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The Effect of Service Quality and Ship Pilotage Service Prices on Service User Loyalty through User Satisfaction at PT Pertamina (Persero) Tanjung Uban Terminal

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Abstract: As a maritime country, Indonesia has great potential for developing maritime transportation, with port services, especially ship pilotage services, being a strategic element in ensuring safety and operational smoothness. This study was conducted at PT Pertamina (Persero) Tanjung Uban Terminal, which plays a vital role in the distribution of fuel and other products. Despite its strategic position, various challenges were identified, such as delays in pilot response times, lack of coordination, inconsistent implementation of standard operating procedures (SOPs), and perceptions of imbalance between costs and service quality. These issues have led to low user satisfaction and loyalty, although some users continue to use the service due to limited alternatives. This study aims to analyze the influence of service quality and pilotage service pricing on user loyalty through satisfaction as an intervening variable. A quantitative approach was used with Structural Equation Modeling based on Partial Least Squares (SEM-PLS) and 79 respondents. The analysis tested both direct and indirect relationships among the variables. The results show that the competence of crossing guards significantly influences both safety and user discipline. Discipline also plays a proven role in improving safety. Conversely, the functionality of safety equipment did not show a significant direct influence on either discipline or safety. Discipline was found to mediate the relationship between guard competence and safety, but not between equipment functionality and safety.

Keyword: Service Quality, Price, Faciites, Loyalty, Satisfaction.

INTRODUCTION

Indonesia, as an archipelagic and maritime nation, holds a strategic position in the development of maritime transportation as one of the main foundations supporting interregional connectivity, the distribution of goods and energy, passenger mobility, and the sustainability of national economic activities. Indonesia's geographical conditions, consisting of thousands of islands, make maritime transportation an indispensable component of the national logistics

system, particularly in ensuring the smooth distribution of goods between islands and supporting industrial activities that depend on reliable supply through sea routes.

Within the maritime transportation system, ports serve not only as places where ships berth, load and unload cargo, and embark and disembark passengers, but also as strategic nodes connecting various transportation activities and economic operations. A port is an area consisting of land and water zones with defined boundaries that are designated for the implementation of governmental activities and port-related business activities (Sahara & Pradana, 2021). The operation of ports is supported by various facilities for navigation safety and security, as well as supporting infrastructure that enables ships to conduct their operations safely, effectively, and efficiently. Therefore, the success of a port is determined not only by the availability of physical infrastructure but also by the quality of services provided to users. Port services encompass various types of ship-related services, including anchorage, berthing, pilotage, towage, navigation, and bunkering services, as well as cargo services such as terminal and storage services. Each type of service has a distinct function, yet they are interconnected in forming an integrated port service system. The quality of each link in the service chain determines the smoothness of overall ship operations. Consequently, inefficiencies in any particular service may result in delays, increased waiting times, higher operational costs, and disruptions to the distribution of goods and energy.

One of the ship services with a high level of importance and risk is ship pilotage or pilotage service. Pilotage is a service provided by a marine pilot to assist the master in directing, controlling, and maneuvering a vessel within specific waters that have particular characteristics and require specialized expertise and local knowledge (Muchsin, 2021). The role of the marine pilot is crucial because the waters surrounding each port have different characteristics, including water depth, currents, tides, channel conditions, weather, vessel traffic density, and vessel maneuvering characteristics.

In this context, pilotage service is not merely an administrative or routine operational service, but an integral component of the maritime safety system and the efficiency of port operations. The effectiveness of the pilotage process determines the ability of vessels to enter, depart, shift, and maneuver within port areas safely and on schedule. Delays or inaccuracies in providing pilotage services may create a cascading effect on other vessel activities, including increased waiting times, delays in loading and unloading operations, disruptions to vessel arrival and departure schedules, and increased operational costs for shipping companies and service users. Therefore, the quality of pilotage services should be regarded as one of the important indicators for assessing the overall performance of port services.

From a service management perspective, service quality refers to the ability of a service provider to meet customers' needs and expectations by delivering services that are reliable, responsive, accurate, safe, professional, and capable of providing a consistent service experience. Service quality is particularly important in ship pilotage services because service users consider not only the final outcome, namely the vessel's ability to enter or depart from the port, but also the service process they experience. This includes the responsiveness of personnel, timeliness of service, coordination among relevant parties, clarity of information, professionalism of personnel, availability of communication facilities, and the service provider's ability to handle complaints.

