International Proceeding
Tulungagung University
2026

# EFFECTS OF SHIPPING SERVICE QUALITY AND SHIP OPERATIONAL EFFICIENCY ON CUSTOMER SATISFACTION: MEDIATING ROLE OF DELIVERY PUNCTUALITY IN COAL SHIPPING

**Robby Zakharia[1], Melia Eka Lestiani[2],**

[1,2] University of Logistics and International Business Bandung, Indonesia
*robbyzakharia06@gmail.com

**Abstract**

Coal shipping operations face various complex operational challenges, such as delayed departures, inconsistencies estimated arrival times, weather barriers and ship technical constraints that have the potential to reduce customer satisfaction levels. The purpose of this study is to prove whether the timeliness of delivery can be a connecting variable between service quality and operational efficiency regarding customer satisfaction. The research method in this study uses a quantitative design using the PLS-SEM method with support of the SmartPLS 4 application. The research is located in Berau, East Kalimantan with this research sample drawn using purposive sampling techniques and involving 100 respondents from the service users. Primary data collection uses a questionnaire prepared based on a five-level likert scale. The results of the outer model prove that all measurement instruments are valid and reliability. The inner model shows that all hypotheses are accepted ($p<0.05$), where the operational efficiency of the ship and the quality of shipping services have a significant positive effect on customer satisfaction, either directly or indirectly through the mediating effect of delivery punctuality. The results of the $F^2$ test, independent variables have a medium-scale influence on the timeliness of delivery, but all variables only have a small-scale impact on customer satisfaction. The $R^2$ test indicates that customer satisfaction is 37.3% and delivery punctuality is 32.8%. This finding confirms that punctuality is a vital mediator in the coal shipping industry.

**Keywords:** Coal Shipping, Customer Satisfaction, Delivery Punctuality

## 1. INTRODUCTION

The coal shipping industry plays a crucial role in supporting energy distribution as well as industrial needs in Indonesia. As one of the main commodities that support the power generation and manufacturing industry sectors, coal shipping requires an effective, efficient, and timely sea transportation system. In practice, shipping companies are not only required to be able to transport large quantities of cargo, but also provide quality services to maintain consumer satisfaction amid fierce competition in the maritime transportation service sector. Therefore, the quality of shipping services and the operational efficiency of ships are crucial elements that must be considered to ensure the success of the coal distribution process.

Customer satisfaction is one of the indicators of the success of a service company to accommodate customer needs and expectations. According to Kotler and Keller (2016), customer satisfaction is an individual's emotional response, both in the form of satisfaction and dissatisfaction that arises after evaluating the suitability between the performance of the services obtained and previous expectations. Viewed from the aspect of coal shipping, service user satisfaction is influenced by service quality, delivery timeliness, and the company's ability to fulfill operational commitments. Previous research indicates that service quality and operational reliability are related to customer satisfaction levels in the service and logistics sectors (Tandilino et al., 2023).

The quality of sea transportation services plays a crucial role in optimizing customer satisfaction levels. Previous research shows that the SERVQUAL approach is still relevant to measure service quality in the transportation and logistics sectors (Saputra & Rosihan, 2023). That customer satisfaction doesn't just appear on its own, but is a direct result of reliable, customer-focused logistics performance (Lestiani, M. E., & Wardini, K, 2020). In coal shipping, service quality includes clarity of ship schedule information, speed of response to customer needs, ability to handle operational constraints, and consistency of service during the transportation process. In addition to service quality, ship operational efficiency is also an important factor in supporting customer satisfaction. Ship operational efficiency reflects the company's ability to optimize the use of resources to produce effective services with optimal use of time, cost, and energy. In coal shipping, operational efficiency can be seen through fleet optimization, shipping time efficiency, loading and unloading process effectiveness, reduction of idle time, and minimal operational obstacles. Efficient ship operations are expected to be able to increase service reliability and customer satisfaction.

