

THE INFLUENCE OF GREEN LOGISTICS AND SERVICE QUALITY ON CUSTOMER SATISFACTION AND LOYALTY AT PT TIKI JALUR NUGRAHA EKAKURIR (JNE): A CASE STUDY OF CUSTOMERS IN EAST JAKARTA

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Abstract: This study aims to determine the effect of green logistics and service quality on customer loyalty through customer satisfaction as an intervening variable at Jalur Nugraha Ekakurir (JNE) Jakarta 2024. This research uses a quantitative approach. The sample in this study we used the lemeshow formula, where the population was not known for sure so as to get a sample size of 96.04 and rounded up to 100. The sampling technique applied in this study was purposive sampling technique. The questionnaire was distributed online via google form using a 5 Likert scale. The survey results were processed using SEM with SMART PLS software. With SmartPLS 4.0 software. For validity and reliability tests, R-square, and hypothesis testing. This study found a positive and significant relationship between green logistics and service quality on customer loyalty through customer satisfaction at Jalur Nugraha Ekakurir (JNE) Jakarta 2024.

Keywords: *green logistics, service quality, customer satisfaction, customer loyalty*

1. Introduction

In the modern business world, one of the most important services is freight forwarding. With the growth of global trade and technological advancements, the need for delivery services is increasing. However, the transportation and logistics sector has a negative impact on air pollution. According to the data (Inventarisasi Emisi GRK Bidang Energi, 2020) Land transportation including private cars, trucks and buses is the second largest contributor to air pollution. Transportation accounts for 24.64% of all greenhouse gases. To reduce the negative impact on the environment, the process of shipping goods should be done in an environmentally friendly way. A logistics company that is currently developing and serving real delivery is JNE. JNE is a company in the field of shipping and logistics. JNE's official name is Jalur Nugraha Ekakurir. PT JNE is one of the well-known and widest logistics service provider companies in Indonesia and is based in Jakarta. With the largest logistics service provider in Indonesia, JNE was reborn with the philosophy of "Rise Together", requiring all levels of JNE to collaborate to carry out the concept of sustainable logistics. So

the concept of green logistics is very appropriate. It is an approach that aims to reduce the environmental impact of logistics activities, including the transportation, storage and delivery of goods. (La Ode M Syuhada, 2023).

Due to environmental priorities and public pressure, many regulations and restrictions have been created. JNE companies are starting to pay attention to green behavior and environmental values in every aspect of their operations. Both individual and business customers have started to pay attention to the quality of the goods and services they purchase. Therefore, the idea of green logistics and transportation has gained value in the market (Larina et al., 2021). To optimize resource efficiency and reduce carbon emissions in the supply chain, the concept of Green Logistics also known as green logistics is used as one of the strategies. However, the selection of strategies to make a company advance in the world of shipping services they must focus on the service quality system for logistics (Logistics Service Quality) and satisfaction from customers, in order to make an evaluation tool for the company's progress in the future and will have an impact on the level of loyalty from customers. (Shinta Wahyu Hati, 2019).

2. Literature review

Green Logistics

Green logistics is a concept in logistics that reduces ecological impact during the product delivery process without compromising customer demand and needs (Seroka-Stolka & Ociepa-Kubicka, 2019). The implementation of green logistics in organizations highlights a number of advantages. The practice shows an increase in the volume of goods delivered on time, better use of capacity, improved product or service quality, increased product variety and reduced waste. In addition, the implementation of green logistics benefits organizations by reducing material purchase costs, energy costs, waste treatment and disposal costs in an effort to eliminate environmental damage (Sidek et al., 2021). Green logistics services continue to grow worldwide and are an essential component of trading companies in their growth and competitiveness (Androniceanu et al., 2021). The concept of green logistics refers to reducing the negative impact on the environment during the process of delivering products while maintaining customer demand and needs. In addition, this practice helps businesses by reducing the cost of purchasing materials, energy, waste treatment, and disposal, thereby reducing the negative impact on the environment, so green logistics services continue to grow worldwide and are an essential part of businesses to thrive and become more competitive.

Service Quality

Service quality is an invisible activity that occurs due to interactions between consumers and employees, or “things provided by the company in providing services intended to solve problems” consumers. That a good quality image is not seen from the perception of the

company, but based on customer perceptions (Mariansyah & Syarif, 2020). From here, customer loyalty is obtained which results from the quality of service provided so that customers feel satisfied. Better service quality will influence customer decisions whether they will be loyal to the company or not (Rudy Hartono et al., 2018). Therefore, service quality can affect customer loyalty, from good service quality so that customers feel satisfied and will influence customer decisions whether they will remain loyal to the company.