Good service quality creates positive perceptions and strengthens users' confidence in the competence of the service provider. Conversely, slow, inconsistent, poorly communicated services that fail to respond appropriately to users' needs can create negative perceptions and reduce their level of trust. In the port industry, which is highly dependent on timeliness and safety, service quality has even broader implications because it is closely related to supply chain efficiency, vessel operating costs, terminal productivity, and the continuity of strategic commodity distribution.

The issue of service quality is particularly relevant to be examined at the Tanjung Uban Terminal of PT Pertamina (Persero), which plays an important role in supporting the distribution of fuel and various other products. As a terminal supporting energy distribution activities, the smooth movement of vessels is an essential element in ensuring the continuity of operational activities. In this context, ship pilotage services play a crucial role in supporting the safety and smooth operation of vessels as they enter and depart from the terminal and maneuver within the terminal area. However, based on the empirical conditions underlying this study, ship pilotage services at Tanjung Uban Terminal continue to face several issues that may affect service users' perceptions.

Several issues have been identified, including delays in the response of marine pilots to service requests, suboptimal coordination between marine pilots and relevant parties, limited communication facilities, and inconsistent implementation of standard operating procedures. These issues may create uncertainty in the service process and potentially increase vessel waiting times. In port operations, waiting time is a highly sensitive factor because delays of even a few minutes or hours can have consequences for vessel schedules, the utilization of terminal facilities, fuel costs, labor costs, and the overall logistics process. Therefore, the speed and accuracy of marine pilots' responses are not merely matters of customer service, but also constitute an important aspect of efforts to improve operational efficiency and maintain the continuity of terminal activities.

In addition to service quality, the price of pilotage services is another factor that needs to be considered in understanding service users' behavior. In the context of services, price is not merely viewed as the amount of money that customers are required to pay, but also as an indicator of the value they receive from the service provided. Users' perceptions of price fairness may be shaped by comparing the costs incurred with the quality, benefits, safety, timeliness, and convenience of the services received. Although pilotage service tariffs are determined based on applicable regulations, service users may still have different perceptions regarding the fairness and proportionality of the costs charged.

Problems may arise when users perceive that the costs they pay are not commensurate with the quality of service received, particularly when delays occur, coordination is ineffective, information is insufficient, or the service fails to meet their expectations. Under such conditions, price perception may become one of the determinants of user satisfaction. A price that is perceived as fair and consistent with the benefits received tends to increase satisfaction, whereas a price perceived as excessively high in relation to the benefits of the service may lead to dissatisfaction. Therefore, the analysis of service quality cannot be entirely separated from price perception, as both aspects jointly shape users' evaluations of the value of the services they receive.

The empirical conditions at Tanjung Uban Terminal indicate a gap between service users' expectations and the actual services received. Based on the preliminary data obtained, relatively high levels of dissatisfaction were identified across several service indicators. Regarding the responsiveness of marine pilots, 42% of users stated that they were very dissatisfied, while 30% reported being dissatisfied. For the indicator of coordination among personnel during the pilotage process, 38% of respondents stated that they were very dissatisfied and 35% were dissatisfied. Furthermore, the indicator concerning the appropriateness of service costs in relation to service quality showed an even higher level of dissatisfaction, with 45% of respondents stating that they were very dissatisfied and 28% dissatisfied. Regarding the clarity of information about service schedules and procedures, 36% of respondents stated that they were very dissatisfied and 33% dissatisfied. Meanwhile, concerning the ease of submitting complaints, 40% of respondents reported being very dissatisfied and 27% dissatisfied. These data indicate that service-related issues are not limited to the technical aspects of pilotage operations but also encompass communication, responsiveness, transparency, and perceptions of service value. The high percentage of dissatisfaction across several indicators highlights the

need for a more systematic evaluation of pilotage service quality and the price factors perceived by service users.

User dissatisfaction may subsequently affect customer loyalty. Customer loyalty is an important indicator of the sustainability of the relationship between service providers and service users. In the context of ship pilotage services, loyalty is reflected not only in the repeated use of services but also in users' willingness to maintain business relationships, provide positive recommendations, demonstrate trust in the service provider, and remain with the provider despite the availability of alternative services. Strong loyalty is essentially formed through positive and consistent service experiences over time. When users receive services that meet their expectations, perceive the costs paid as commensurate with the benefits received, and receive prompt and professional responses when encountering problems, the likelihood of developing satisfaction and loyalty increases. Conversely, repeated negative experiences may lead to decreased trust, increased complaints, and a greater tendency to consider alternative service providers or ports. In the context of Tanjung Uban Terminal, challenges to user loyalty are reflected in complaints regarding delayed responses, ineffective coordination, and an imbalance between service costs and service quality. Although some users continue to utilize the services due to operational requirements, contractual relationships, or limited alternatives, such continued use does not necessarily indicate strong affective loyalty. In other words, continued service utilization does not always demonstrate that users have high levels of satisfaction and loyalty.