However, coal shipping operations still face various challenges such as delays in ship departures, discrepancies in estimated arrival times, weather barriers, waiting time at the port, and ship technical constraints that can hinder the delivery process. These conditions can affect service quality and reduce customer satisfaction levels. In this regard, the suitability of time in the delivery process is considered as the main factor that connects service quality and operational efficiency regarding the level of customer satisfaction. Delivery time suitability is the company's ability to ensure that goods are received by customers according to the promised time as an important part of logistics and supply chain management (Christopher, 2016). In coal shipping, delivery delays can disrupt customer operations, increase logistics costs, and reduce the level of confidence of service users in the company. On the other hand, timely delivery can form a positive assessment of service users with the quality of the company's services.

To bridge the gap between operational execution and final customer perception, it is essential to understand how service quality and fleet efficiency translate into tangible outcomes. High-quality service and optimized ship operations will only generate significant value if they succeed in guaranteeing delivery punctuality. When logistical constraints occur, punctuality acts as a critical determinant, even if a company possesses excellent administrative service quality, a failure to deliver on time due to operational inefficiencies will ultimately diminish customer satisfaction. Therefore, analyzing delivery punctuality not merely as an

outcome, but as a central mechanism that transfers the benefits of operational efficiency and service quality to the customer, is highly imperative in the context of maritime logistics.

Table 1. Gap Reserarch

| Researcher | Variabel | Object Research | Research Gap |
|---|---|---|---|
| Jati (2021) | Service Quality, Punctuality Time, Satisfaction Passenger | Sea Transportation (Passenger Ship) | Using punctuality as the independent variable and focusing on passengers, not cargo/maritime logistics. |
| Barahama (2022) | Service Quality, Trip Time Accuracy, Loyality | Public Sea Transportation at Batam Port | This model excludes the ship's operational efficiency variable, testing only the direct effects |
| Ade Kurniawan, Melia Eka Lestiani, & Maniah. (2026) | Logistics Service Quality, Customer Satisfaction, Customer Service, Logistic Service Recovery | Expedition Logistic Service Industry | Focused on commercial goods logistics (usually land logistics/regular shipping) |
| Robby Zakharia, Melia Eka Lestiani. (2026) | Shipping Service Quality, Operational Ship Efficiency, Delivery Punctuality, Customer Satisfaction | The maritime industry in coal cargo | Making Delivery Punctuality a mediating (intervening) variable between service quality and ship operational efficiency on customer satisfaction, while specifically focusing on the complexity of maritime logistics for coal commodities. |

Source: Data Processing Results, 2026

Based on Table 1, a research gap is evident in the previous literature. The studies by Jati (2021) and Barahama (2022) predominantly position punctuality as an independent variable and solely test for direct effects without examining the mediating mechanisms. Furthermore, previous research has largely focused on sea transportation passengers or general commercial land logistics/freight services, as seen in the study by Ade Kurniawan et al. (2026). A comprehensive formulation measuring the operational efficiency of specialized energy cargo maritime fleets is still lacking. The current study (Zakharia & Lestiani, 2026) offers novelty by introducing Delivery Punctuality as a mediating variable that bridges of Shipping Service Quality and Operational Ship Efficiency on Customer Satisfaction. In addition to this

conceptual novelty, this study also presents contextual novelty by specifically exploring the coal maritime logistics industry, which involves significantly higher operational complexity, weather challenges, and port queues compared to standard commercial logistics.