Customer Satisfaction

According to Wulanjani, & Derriawan in the journal Customer satisfaction is the level of a person's feelings after comparing the perceived (performance or results) with the perceived (performance or results) with his expectations. Consumers can experience one of three levels of satisfaction. First, if the product performance is below expectations, consumers will feel disappointed. Second, if the product performance matches expectations, consumers will feel satisfied. Third, if performance exceeds expectations, consumers will feel very satisfied. Consumers who feel satisfied after comparing what they receive will feel the results of the experience when using the service, and they will buy again and give recommendations to others to buy at the same place (Gultom et al., 2018). Customers who feel satisfied after using the service will feel the results of their experience when using the service, and they will return to buy the product and advise others to use it too.

Customer Loyalty

According to Dilla, & Ngatno in the journal (Gunawan, 2022) Customer loyalty does not happen by itself, customer loyalty is a behavior that is formed from the attitude of someone who is loyal in general must feel satisfied first, customer satisfaction will form customer loyalty. Customer loyalty is a customer's dedication to a particular commodity or service. Customers who are loyal to a business will only use its goods and services, and they do not want to switch to other goods and services. By providing quality service and rewards during various shopping activities, customer loyalty can be strengthened in the minds of consumers (Kethan & S, 2022). Customer loyalty is the same as customer loyalty to a particular product or service. Customers who are loyal to a company will only use the company's products and services and will not switch to other products and services. Customer loyalty can be strengthened by providing good service quality for customers.

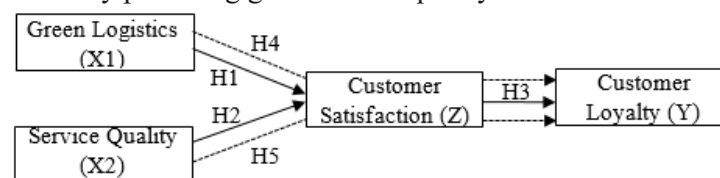


Fig. 1. Conceptual Framework
(Source: processed by the author)

- H1 : It is suspected that green logistics has a positive and significant effect on customer satisfaction
- H2 : It is suspected that service quality has a positive and significant effect on customer satisfaction
- H3 : It is suspected that customer satisfaction has a positive and significant effect on customer loyalty
- H4 : It is suspected that there is an indirect relationship between green logistics on customer loyalty and customer satisfaction
- H5 : It is suspected that there is an indirect relationship between service quality and customer loyalty through customer satisfaction

3. Research method

This study uses quantitative methods to determine the effect of green logistics and service quality on customer satisfaction and loyalty in shipping services: a case study of customers in East Jakarta. This research uses non-probability sampling by involving 100 respondents who use PT Tiki Jalur Nugraha Ekakurir (JNE). This study uses a questionnaire distributed to users of PT Tiki Jalur Nugraha Ekakurir (JNE). Filling out the questionnaire, respondents can provide an assessment of each question based on their personal experience using a 1-5 Likert rating scale ranging from “strongly agree” to “strongly disagree”. This research test uses Path analysis to test the relationship between variables. Testing using this quantitative method will be assisted by the Smart PLS version 4.0 application.

Table 1. Dimensi dan indikator

Variable	Indicator	Source
Grenn Logistics (X1)	1. Design of green products 2. Distribution of green logistics 3. Warehousing of green logistics 4. Packaging of green logistics	(Wang, 2019)
Service Quality (X2)	1. Tangibility 2. Realibility 3. Responsiveness 4. Emphathy 5. Assurance	According to Indrasari in (Senjaya et al., 2023)
Customer Satisfaction (Z)	1. Expectations 2. Performance	(Thung, 2020)

Customer Loyalty (Y)	1. Repurchase Interest 2. Willingness to Recommend	(Woro Sasmiyarsi & Meliana, 2019)
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(Source: processed by the author)

1. Result and discussion**4.1 Validity and Reliability Testing**

From the results of calculations that have been carried out with SmartPLS 4.0, the following results are obtained:

Tabel 2. Square Root of AVE and Corellation Between Variabel

Variabel	AVE	Root AVE
Green Logistics	0.512	0.715
Service Quality	0.604	0.777
Customer Satisfaction	0.675	0.821
Customer Loyalty	0.704	0.839

Source : Processed Data (Smart PLS 4.0)

Based on the results obtained using SmartPLS 4.0, the AVE square root value of all variables is greater than the correlation coefficient between constructs and other constructs so it can be concluded that this value has good discriminant validity. From table 1, it can be seen that the variables of green logistics, service quality, customer satisfaction and customer loyalty can reflect each valid variable because the AVE value is > 0.5 .