In this context, user satisfaction holds a crucial position because it can function as a mechanism that mediates the effects of service quality and price on loyalty. Satisfaction is essentially the user's evaluation after comparing their expectations before receiving the service with the actual service performance experienced. When service performance meets or exceeds expectations, users tend to experience satisfaction, whereas when performance falls below expectations, users are likely to experience dissatisfaction. Therefore, good service quality and a price perceived as fair do not necessarily generate loyalty automatically without a satisfactory service experience. Satisfied service users are more likely to maintain relationships with service providers, reuse the services, provide recommendations, and demonstrate greater tolerance toward changes in service conditions. In the context of ship pilotage services, satisfaction may be established when users receive services that are fast, safe, timely, communicative, professional, and commensurate with the costs paid. Thus, user satisfaction can be regarded as an intervening variable that explains the process through which service quality and price ultimately influence service user loyalty.

The urgency of this research is further strengthened by the characteristics of the maritime industry, which demand high levels of safety, timeliness, and operational reliability. Delays or failures in pilotage services may have more significant consequences than those associated with services in general because they are directly related to vessel operations, navigational safety, terminal facility utilization, and the smooth functioning of the supply chain. In the context of a terminal supporting energy distribution, disruptions to vessel operations may have broader implications for the continuity of distribution and operational efficiency. Therefore, terminal management needs to empirically understand the factors influencing service user satisfaction and loyalty so that service quality improvement strategies can be directed toward aspects that users genuinely perceive as important. Evaluation of service quality should also encompass human resource aspects, particularly the competence and professionalism of marine pilots, because their ability to maneuver vessels and communicate effectively with relevant parties is critical to the quality of the user experience. In addition, the availability of adequate communication and navigation facilities should be an integral part of service quality improvement efforts to support rapid responses and effective coordination.

Several previous studies have examined the relationships among service quality, price, satisfaction, and customer loyalty across various service industries. Research on ship pilotage

service quality has demonstrated a relationship between service quality and service user satisfaction, while other studies in the service sector have shown that price perceptions can influence customer satisfaction (Wijaya, 2022). However, limitations remain in previous research, particularly with regard to research contexts and the integration of variables. Most studies on satisfaction and loyalty have been conducted in general service sectors, such as transportation, banking, retail, and public services, while studies specifically addressing ship pilotage services at industrial terminals remain relatively limited. Port-related research has also tended to focus on cargo handling services, port facilities, logistics performance, and physical services, whereas pilotage services as navigation services characterized by high safety requirements and operational risks have received comparatively limited attention. Furthermore, previous studies have generally examined the effects of service quality on satisfaction or loyalty separately and have rarely integrated service quality and price as independent variables, satisfaction as an intervening variable, and loyalty as a dependent variable within a single comprehensive research model. These limitations indicate the existence of a research gap that needs to be addressed through research that considers the specific characteristics of ship pilotage services at industrial terminals.

Based on these conditions, this study is directed at analyzing the effects of ship pilotage service quality and price on service user loyalty, with user satisfaction as an intervening variable at the Tanjung Uban Terminal of PT Pertamina (Persero). The research model is based on the assumption that service quality and price are factors that shape users' perceptions of service value, which subsequently influence satisfaction and encourage the development of loyalty. In this study, service quality represents the service provider's ability to deliver services that are fast, accurate, safe, professional, responsive, and consistent, while price represents users' perceptions of the fairness and appropriateness of the costs relative to the benefits of the services received. Satisfaction is positioned as an intervening variable that reflects users' evaluations after comparing their expectations with actual service performance, while loyalty represents users' tendency to maintain their relationship with the service provider and reuse pilotage services. Through this model, the study seeks not only to determine whether service quality and price influence loyalty but also to explain the extent to which these effects occur through user satisfaction.

Academically, this study is expected to contribute to the development of service management literature, particularly within the context of port services and ship pilotage, which possess characteristics that differ from those of conventional consumer services. The integration of service quality, price, satisfaction, and loyalty within a single model is expected to broaden understanding of the mechanisms underlying loyalty formation among users in the maritime service sector. Practically, the findings are expected to provide a basis for evaluating the management of the Tanjung Uban Terminal of PT Pertamina (Persero) in developing strategies to improve pilotage service quality, particularly by accelerating personnel responses, strengthening coordination among relevant agencies and personnel, improving information clarity, ensuring consistent implementation of SOPs, enhancing communication and navigation facilities, and increasing transparency and perceptions of service price fairness. Improvements in these areas are expected to reduce the gap between service users' expectations and their actual experiences, increase satisfaction, strengthen trust, and ultimately build sustainable user loyalty. Therefore, this study is not only relevant to addressing pilotage service issues at Tanjung Uban Terminal but also has strategic value in supporting competitiveness, operational efficiency, navigational safety, and sustainable relationships between port service providers and service users within Indonesia's maritime industry.