## LITERATURE REVIEW

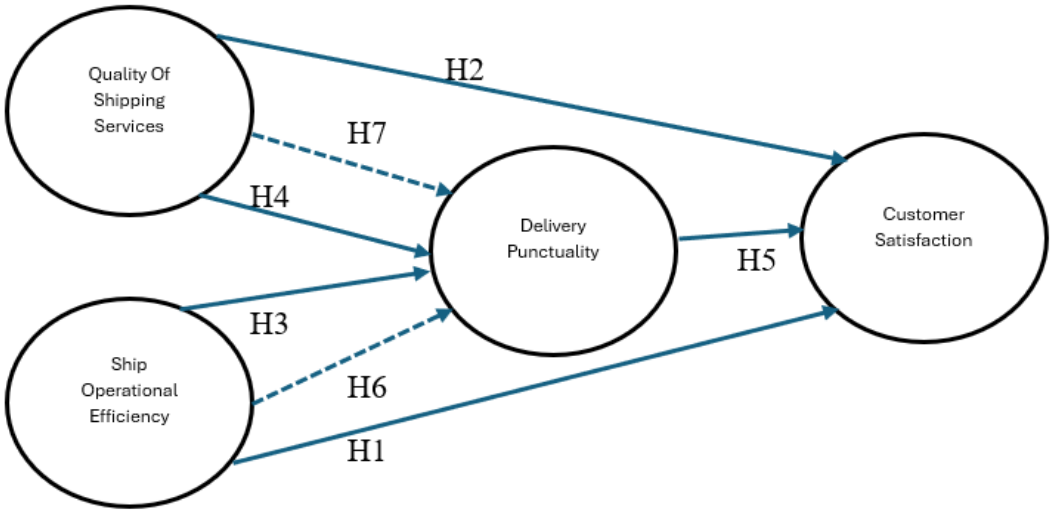
Supply Chain Management Theory is the main theoretical foundation that explains the management of the flow of goods, information, and operational activities in an integrated manner to meet customer needs. (Christoper, 2016) explained that supply chain management is oriented towards value creation through effective, efficient, and responsive logistics process management. In the coal shipping industry, ship transportation activities are an important part of the supply chain involving shipping companies, port management, and service users. The success of the process is not only contingent upon the company's capacity to deliver services, but also by the ship's operational efficiency and delivery timeliness. Therefore, this theory is the basis for explaining the relationship between service quality, ship operational efficiency, delivery timeliness, and service user satisfaction at PT XYZ.

Customer satisfaction is the main key to the success of service companies in meeting the needs and expectations of service users. In the coal shipping industry, service user satisfaction is highly dependent on service quality, delivery timeliness, and fulfillment of the company's operational commitments. (Tandilino et al, 2023) emphasized that service quality and operational reliability have a significant influence on the level of customer satisfaction, especially in the service and logistics sectors. In this study, service user satisfaction is reflected in the suitability of service with expectations, satisfaction with operational performance, fulfillment of delivery schedules, and service users assessment of the overall services provided by PT XYZ. Delivery timeliness is the company capabality to distribute cargo according to the schedule and estimated time that has been agreed upon with service users. (Christopher, 2016) explained that schedule reliability is one of the important aspects of logistics performance. In the shipping of strategic commodities such as coal, delivery delays can disrupt customer operational activities, increase logistics costs, and reduce trust in service providers. On the other hand, timely and consistent delivery can provide certainty for service users in planning their operational activities. Therefore, the timeliness of delivery in this researh is positioned as a mediating variable that links the quality of service and operational efficiency of ships with the satisfaction of service users.

Furthermore, ship operational efficiency acts as a vital pillar in maritime supply chain management, directly complementing service quality. Operational efficiency encompasses the optimal utilization of fleet resources, the minimization of port idle time, and the effective execution of loading and unloading procedures. In the highly dynamic environment of coal shipping, even minor operational inefficiencies can cascade into significant delivery delays. Therefore, by ensuring smooth and efficient vessel operations, shipping companies can secure their delivery timeliness. This intricate dynamic reinforces the core premise of this study, that both service quality and ship operational efficiency do not fulfill customer expectations in isolation, but must strategically culminate in timely deliveries to ultimately achieve and enhance service user satisfaction at PT XYZ.

Relationship Between Variables and Hypothesis Development.

Figure 1. Conceptual Framework




H1: Ship Operational Efficiency significantly and positively influences on Customer Satisfaction. Research by Yan et al. (2024) shows that ship service time is an important indicator of operational efficiency and service quality, because uncertainty of service time can disrupt operational efficiency and cause economic losses.