Reliability Testing

The most commonly used method for reliability testing is to look at the Cronbach's Coefficient Alpha and Composite Reliability values. The instrument can be said to be reliable if the Cronbach's coefficient Alpha value is greater than 0.70 according to Ghazali in his study (Hair et al, 2021). While the value of the composite reliability method is well accepted if the value is $0.70 \leq \text{composite reliability} / \text{Cronbach's alpha} \leq 0.95$ (Hair et al., 2019).

Tabel 3. Reliability Indicator

Variable	Composite Reliability	Cronbach's Alpha	Result
Green Logistics	0.863	0.810	Reliable
Service Quality	0.938	0.927	Reliable
Customer Satisfaction	0.892	0.839	Reliable
Customer Loyalty	0.905	0.860	Reliable

Source : Processed Data (Smart PLS 4.0)

Validity Testing

In this study, validity testing was carried out using two criteria, namely convergent validity and discriminant validity. Convergent validity is a multi-item scale validity test that represents a situation where the variance value of items measuring the same construct is greater than 70% (Hair et al., 2019). Based on the validity test results in the figure above, it shows that the loading factor value of each dimension has a loading factor value ≥ 0.70 , so it can be concluded that it meets the criteria for convergent validity.

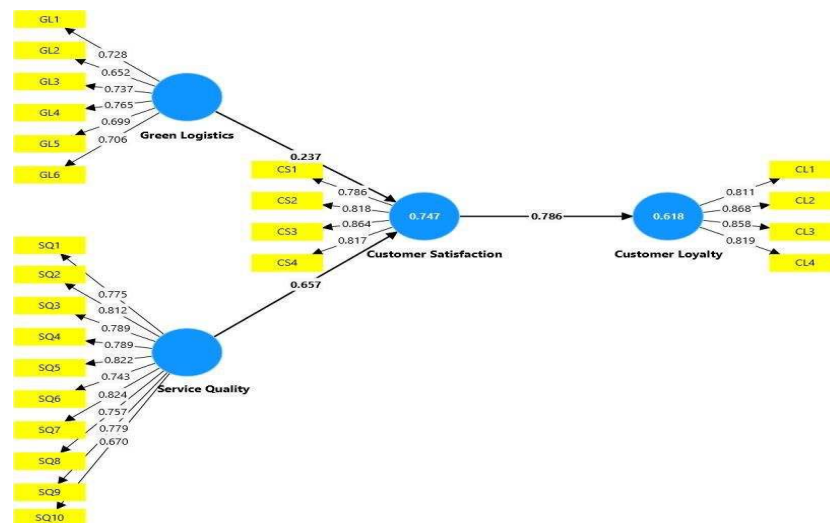


Fig. 2. Outer loading

Source: Processed Data (Smart PLS 4.0)

Discriminant Validity

In this research variable, it can be seen that it has the results of the discriminant validity test, namely the cross loading factor value > 0.7 so that all are considered valid. So it can be concluded that the results obtained above state that the indicators of green logistics, service quality, customer satisfaction and loyalty of PT Tiki Jalur Nugraha Ekakurir with a sample size of 100 used in this study have good discriminant validity in compiling each variable.

Tabel 4. Cross Loadings

	Customer Satisfaction	Service Quality	Green Logistics	Customer Loyalty
KP1	0.786	0.639	0.563	0.654
KP2	0.818	0.703	0.636	0.665
KP3	0.864	0.731	0.710	0.706
KP4	0.817	0.733	0.660	0.554
KPL1	0.656	0.775	0.724	0.637
KPL10	0.622	0.670	0.573	0.566
KPL2	0.662	0.812	0.633	0.628
KPL3	0.634	0.789	0.618	0.683
KPL4	0.632	0.789	0.717	0.672
KPL5	0.761	0.822	0.638	0.661
KPL6	0.628	0.743	0.623	0.605
KPL7	0.726	0.824	0.606	0.632
KPL8	0.641	0.757	0.684	0.544
KPL9	0.657	0.779	0.656	0.614
LH1	0.570	0.581	0.728	0.517
LH2	0.415	0.541	0.652	0.417
LH3	0.520	0.675	0.737	0.530
LH4	0.663	0.676	0.765	0.697
LH5	0.604	0.553	0.699	0.616
LH6	0.542	0.536	0.706	0.525
LP1	0.674	0.668	0.641	0.811
LP2	0.646	0.648	0.599	0.868
LP3	0.703	0.690	0.683	0.858
LP4	0.610	0.692	0.705	0.819

Source : Processed Data (Smart PLS 4.0)

Table 4 shows that the correlation of each variable has a higher value than the other variables. So it can be concluded that the data in the table above has good discriminant validity.