METHOD

This study employs a quantitative approach using a survey method to analyze the effects of service quality and ship pilotage service prices on service user loyalty, with user satisfaction

as an intervening variable at the Tanjung Uban Terminal of PT Pertamina (Persero). The study was conducted at the Tanjung Uban Integrated Terminal, Riau Islands, which holds a strategic position due to its proximity to Singapore, one of the major trading hubs in the Asian region. The terminal plays an important role in supporting energy distribution activities, particularly fuel and LPG, for both domestic and international needs. Covering an area of approximately 247 hectares, the terminal is equipped with seven berths, fuel storage capacity of 400,000 KL, LPG storage capacity of 93,500 MT, as well as blending and distribution facilities for biodiesel, gasoline, and kerosene to several regions across Indonesia. These operational characteristics make Tanjung Uban Terminal a relevant research setting for examining the quality of ship pilotage services, as the smooth movement of vessels is directly associated with safety, timeliness, and the continuity of energy distribution. The study population consists of all users of ship pilotage services at Tanjung Uban Terminal, totaling 367 individuals, including commercial ship pilotage service users and parties directly involved in port activities, such as ship operators, shipping agents, and other relevant personnel. The sample was determined using purposive sampling based on the characteristics and relevance of respondents to the research objectives (Rahim, 2020).

The sample size was determined using the Slovin formula (Ramadhani & Bina, 2021) with a 10% margin of error, resulting in 78.58 respondents, which was rounded to 79 respondents. Data were collected through observation, a literature review, and questionnaire distribution. Observation was conducted to obtain direct information regarding the conditions and activities of ship pilotage services in the field (Sugiarto, 2022), while the literature review was used to strengthen the theoretical foundation and obtain secondary information from scientific journals, books, and other relevant academic sources. The questionnaire served as the primary instrument for collecting primary data from respondents and was distributed both directly and online through Google Forms in coordination with the terminal management (Zulkarnain et al., 2019). The research instrument was designed to measure four main constructs: service quality, price, user satisfaction, and service user loyalty.

Service quality was operationalized through five dimensions: reliability, responsiveness, assurance, empathy, and tangibles (Berry & Parasuraman, 1998). Price was measured based on price affordability, price suitability in relation to service quality, price competitiveness, and price suitability in relation to the benefits received by users (Sudaryanto et al., 2024). User satisfaction was measured through satisfaction with service access, ease of obtaining services, service processes, and overall service performance (Kusuma et al., 2015). Meanwhile, service user loyalty was measured through purchase intention, word of mouth, price sensitivity, and complaining behavior (Almana et al., 2018). All indicators were incorporated into the research instrument to obtain an empirical representation of users' perceptions of ship pilotage services and the relationships among the research variables.

Data analysis was conducted using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) method with the assistance of SmartPLS software. PLS-SEM was selected because of its ability to simultaneously analyze relationships among latent variables, evaluate measurement and structural models, and accommodate research models involving multiple latent constructs and reflective indicators (Prayitno, 2021). Evaluation of the measurement model, or outer model, was conducted through tests of convergent validity, discriminant validity, and construct reliability. Convergent validity was assessed using factor loading values and Average Variance Extracted (AVE), while discriminant validity was evaluated through cross-loading values and comparison of the square root of AVE with correlations among constructs. Construct reliability was assessed using Cronbach's Alpha and Composite Reliability, with values required to meet the established acceptance thresholds.

After the measurement model met the validity and reliability criteria, the analysis proceeded to the evaluation of the structural model, or inner model, to determine the ability of exogenous constructs to explain endogenous constructs. The inner model was evaluated by

examining R-square, Q-square, path coefficients, and the significance of relationships among variables through the bootstrapping procedure. The R-square value was used to assess the proportion of variance in endogenous constructs explained by exogenous constructs, while Q-square was used to assess the predictive relevance of the model. Path coefficient and significance testing were conducted to determine the direct effects of service quality and price on user satisfaction and loyalty, as well as to examine the mediating effect of satisfaction on the relationships between service quality and price and service user loyalty. Through this research design, the study enables a comprehensive examination of the relationships among service quality, price, satisfaction, and loyalty among ship pilotage service users, thereby providing empirical evidence regarding the factors that determine the sustainability of relationships between service users and service providers at the Tanjung Uban Terminal of PT Pertamina (Persero).