H2: The Quality of Shipping Services significantly and positively influences on Customer Satisfaction. Research by Chao et al. (2023) in the context of ocean freight forwarders also shows the importance of service quality in shaping customer satisfaction and subsequent customer behavior. Meanwhile, research on logistics services shows that service quality is positively related to customer satisfaction.

H3: Ship Operational Efficiency significantly and positively influences on the Timeliness of Delivery. Russo et al. (2024) explained that ship time at the port is an important characteristic in maritime transportation systems, while Chu et al. (2024) pointed out that the uncertainty of vessel turnaround time can reduce operational efficiency and cause economic losses.

H4: Shipping Service Quality significantly and positively influences on the Timeliness of Delivery. Hsu et al. (2023) found that service success factors include accurate and safe cargo delivery and the provision of port facilities quickly to shorten ship turnaround times. These findings show that the quality of the service process is related to the speed and accuracy of sea transportation activities.

H5: Timeliness Delivery significantly and positively influences on Customer Satisfaction. Timeliness is one of the important aspects of logistics service quality. Khan (2023) found that timeliness is one of the important antecedents of customer satisfaction in logistics services, even becoming the most significant factor compared to several other dimensions of service quality in the context of the study.

H6: Ship Operational Efficiency significantly and positively influences t on Customer Satisfaction through Delivery Punctuality. Ricardianto et al. (2023) found that timeliness has an influence on customer satisfaction and acts as a bridge variable in the correlation between

service factors and customer satisfaction in delivery services. The findings show that the quality or performance of operational processes can produce customer satisfaction through the company's ability to deliver timely delivery. Thus, improved ship operational efficiency is expected to be able to increase delivery timeliness, which ultimately increases customer satisfaction.

H7: Shipping Service Quality significantly and positively influences on Customer Satisfaction through Delivery Timeliness. The quality of shipping service can be seen as a factor that affects customer satisfaction through the company's ability to provide reliable service and in accordance with promises to customers. In research on logistics service quality, timeliness is one of the important dimensions related to customer satisfaction. Prassida et al. (2024) found that the dimension of logistics service quality, including timeliness, has a positive and significant conection with customer satisfaction.

## RESEARCH METHOD

The researcher used a quantitative design using the PLS-SEM method with the support of the SmartPLS 4 application. This study was conducted in Berau Regency, East Kalimantan Province, with respondents taken from shipping service users. There are two stages in this study, namely external model testing to test the validity and reliability of the instrument, and inner model testing using direct influence tests, indirect influence tests, $F^2$ and $R^2$. In this study, sampling was done using purposive sampling techniques, with respondents deliberately selected based on certain criteria or special considerations. The population in this study involved parties who interact directly in the operational process of coal shipment, with a research sample of 100 respondents consisting of 100 people from shipping service users. The primary data collection process in the field was carried out through the distribution of questionnaires whose measurements used likert scale instruments 1-5. The determination of the minimum sample size in this study is based on a combination of expert guidelines to ensure the reliability of the Partial Least Squares (PLS-SEM) analysis results. Based on the guidelines by Hair et al. (2019), for a basic research model, a minimum sample size of 100 respondents is considered sufficient to achieve stable model estimation. This view is reinforced by more recent literature from Memon et al. (2020), which asserts that as a rule of thumb, a minimum sample of 100 respondents is widely acceptable in SEM-based survey research to ensure meaningful results and avoid bias. Therefore, the sample size used in this study was set at 100 respondents. Results of the measurement of the outer model test with reflective indicators were tested using 3 criteria, namely convergent validity, discriminant validity, and reliability. Meanwhile, the inner model test was tested using criteria, namely direct influence, indirect influence, $F^2$ and $R^2$.

