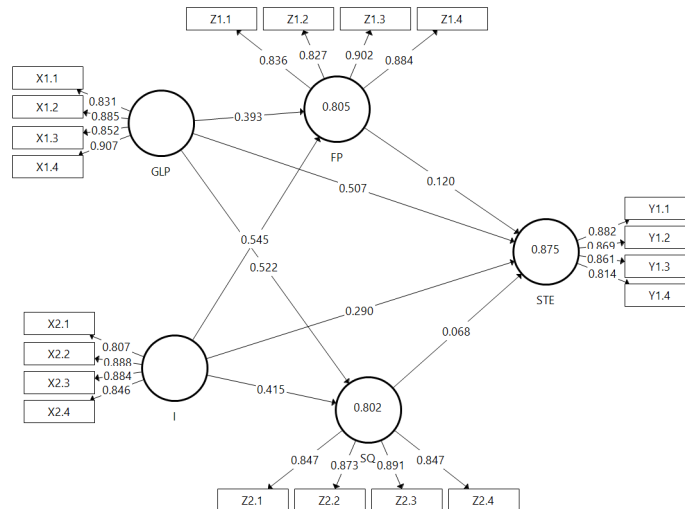
Table 2. Population & Confidence Level

Data collection was done through distributing questionnaires using Google Forms, online and in person. The questions in the questionnaire will use a Likert scale to assign a value to each variable. Strongly agree, agree, neutral, disagree, and strongly disagree make up the Likert scale that is employed.

The analysis was conducted using Smart-PLS 4.0 software. This method was chosen for its ability to handle research models with multiple latent variables, providing reliable and relevant results aligned with the research objectives. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to model the relationships between variables.

4. Results and Discussion

Fig 2. Outer Model



Based on the table above, the outer loading values for all indicators of the green logistics performance (GLP), infrastructure (I), firm performance (FP), service quality (SQ), service trade, and environment (STE) are greater than 0.5, indicating that they are valid.

Table 3. Convergent Validity Test

	GLP	I	STE	FP	SQ
X1.1	0,831				
X1.2	0,885				
X1.3	0,852				
X1.4	0,907				
X2.1		0,807			
X2.2		0,888			
X2.3		0,884			
X2.4		0,846			
Y1.1			0,882		
Y1.2			0,869		
Y1.3			0,861		
Y1.4			0,814		
Z1.1				0,836	
Z1.2				0,827	

Z1.3	0,902
Z1.4	0,884
Z2.1	0,847
Z2.2	0,873
Z2.3	0,891
Z2.4	0,847

According to (HAMID&ANWAR, 2019), the criteria for convergent validity, a loading factor is considered acceptable if it is greater than 0.70. Based on the table above, it can be observed that the loading factor for all items is greater than 0.70, leading to the conclusion that all items are considered valid for convergent validity.

Table 4. Discriminant Validity

	FP	GLP	I	SQ	STE
X1.1	0,694	0,831	0,789	0,681	0,829
X1.2	0,813	0,885	0,658	0,787	0,801
X1.3	0,671	0,852	0,719	0,753	0,731
X1.4	0,744	0,907	0,707	0,780	0,792
X2.1	0,767	0,854	0,807	0,778	0,762
X2.2	0,727	0,680	0,888	0,715	0,802
X2.3	0,781	0,686	0,884	0,678	0,746
X2.4	0,698	0,588	0,846	0,719	0,665
Y1.1	0,745	0,748	0,759	0,757	0,882
Y1.2	0,780	0,789	0,754	0,681	0,869
Y1.3	0,689	0,818	0,724	0,777	0,861
Y1.4	0,734	0,751	0,748	0,725	0,814
Z1.1	0,836	0,673	0,795	0,720	0,742
Z1.2	0,827	0,806	0,728	0,765	0,764
Z1.3	0,902	0,748	0,794	0,780	0,735
Z1.4	0,884	0,670	0,675	0,774	0,723
Z2.1	0,746	0,754	0,754	0,847	0,751
Z2.2	0,812	0,765	0,735	0,873	0,740
Z2.3	0,841	0,771	0,738	0,891	0,750
Z2.4	0,645	0,697	0,695	0,847	0,727

According to (HAMID&ANWAR, 2019), a Cross loading is considered acceptable if it is greater than 0.70. Based on the table above, it can be observed that the cross loading of all

indicator across the variable are greater than 0.70, leading to the conclusion that all items are considered valid.

Table 5. Reliability Test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
FP	0,885	0,885	0,921	0,745
GLP	0,892	0,894	0,925	0,756
I	0,879	0,879	0,917	0,734
SQ	0,888	0,888	0,922	0,748
STE	0,879	0,879	0,917	0,734

According to HAMID&ANWAR, (2019), a reliability test is considered acceptable if the composite reliability value is greater than 0.70. From the table above, the composite reliability values for all variables are greater than 0.70, indicating that all variables are reliable.