RESULTS AND DISCUSSION

This study involved 79 ship pilotage service users at PT Pertamina (Persero) Tanjung Uban Terminal who met the criteria established for research respondents. The characteristics of the respondents indicate that most were directly involved in vessel operational activities. In terms of position, the respondents were predominantly vessel officers, consisting of Chief Officers and Chief Engineers, with 21 respondents (27%), followed by shipping operational staff with 19 respondents (24%), vessel operations supervisors with 16 respondents (20%), vessel masters with 13 respondents (16%), and heads of logistics/shipping divisions with 10 respondents (13%). In terms of experience using ship pilotage services, the largest group had more than five years of experience, comprising 31 respondents (39%), followed by those with 1–3 years of experience with 23 respondents (29%), 3–5 years of experience with 20 respondents (25%), and less than one year of experience with 5 respondents (6%). Meanwhile, based on the types of vessels operated, the majority of respondents were operators of LNG/LPG vessels, totaling 35 respondents (44%), followed by tanker vessels with 21 respondents (27%), supply vessels with 13 respondents (16%), tugboats with 7 respondents (9%), and cargo vessels with 3 respondents (4%). This composition indicates that the majority of respondents possessed relevant experience and operational involvement in ship pilotage activities, providing them with adequate capacity to assess service quality, price perceptions, satisfaction, and service user loyalty. The dominance of respondents operating LNG/LPG vessels and tankers also indicates that pilotage services at Tanjung Uban Terminal are associated with vessel types characterized by relatively high operational complexity and safety risks. Consequently, aspects such as reliability, responsiveness, assurance, professionalism, and service accuracy become increasingly important in determining the quality of pilotage services.

Table 1 Results of the Service Quality Validity Test

Variable/Dimension/Indicator	Loading Factor	Description
Tangible		
Pilotage facilities and infrastructure are in good and well-maintained condition	0,746	Valid
Responsiveness		
Pilotage personnel respond promptly to requests for additional services	0,749	Valid
Reliability		
Pilotage services are always provided according to the agreed schedule	0,778	Valid

Assurance		
Personnel provide clear explanations regarding pilotage procedures	0,790	Valid
Empathy		
Pilotage personnel understand the specific needs of user vessels	0,797	Valid

Source: Data Processing Results Using SmartPLS 4.0

The measurement model was evaluated using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS. The results indicate that the research instrument generally meets the established validity and reliability criteria. The factor loading values for the service quality construct ranged from 0.746 to 0.797, price from 0.755 to 0.873, user satisfaction from 0.751 to 0.936, and user loyalty from 0.754 to 0.805. These values generally exceed the minimum threshold applied in the study, indicating that the indicators demonstrate adequate convergent validity. However, an inconsistency was identified in the reporting of the user satisfaction indicators. The indicator “the ship pilotage service meets my expectations as a service user” has a factor loading of 0.751 but was reported as invalid. Statistically, if the threshold applied is 0.70 or even 0.50, a loading value of 0.751 meets the criteria for convergent validity. Therefore, the final version of the article should correct this classification to ensure consistency between the reported results and the validity criteria applied. Furthermore, the reliability analysis shows that the Cronbach’s Alpha values for all constructs exceed 0.70, namely 0.831 for service quality, 0.702 for price, 0.788 for user satisfaction, and 0.781 for user loyalty. Composite Reliability values also exceed 0.70 for all constructs, with values of 0.881, 0.748, 0.871, and 0.859, respectively. The Average Variance Extracted (AVE) values are likewise above 0.50, namely 0.596 for service quality, 0.587 for price, 0.643 for user satisfaction, and 0.604 for user loyalty. These results indicate that the research constructs demonstrate adequate internal consistency and sufficient ability to explain the variance of their respective indicators. Therefore, the measurement model satisfies the required criteria and can proceed to the structural model evaluation stage.