4.2 Dirrect Effect

Tabel 5. Direct Effect

Path	Original Sample (O)	T Statistics	P Values	F Square	Result
Customer Satisfaction → Customer Loyalty	0.786	15.599	0.000	1.620	Accepted
Service Quality → Customer Satisfaction	0.657	6.584	0.000	0.528	Accepted
Green Logistics → Customer Satisfaction	0.237	2.386	0.017	0.069	Accepted

Source : Processed Data (Smart PLS 4.0)

Based on hypothesis testing in this study using the T statistical value and the T table, if the T statistical value obtained is greater than the T table, the hypothesis is supported (accepted). From table 5 we can see that customer satisfaction directly affects customer loyalty with Tstatistics of $15.599 > 1.98$ and a P-Value of $0.000 < 0.05$. Next is service quality directly affects customer satisfaction with Tstatistics of $6.584 > 1.98$ and a P-Value of $0.000 < 0.05$. Furthermore, green logistics directly affects customer satisfaction with a T-statistic of $2.386 > 1.98$ and a P-Value of $0.017 < 0.05$.

H1: Green logistics has a positive and significant effect on customer satisfaction.

The test results show that there is a direct effect of green logistics on customer satisfaction of 0.237, Tstatistic 2.386 is greater than Ttable 1.98. It can be stated that the hypothesis of the effect of green logistics on customer satisfaction is supported by these results. The results of the analysis of the effect of green logistics have a positive and significant impact on customer satisfaction. This is supported by the existence of research that has been researched previously on (Kawa & Pierański, 2021). In the Fsquare test the existence of green logistics in increasing customer satisfaction has an influence of 0.069 (weak).

H2: Service quality has a positive and significant effect on customer satisfaction.

The test results show that there is a direct effect of service quality on customer satisfaction of 0.657, Tstatistic 6.584 is greater than Ttable 1.98. It can be stated that the hypothesis of the effect of service quality on customer satisfaction is supported by these results. The results of the analysis of service quality have a positive and significant effect

on customer satisfaction. This is supported by the existence of research that has been previously researched on (Levia & Humaira, 2023). In testing Fsquare the existence of service quality in increasing customer satisfaction has an influence of 0.528 (strong).

H3: Customer satisfaction has a positive and significant effect on customer loyalty.

The test results show that there is a direct effect of customer satisfaction on customer loyalty of 0.786, Tstatistic 15.599 is greater than Ttable 1.98. It can be stated that the hypothesis of the effect of customer satisfaction on customer loyalty is supported by these results. The results of the analysis of the effect of customer satisfaction have a positive and significant effect on customer loyalty. This is supported by the existence of research that has been researched on (Levia & Humaira, 2023). In the Fsquare test the existence of customer satisfaction in increasing customer loyalty has an influence of 1.620 (strong).

4.3 Indirect Effect

Tabel 6. Indirect Effect

Effect	Original Sample (O)	T Statistic	P Values	Upsilon V	Result
Green Logistics → Customer Satisfaction → Customer Loyalty	0.187	2.292	0.000	0.034	Accepted
Service Quality → Customer Satisfaction → Customer Loyalty	0.517	6.102	0.022	0.265	Accepted

Source : Processed Data (Smart PLS 4.0) The hypothesis results from the table above regarding Path Coefficients and Indirect Effect are as follows :

From table 6, it can be seen that green logistics has an indirect effect on customer satisfaction and customer loyalty with Tstatistics of $2.292 > 1.98$, p-value $0.000 < 0.05$. Furthermore, service quality also has an indirect effect on customer satisfaction and customer loyalty with Tstatistics of $6.102 > 1.98$, and a p-value of $0.022 < 0.05$.

H4: Green logistics has an indirect effect on customer satisfaction and customer loyalty.

The test results show that there is an indirect effect of green logistics on customer satisfaction and customer loyalty of 0.187, Tstatistic 2.292 is greater than Ttable 1.98. It can be stated that the hypothesis of the effect of green logistics on customer

satisfaction and customer loyalty is supported by these results. The results of testing the effect of green logistics on customer satisfaction and loyalty have a positive and significant impact. This is supported by the existence of research that has been researched previously found in (Kawa & Pierański, 2021). In testing the effect size of the existence of green logistics in increasing customer satisfaction and customer loyalty has an influence of 0.034 (weak).