Table 6. Inner Model
R SQUARE

	R Square	R Square Adjusted
FP	0,805	0,797
SQ	0,802	0,793
STE	0,875	0,864

According to (HARYONO 2016), the R-square value is considered acceptable if it meets the following criteria: 0.67 (strong), 0.33 (moderate), and 0.19 (weak). From the table above, the adjusted R-square value for variable FP is 0.797, indicating that variables GLP and I can explain 79,7% of the variance in variable FP. Therefore, it can be concluded that the model is considered strong. Meanwhile, the adjusted R-square value for variable SQ is 0.793, indicating that variables GLP, I, and STE can explain 79,3% of the variance in variable SQ. This suggests that the model is considered strong. Lastly, the adjusted R-square value for variable STE is 0.864, indicating that variables GLP and I can explain 8,64% of the variance in variable STE. Thus, the model is considered strong.

Table 7. Effect Size

	FP	GLP	I	SQ	STE
FP					0,019

GLP	0,254	0,441	0,438
I	0,489	0,278	0,139
SQ			0,006
STE			

According to (HARYONO 2016), the effect size is considered acceptable if it meets the following criteria: 0.35 (strong), 0.15 (moderate), and 0.02 (weak). The explanation is as follows:

- A. The effect of FP on STE is 0.019, which is considered moderate.
- B. The effect of GLP on FP is 0.254, which is considered strong
- C. The effect of GLP on SQ is 0.441, which is considered strong
- D. The effect of GLP on STE is 0,438, which is considered strong
- E. The effect of I on FP is 0.489, which is considered Strong
- F. The effect of I on SQ is 0.278, which is considered strong
- G. The effect of I on STE is 0.139, which is considered Strong
- H. The effect of SQ on STE is 0.006, which is considered weak

Hypothesis Test

Table 8. Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
FP -> STE	0,120	0,136	0,185	0,649	0,517
GLP -> FP	0,393	0,404	0,144	2,726	0,007
GLP -> SQ	0,522	0,523	0,133	3,919	0,000
GLP -> STE	0,507	0,511	0,173	2,932	0,004
I -> FP	0,545	0,534	0,146	3,744	0,000
I -> SQ	0,415	0,415	0,136	3,059	0,002
I -> STE	0,290	0,274	0,147	1,971	0,049
SQ -> STE	0,068	0,066	0,157	0,434	0,664

According to HAMID&ANWAR, (2019), hypothesis testing must have criteria > 1.96 (significance level = 5%) as for the following explanation:

- A. GLP > STE obtained a P value of 0.004 > 0.05, then H1 is accepted
- B. I > STE obtained a P value of 0.049 > 0.05, then H2 is accepted
- C. GLP > FP obtained a P value of 0.007 > 0.05, then H3 is accepted
- D. GLP > SQ obtained a P value of 0.000 > 0.05, then H4 is accepted

- E. $I > FP$ obtained a P value of $0.000 > 0.05$, then H_5 is accepted
- F. $I > SQ$ obtained a P value of $0.002 > 0.05$, then H_6 is accepted
- G. $FP > STE$ obtained a P value of $0.517 > 0.05$, then H_7 is rejected
- H. $SQ > STE$ obtained a P value of $0.664 > 0.05$, then H_8 is rejected

Table 9. Specific Indirect Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
GLP -> FP -> STE	0,047	0,052	0,084	0,565	0,572
I -> FP -> STE	0,066	0,078	0,104	0,629	0,530
GLP -> SQ -> STE	0,036	0,035	0,087	0,410	0,682
I -> SQ -> STE	0,028	0,028	0,068	0,417	0,677

- A. $GLP > FP > STE$ obtained a P value of $0.571 > 0.05$, then H_9 is rejected
- B. $GLP > SQ > STE$ obtained a P value of $0.682 > 0.05$, then H_{10} is rejected
- C. $I > FP > STE$ obtained a P value of $0.530 > 0.05$, then H_{11} is rejected
- D. $I > SQ > STE$ obtained a P value of $0.677 > 0.05$, then H_{12} is rejected

5. Conclusion

Based on the analysis and findings of this study, it is concluded that green logistics and infrastructure significantly impact service trade and environmental sustainability in Indonesia's logistics sector, particularly at DHL Global Forwarding. The results indicate that green logistics and infrastructure upgrades enhance service quality and firm performance, promoting sustainable trade practices and economic growth. However, the direct effects of service quality and firm performance on service trade and the environment are insignificant, suggesting further investigation.

In summary, this research underscores the importance of sustainable logistics practices in driving economic growth while minimizing environmental impacts. Future studies should consider additional variables and long-term effects to understand how green logistics influences international trade and environmental outcomes.

6. Implication

The results of this study provide valuable guidance for companies and future researchers. First, the company can optimize transportation routes to reduce greenhouse gas emissions, lower operational costs, and speed up delivery times. Second, utilizing renewable energy, such as solar panels in offices, warehouses, and other facilities, can help reduce energy costs and carbon footprint. Third, The company can further improve service quality, ensuring that reliable and satisfying services effectively promote green logistics to consumers. In order to provide a

more original and intricate study, researchers also expect that future studies on this subject will include various elements like companies, policies, or technology.

7. Limitation

It is important to take into account the many limitations of this study. First, because this study's geographic scope is restricted to the Indonesian environment, its conclusions might not be as applicable to other nations with diverse infrastructure and regulatory frameworks. Second, This study also does not fully consider other variables that may be relevant, such as the impact of specific government regulations or macroeconomic factors that could affect the results. Third, since the study was conducted over a period of time, changes in technology, regulations, or market trends after the study may reduce the relevance of the findings in the future.

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