Table 2 Results of the Price Validity Test

Variable/Dimension/Indicator	Loading Factor	Description
Price Affordability		
The price of vessel pilotage services set by PT Pertamina remains affordable for my company	0,755	Valid
Price–Quality Congruence		
The price charged is proportional to the quality of the pilotage services provided	0,873	Valid
Price Competitiveness		

The price of vessel pilotage services at Tanjung Uban Terminal is competitive compared to other ports	0,784	Valid
Price–Benefit Congruence		
The price paid is commensurate with the efficiency, safety, and comfort I receive from this service	0,755	Valid

Source: Data Processing Results Using SmartPLS 4.0

The results of the structural model evaluation demonstrate a very strong explanatory capability of the model. The adjusted R-square value for user satisfaction was 0.880, indicating that 88.0% of the variance in user satisfaction can be explained by service quality and price, while the remaining 12.0% is explained by other factors outside the research model. For the user loyalty construct, the adjusted R-square value reached 0.971, indicating that 97.1% of the variance in user loyalty can be explained by service quality, price, and user satisfaction, while approximately 2.9% is influenced by other factors not included in the model. These findings indicate that the research model has a very high explanatory capability in explaining the formation of satisfaction and loyalty among ship pilotage service users. Nevertheless, the high R-square value, particularly the value of 0.971, should be interpreted cautiously because an exceptionally high value may indicate very strong relationships among constructs. It is therefore necessary to ensure that there are no multicollinearity issues or conceptual overlaps among the variables. Accordingly, the journal article should ideally complement the structural model evaluation with information on Variance Inflation Factor (VIF), Q-square or PLSpredict, and effect size (f-square) to provide a more comprehensive assessment of the structural model's quality.

Table 3 Results of the User Satisfaction Validity Test

Variable/Dimension/Indicator	Loading Factor	Description
Satisfaction with Service Accessibility		
The location and supporting facilities for obtaining vessel pilotage services are easily accessible	0,793	Valid
Satisfaction with Ease of Obtaining Services		
The process of requesting vessel pilotage services is very easy to carry out	0,936	Valid
Satisfaction with the Service Process		
During the pilotage service process, I feel that I am served well	0,93	Valid
Satisfaction with Service Quality		

Vessel pilotage services meet my expectations as a service user	0,751	Tidak Valid
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Source: Data Processing Results Using SmartPLS 4.0

Table 4 Results of the User Loyalty Validity Test

Variable/Dimension/Indicator	Loading Factor	Description
Purchase intention		
I intend to use vessel pilotage services from PT Pertamina again in the future	0,754	Valid
Word of mouth		
I often share positive experiences regarding these vessel pilotage services	0,759	Valid
Price sensitivity		
I will continue to use this service even if there is a slight increase in price	0,805	Valid
Complaining behavior		
If there is a discrepancy in the service provided, I will submit a complaint directly to the relevant party	0,788	Valid

Source: Data Processing Results Using SmartPLS 4.0

Table 5 Results of the Reliability Test

Variable	Cronbach's alpha	Composite reliability (rho_c)
Service Quality	0,831	0,881
Price	0,702	0,748
User Satisfaction	0,788	0,871
User Loyalty	0,781	0,859

Source: Data Processing Results Using SmartPLS 4.0

Table 6 Results of the Composite Reliability Test

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Service Quality	0,831	0,833	0,881	0,596
Price	0,702	0,810	0,748	0,587
User Satisfaction	0,788	0,841	0,871	0,643

User Loyalty	0,781	0,782	0,859	0,604
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Source: Data Processing Results Using SmartPLS 4.0

Table 7 Coefficient of Determination (R²) Values

	R-square	R-square adjusted
Service Quality	0,887	0,880
User Loyalty	0,973	0,971

Source: Data Processing Results Using SmartPLS 4.0

Hypothesis testing shows that all seven research hypotheses were supported. Service quality has a positive and significant effect on user loyalty, with a path coefficient of 0.985, a t-statistic of 82.371, and a p-value of <0.001. This result indicates a very strong relationship between improvements in ship pilotage service quality and increased service user loyalty. In the operational context of Tanjung Uban Terminal, service users tend to maintain their relationship with the service provider when they receive reliable and responsive services, assurance of safety and professionalism, empathy toward their needs, and adequate supporting facilities. This finding confirms that service quality is a strategic factor in maintaining long-term relationships with ship pilotage service users. The result is consistent with previous studies demonstrating that service quality capable of meeting or exceeding customer expectations can increase satisfaction and ultimately strengthen customer loyalty. Therefore, improving service quality not only affects the user experience but also serves as a strategic instrument for sustaining long-term business relationships between the terminal and its service users.