### Outer Model Test

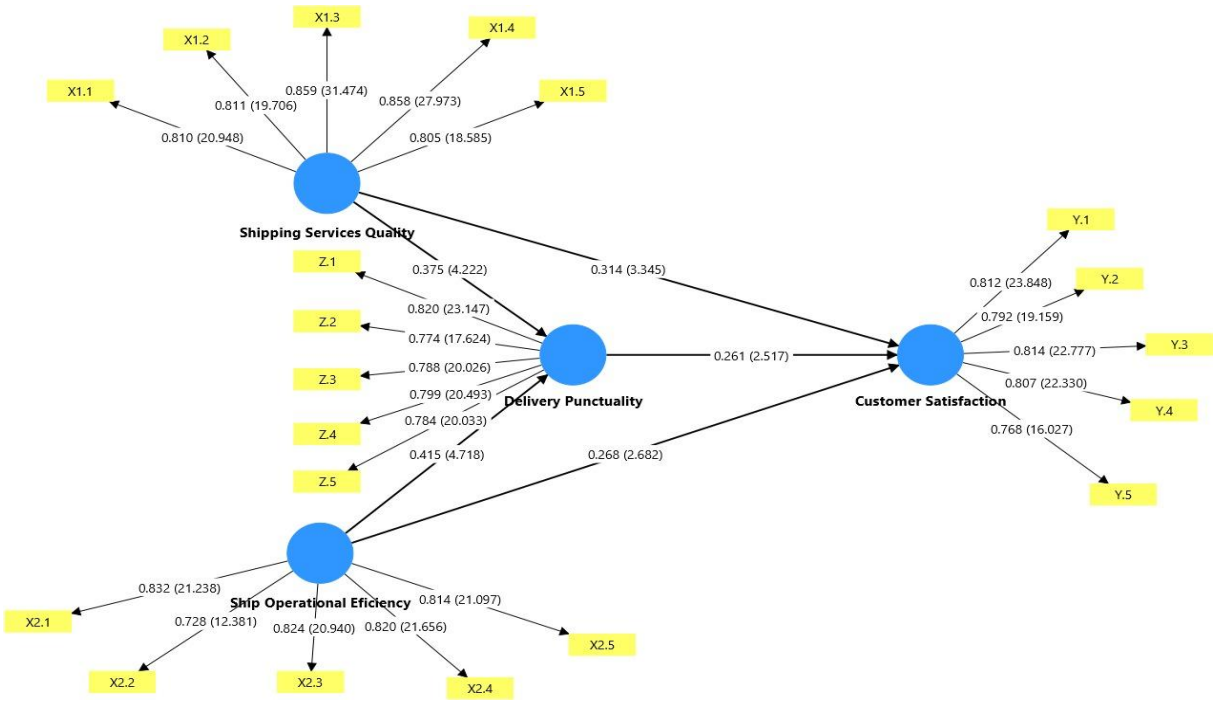
Convergent validity, The output results of outer loading show all indicators have met the criteria for convergent validity, which is evidenced by the absence of indicator items that have a loading factor below 0.7.

Table 2. Result Outer Loading

| Variabel | Indicator | Outer Loading |
|---|---|---|
| Shipping Service Quality | X1.1 | 0.810 |
| | X1.2 | 0.811 |
| | X1.3 | 0.859 |
| | X1.4 | 0.858 |
| | X1.5 | 0.805 |
| Ship Operational Eficiency | X2.1 | 0.832 |
| | X2.2 | 0.728 |
| | X2.3 | 0.824 |
| | X2.4 | 0.820 |
| | X2.5 | 0.814 |
| Delivery Punctuality | Z.1 | 0.820 |
| | Z.2 | 0.774 |
| | Z.3 | 0.788 |
| | Z.4 | 0.799 |
| | Z.5 | 0.784 |
| Customer Satisfaction | Y.1 | 0.812 |
| | Y.2 | 0.792 |
| | Y.3 | 0.814 |
| | Y.4 | 0.807 |
| | Y.5 | 0.768 |

Source: Data Processing Results, 2026

Figure 1. Bootsrap Test Results



Discriminant validity, results of the analysis show that the square root of the AVE listed on the diagonal line is higher than the correlation coefficient between other variables. These findings confirm that the research instrument has succeeded in meeting the requirements of discriminant validity according to Fornell-Larcker.