H5: Service quality has an indirect effect on customer satisfaction and customer loyalty.

The test results show that it can be stated that there is an indirect effect of service quality on customer satisfaction and customer loyalty of 0.517, Tstatistic 6.102 is greater than Ttable 1.98. It can be stated that the hypothesis of the effect of service quality on customer satisfaction and customer loyalty is supported by these results. The results of testing the effect of service quality on customer satisfaction and loyalty have a positive and significant impact. This is supported by the existence of research that has been researched previously on (Wulandari et al., 2021). In testing the effect size of the existence of service quality in increasing customer satisfaction and customer loyalty has an influence of 0.265 (strong).

4.4 Model fit

Rsquare and Qsquare

Tabel 7. Rsquare and Qsquare

Variables	R ²	Q ²
Customer Satisfaction	0.747	0.731
Customer Loyalty	0.618	0.653

Source : Processed Data (Smart PLS 4.0)

Based on the data above, the Rsquare statistical measure describes the amount of variation in endogenous variables that can be explained by other exogenous or endogenous variables in the model. It can be concluded that the customer satisfaction variable can be influenced or explained by the green logistics and service quality variables by 74.7% (medium) and is influenced by other variables other than the research variables by 25.3%. And loyalty can be influenced or explained by green logistics variables, service quality and customer satisfaction by 61.8% (medium) and is influenced by other variables other than the research variables by 38.2%.

Qsquare describes a measure of predictive accuracy, namely how well each change in exogenous or endogenous variables is able to predict endogenous variables. This measure is a validation in PLS to state the suitability of model predictions. The

Qsquare value above 0 states that the model has predictive relevance, but in (Hair et al., 2019) the qualitative Qsquare interpretation value is 0 (low influence), 0.25 (moderate influence), and 0.50 (high influence). Based on the results of data processing above, the Qsquare value of the customer satisfaction variable is 0.731 (high influence) and customer loyalty is 0.653 (high influence).

5. Conclusion

This research shows that Green Logistics has a positive impact on the customer experience of PT Tiki Jalur Nugraha Ekakurir (JNE). In addition, Service Quality impacts customer satisfaction in a significant way, due to the importance of customer service responsiveness, safety of goods, good service improves customer experience and makes them feel valued. The impact of Green Logistics and Service Quality can increase customer satisfaction. If PT Tiki Jalur Nugraha Ekakurir (JNE) demonstrates a commitment to environmental sustainability, customers will care more about environmental issues and tend to be more satisfied. In addition, if users are satisfied, they will reuse and generate a high level of loyalty among customers, those who use the services of Jalur Nugraha Ekakurir (JNE) will continue to use the services.

6. Implications

Based on the results of the study, it can be concluded that all variables have a significant positive effect both directly and indirectly on the typing of each variable. Based on the above conclusions, in this study the authors provide useful suggestions as follows:

1. Green Logistics has a direct impact on customer satisfaction, and it is expected that Nugraha Ekakurir Line (JNE) can consistently maintain and improve green logistics in the delivery process.
2. Service quality directly on customer satisfaction also needs to be improved, so that the conclusions of this study can be taken into consideration in maintaining and improving the quality of the company's current services.
3. Customer loyalty is directly influenced by customer satisfaction, because satisfied customers will tend to use the Nugraha Ekakurir Line (JNE). Therefore, Nugraha Ekakurir Line (JNE) needs to increase customer satisfaction to attract more customers and make them loyal to Nugraha Ekakurir Line (JNE) services.
4. Green logistics and Service Quality have an indirect impact on loyalty through customer satisfaction, where when these two variables have a positive impact on customer satisfaction. From the satisfaction that customers get, it will affect customer loyalty to the company.

In this case, it becomes a reference that must be considered again green logistics and service quality in the delivery process, with the hope that PT Tiki Jalur Nugraha Ekakurir (JNE) must reconsider the quality of service and environmentally friendly logistics during the delivery process, in the hope of reducing problems that make customers dissatisfied, such as delays in delivery and the use of materials that damage the environment.

7. Research limitations

Overall, PT Tiki Jalur Nugraha Ekakurir (JNE) Jakarta has built customer loyalty well through customer satisfaction which is influenced by green logistics and service quality. However, this study has several limitations that can be used as benchmarks for future researchers to get better research results, namely as follows:

1. This study involves only 100 respondents who use the Nugraha Ekakurir (JNE) delivery service in Jakarta.
2. This study uses only four variables, two of which are free variables namely green logistics and quality of service, one client loyalty-bound variable and customer satisfaction mediation variable.

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