Table 8 Direct Effect Test Results from Partial Least Squares (PLS)

	Original Sample	Standard Deviation	T Statistics	Pvalues (1 Tail)	Conclusion
Service Quality -> User Loyalty H1	0,985	0,012	8,237	0,000	H1 Accepted/Supported
Price -> User Loyalty H2	0,606	0,126	5,898	0,000	H2 Accepted/Supported
Service Quality -> User Satisfaction H3	0,613	0,101	6,085	0,000	H3 Accepted/Supported
Price -> User Satisfaction H4	0,558	0,115	5,376	0,000	H4 Accepted/Supported
User Satisfaction -> User Loyalty H5	0,519	0,122	5,148	0,000	H5 Accepted/Supported
Service Quality -> User Satisfaction -> User Loyalty H6	0,711	0,042	8,805	0,000	H6 Accepted/Supported
Price -> User Satisfaction -> User Loyalty H7	0,695	0,124	6,663	0,000	H7 Accepted/Supported

Source: Data Processing Results Using SmartPLS 4.0

Price was also found to have a positive and significant effect on service user loyalty, with a path coefficient of 0.606, a t-statistic of 5.898, and a p-value of <0.001. This finding indicates that service users are more likely to continue using pilotage services when the price is perceived

as affordable, consistent with the quality and benefits of the service, and sufficiently competitive. In ship pilotage services, price is not perceived merely as a cost incurred by users but also as a representation of the value obtained from the service provided. When users perceive that the costs paid are commensurate with the safety, efficiency, timeliness, convenience, and quality of the services received, their perceived value becomes more positive, thereby increasing their tendency to continue using the service. This finding supports previous research indicating that prices perceived as fair, competitive, and proportional to the benefits received can contribute to increased customer loyalty. Therefore, transparent and proportionate price management represents an important strategy for maintaining service user loyalty.

Furthermore, service quality was found to have a positive and significant effect on service user satisfaction, with a path coefficient of 0.613, a t-statistic of 6.085, and a p-value of <0.001. This result indicates that users' perceptions of service quality are one of the main determinants of satisfaction. Service users are more likely to be satisfied when pilotage services are delivered in a timely, responsive, professional, and safe manner, are easily accessible, and are supported by adequate communication and facilities. In the context of Tanjung Uban Terminal, service quality is particularly important because pilotage services are directly related to vessel safety and the smooth operation of terminal activities. This finding is consistent with previous studies demonstrating that service quality dimensions, including reliability, responsiveness, assurance, empathy, and tangibles, play an important role in increasing customer satisfaction. Therefore, improving service quality should be regarded as a primary priority because, in addition to having a direct effect on loyalty, service quality also contributes to user satisfaction, which subsequently strengthens the relationship between service users and the service provider.

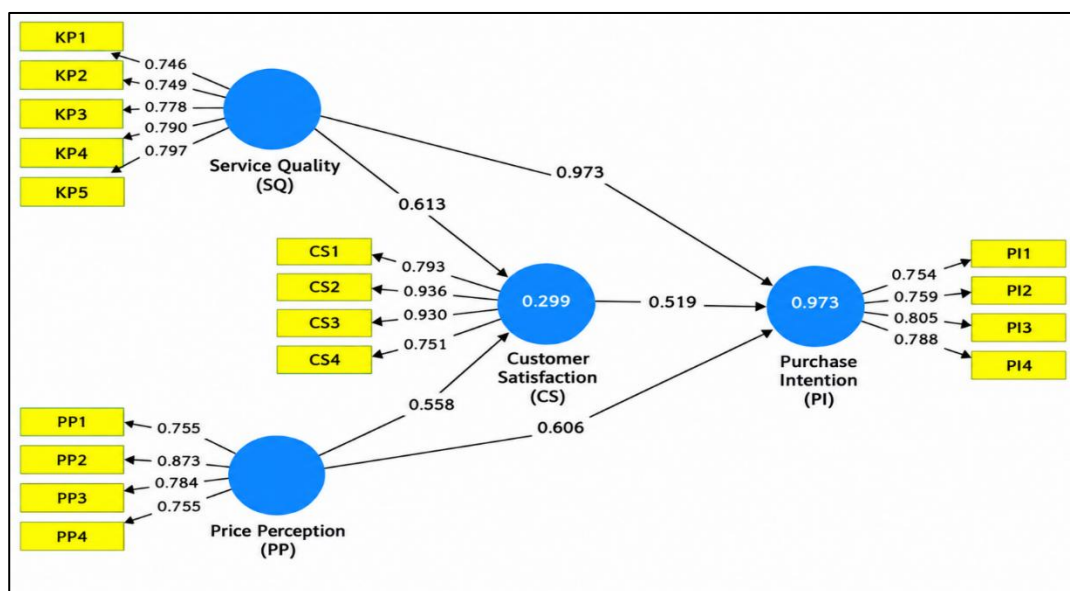


Figure 1 The results of the Partial Least Squares (PLS) data processing

Source: Data Processing Results Using SmartPLS 4.0

Price also has a positive and significant effect on user satisfaction, with a path coefficient of 0.558, a t-statistic of 5.376, and a p-value of <0.001. This finding indicates that user satisfaction is determined not only by service quality but also by perceptions of the fairness of the costs incurred. Prices perceived as affordable, consistent with service quality, competitive, and proportional to the benefits received tend to generate more positive perceptions of value. Conversely, when users perceive that the costs incurred are not commensurate with the services received, the potential for dissatisfaction increases. This finding supports previous research indicating that price and service quality are important factors in the formation of customer satisfaction. In the context of ship pilotage services, the result suggests that pricing strategies

need to be integrated with service quality improvements so that users perceive the costs not merely as a financial burden, but as an expenditure that provides commensurate benefits and value.