Table 3. Result Fornell-Larcker Criterion

| **Variabel** | Shipping Service Quality | Ship Operational Eficiency | Customer Satisfaction | Delivery Punctuality |
|---|---|---|---|---|
| Shipping Service Quality | 0.829 | | | |
| Ship Operational Eficiency | 0.805 | 0.805 | | |
| Customer Satisfaction | 0.432 | 0.397 | 0.799 | |
| Delivery Punctuality | 0.396 | 0.434 | 0.502 | 0.793 |

Source: Data Processing Results, 2026

The table demonstrates that all Heterotrait-Monotrait Ratio values are below 0.90. Consequently, the research model formed by the four variables achieves satisfactory discriminant validity.

Table 4. Result HTMT

| **Variabel** | Shipping Service Quality | Ship Operational Eficiency | Customer Satisfaction | Delivery Punctuality |
|---|---|---|---|---|
| Shipping Service Quality | | 0.111 | 0.491 | 0.451 |
| Ship Operational Eficiency | | | 0.453 | 0.498 |
| Customer Satisfaction | | | | |
| Delivery Punctuality | | | 0.582 | |

Source: Data Processing Results, 2026

Reliability test, Based on the reliability test table, the Cronbach's Alpha and Composite Reliability values for all constructs surpass the 0.70 threshold. Thus, it can be concluded that the entire study construct is reliable and has high consistency.

Table 5. Reliability Test Results

| Variabel | Cronbach 's Alpha | Composite Reability (rho_a) | Composite Reability (rho_c) |
|---|---|---|---|
| Shipping Service Quality | 0.886 | 0.891 | 0.917 |
| Ship Oerational Eficiency | 0.864 | 0.872 | 0.902 |
| Delivery Punctuality | 0.858 | 0.862 | 0.898 |
| Customer Satisfaction | 0.853 | 0.855 | 0.894 |

Source: Data Processing Results, 2026

Inner Model Test

Direct Effect, Based on the results of hypothesis testing, all research variables showed a positive and significant corelation with a p-value of less than 0.05. Ship operational efficiency and shipping service quality were proven to have a positive effect on the timeliness of delivery and customer satisfaction. In addition, the timeliness of delivery also had a significantly and positively influences on on customer satisfaction.

Table 6. Result Direct Effect

| Variabel | Original sample | Sample mean | Standard deviation | T Statistics | P Values |
|---|---|---|---|---|---|
| SOE→CS | 0.268 | 0.274 | 0.100 | 2.682 | 0.007 |
| SOE →DP | 0.415 | 0.420 | 0.088 | 4.718 | 0.000 |
| DP→CS | 0.261 | 0.261 | 0.104 | 2.517 | 0.012 |
| SSQ→CS | 0.314 | 0.318 | 0.094 | 3.345 | 0.001 |
| SSQ→DP | 0.375 | 0.384 | 0.089 | 4.222 | 0.000 |

Source: Data Processing Results, 2026

Indirect Effect, Based on the test results, the timeliness of delivery was proven to be able to mediate positively and significantly the relationship between ship operational efficiency and shipping service quality on customer satisfaction. This is shown by the indirect influence of ship operational efficiency with an original sample value of 0.108 and a p-value of 0.031, as well as the quality of shipping services with an original sample value of 0.098 and a p-value of 0.047. Both relationships have a p-value of less than 0.05.

Table 7. Hasil Indirect Effect

| Variabel | Original sample | Sample mean | Standard deviation | T Statistics | P Values |
|---|---|---|---|---|---|
| SOE→DP→CS | 0.108 | 0.109 | 0.050 | 2.152 | 0.031 |
| SSQ→DP→CS | 0.098 | 0.102 | 0.049 | 1.987 | 0.047 |

Source: Data Processing Results, 2026

Result of $F^2$

a. Ship Operational Efficiency has a small size effect on Customer Satisfaction. This finding is evidenced by an $f^2$ value of 0.091.

b. Ship Operational Efficiency has a medium size effect on Punctuality. This finding is evidenced by an $f^2$ value of 0.256.

c. Delivery Punctuality has a small size effect on Customer Satisfaction. This finding is evidenced by an f2 value of 0.073.

d. Quality of Shipping Service has a small size effect on Customer Satisfaction. This finding is evidenced by an f2 value of 0.130.

e. Quality of Shipping Services has a medium size effect on Punctuality. This finding is evidenced by an f2 value of 0.209.

Result of $R^2$

a. The variables of Ship Operational Efficiency, Delivery Timeliness, and Shipping Service Quality together were able to explain Customer Satisfaction of 37.3%. This finding was evidenced by an R2 value of 0.373.

b. The variables of Ship Operational Efficiency and Shipping Service Quality were able to explain the Timeliness of Delivery by 32.8%. This finding was evidenced by an R2 value of 0.328.

Table 8. $F^2$ Test Results

| Variabel | X1 | X2 | Z | Y |
|---|---|---|---|---|
| Shipping Service Quality | | | 0.209 | 0.130 |
| Ship Operational Eficiency | | | 0.256 | 0.091 |
| Delivery Punctuality | | | | 0.073 |
| Customer Satisfaction | | | | |

Source: Data Processing Results, 2026

Table 9. $R^2$ Test Results

| Variabel | R2 | $R^2$ Adjusted |
|---|---|---|
| Customer Satisfaction | 0.373 | 0.353 |
| Delivery Punctuality | 0.328 | 0.315 |

Source: Data Processing Results, 2026

## RESULT AND DISCUSSION

The results of the study show that the quality of service and the operational efficiency of ships have a positive and significant influence on the timeliness of delivery and the satisfaction of service users at PT XYZ. These findings indicate that the company's ability to provide responsive, consistent, and in accordance with the needs of service users, as well as effective ship operational management, is an important factor in supporting the success of coal transportation activities. These results are in line with the Service Quality Theory in the research of Saputra & Rosihan (2023), which emphasizes the importance of service quality in meeting customer expectations, and the Operations Management Theory from Heizer et al. (2017), which explains that optimal management of resources and operational processes can improve company performance. In addition, the timeliness of delivery has been proven to play a conecting variable in the conection between service quality and ship operational efficiency to service user satisfaction. This shows that quality service and efficient ship operations not only have a direct influence on satisfaction, but also through the company's ability to meet delivery schedules in accordance with agreements. This finding strengthens the concept of Logistics Performance Theory from Christopher (2016), which places time reliability as one of the important aspects in logistics performance. Practically, the results of this study show that PT XYZ needs to improve the effectiveness of operational management through periodic fleet rejuvenation, optimization of schedules and crew readiness, and improved ship maintenance to minimize the risk of technical obstacles that can cause delivery delays. In addition, improving the competence of the customer service team in conveying information about the ship's position and estimated time of arrival or Estimated Time of Arrival (ETA) needs to be a concern to maintain information transparency and trust of service users. However, this study has limitations because it only focuses on one company, namely PT XYZ, in the context of the coal commodity shipping industry. Therefore, results of the study cannot necessarily be generalized to other shipping companies that have different operational characteristics, business scale, shipping routes, and types of cargo. Further research is recommended to expand the research object on several shipping companies and different types of commodities and consider other variables that have the potential to affect the timeliness of delivery and satisfaction of service users.

## CONCLUSION

Based on the results of the research, it can be concluded that the quality of service and operational efficiency of ships are important factors in increasing the satisfaction of service users in the coal shipping industry at PT XYZ. Good service quality through clarity of information, speed of response, and consistency of service, as well as ship operational efficiency through fleet optimization, operational time control, and minimization of technical obstacles, play a role in supporting the timeliness of delivery. In addition, the timeliness of delivery has an important fuction as a conecting variable that connects quality of service and operational efficiency of ships with the satisfaction of service users. This shows that the satisfaction of service users is not only determined by the quality of service and operational performance directly, but also by the company's ability to meet delivery schedule commitments. Therefore, PT XYZ needs to continue to improve service quality, optimize fleet management, strengthen ship maintenance, and improve coordination and communication with service users to maintain delivery reliability and increase customer satisfaction. Further research is suggested to expand the scope of research objects on shipping companies and different types of commodities so that the results of the research can provide a broader picture of the factors that affect the satisfaction of service users in the shipping industry.

## REFERENCES


Chao, S.-L., Yu, M.-M., & Sun, Y.-H. (2023). Ascertaining the effects of service quality on customer loyalty in the context of ocean freight forwarders: An integration of structural equation modeling and network data envelopment analysis. Research in Transportation Business & Management, 47, 100955.

Chu, Z., Yan, R., & Wang, S. (2024). Vessel turnaround time prediction: A machine learning approach. Ocean & Coastal Management, 249, 107021.

Christopher, M. (2016). Logistics & supply chain management (5th ed.). Pearson Education.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning.

Heizer, J., Render, B., & Munson, C. (2017). Operations management: Sustainability and supply chain management (12th ed.). Pearson Education.

Hsu, C.-T., Chou, M.-T., & Ding, J.-F. (2023). Key factors for the success of smart ports during the post-pandemic era. Ocean & Coastal Management, 233, 106455.

Khan, M. Z. (2023). A study of logistics service quality dimensions impacting customer satisfaction in instant food delivery: The Indian perspective. International Journal of Logistics Economics and Globalisation, 10(2), 109–123.

Kotler, P., & Keller, K. L. (2016). Marketing management (15th ed.). Pearson Education.

Lestiani, M. E., & Wardini, K. (2020). Pengaruh Logistics Service Quality Terhadap Kepuasan Pelanggan (Studi Kasus Pada Pelanggan J&T Express di Kota Bandung). Jurnal Logistik Bisnis, 10(2), 52-59.

Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, *4*(2), 1-20

Natalia, R., & Sutawidjaya, A. H. (2024). Impact of consumer motivation and behavior on social Instagram media platforms Somethinc skincare purchases. Jurnal Ilmiah Manajemen Kesatuan, 12(5), 1531–1548.

Prassida, G. F., Munawaroh, H., & Yani, R. A. W. (2024). The distinctive role of satisfaction in bridging the relationship between logistics service quality and behavioral intentions. Procedia Computer Science, 234, 1313–1321.

Ricardianto, P., Kurniawan, I. A., Ikawati, I., Gutomo, T., Sijabat, E. A. S., Mahadita, A., Kusuma, I. G. N. A. E. T., Tursilarini, T. Y., Murtiwidayanti, S. Y., & Endri, E. (2023). Service quality and timeliness: Empirical evidence on the parcel delivery service in Indonesia. Uncertain Supply Chain Management, 11, 1645–1656.

Russo, F., Pedà, G., & Musolino, G. (2024). Attributes influencing port times of container ships. WMU Journal of Maritime Affairs, 23, 375–392.

Saputra, Y., & Rosihan, R. I. (2023). Analisis kualitas pelayanan dengan metode SERVQUAL dan IPA: Studi kasus di Bengkel CV Nusantara Motor. Jurnal Teknologi dan Manajemen, 21(2), 103–112.

Tandilino, E. V., Widada, D., & Sitania, F. D. (2023). Pengukuran tingkat kepuasan pelanggan terhadap jasa pelayanan dengan metode SERVQUAL dan Customer Satisfaction Index (CSI). Journal of Industrial and Manufacture Engineering, 7(2), 266–275.

Yan, R., Chu, Z., Wu, L., & Wang, S. (2024). Predicting vessel service time: A data-driven approach. Advanced Engineering Informatics, 62, 102718.