User satisfaction was also found to have a positive and significant effect on service user loyalty, with a path coefficient of 0.519, a t-statistic of 5.148, and a p-value of <0.001 . This finding indicates that users who are satisfied with the access, convenience, service process, and overall pilotage service are more likely to continue using the service, provide recommendations, and develop long-term relationships with the service provider. Satisfaction serves as an important mechanism in building loyalty because positive service experiences strengthen trust and increase users' willingness to continue using the same service. This finding is consistent with previous studies that identify satisfaction as one of the key determinants of customer loyalty. In the context of Tanjung Uban Terminal, the results indicate that strategies for maintaining loyalty should not focus solely on encouraging repeat service use but should begin with creating a service experience that meets or exceeds users' expectations.

The indirect effect analysis demonstrates that user satisfaction plays an important role in mediating the effect of service quality on loyalty. The indirect effect of service quality on loyalty through user satisfaction has a coefficient of 0.711, a t-statistic of 8.805, and a p-value of <0.001 . This result confirms that improvements in service quality affect loyalty not only directly but also indirectly through increased user satisfaction. In other words, high-quality services create positive experiences for users, these experiences increase satisfaction, and satisfaction subsequently strengthens users' tendency to maintain their relationship with the service provider. This finding supports previous research indicating that customer satisfaction can function as a mediating mechanism between service quality and loyalty. From a managerial perspective, the results suggest that efforts to increase loyalty should not focus solely on retention programs but should begin with improving the quality of user experiences throughout every stage of the ship pilotage service process.

In addition, price has a positive and significant indirect effect on loyalty through user satisfaction, with a coefficient of 0.695, a t-statistic of 6.663, and a p-value of <0.001 . This finding indicates that positive price perceptions can increase satisfaction, which subsequently encourages service user loyalty. Users are more likely to develop long-term relationships when they perceive the price paid as fair, transparent, competitive, and commensurate with the benefits and quality of service received. This result is consistent with previous studies demonstrating that satisfaction plays a mediating role in the relationship between price perceptions and customer loyalty. Therefore, pricing strategies for ship pilotage services should not focus solely on determining tariff amounts but should also consider how those tariffs are understood and perceived by service users. Transparent information regarding the basis for tariff determination, the alignment between costs and service levels, and effective communication regarding the cost structure can help strengthen perceptions of fairness and service value.

Overall, the findings indicate that service quality is the most dominant factor directly influencing service user loyalty, while user satisfaction serves as an important mechanism that strengthens the effects of service quality and price on loyalty. These findings demonstrate that loyalty among ship pilotage service users is formed through a combination of high-quality service experiences and positive perceptions of the value associated with the costs incurred. Therefore, strategies to enhance loyalty at Tanjung Uban Terminal should focus on improving service reliability and responsiveness, the professionalism of marine pilots, the clarity of procedures and information, the quality of supporting facilities, as well as price transparency and fairness. Terminal management should also conduct regular satisfaction assessments and establish responsive complaint-handling mechanisms so that negative experiences can be addressed promptly. Practically, the findings imply that improving service quality should be the primary priority, while pricing policies should be managed transparently and oriented

toward creating value for service users. By integrating these two aspects through enhanced user satisfaction, the company has greater opportunities to build sustainable user loyalty, maintain business relationships, strengthen service reputation, and support the efficiency and sustainability of port service operations at Tanjung Uban Terminal.

CONCLUSION

The results of the study indicate that service quality and price are important factors in shaping the satisfaction and loyalty of ship pilotage service users at PT Pertamina (Persero) Tanjung Uban Terminal. Service quality was found to have a positive and significant effect on service user loyalty, indicating that improvements in reliability, responsiveness, assurance, empathy, and physical service facilities can strengthen users' intention to continue using pilotage services. In addition, price also has a positive and significant effect on loyalty, indicating that users' perceptions of price fairness, affordability, competitiveness, and the appropriateness of price in relation to service quality and benefits are important factors in maintaining long-term relationships with service users.

The study also demonstrates that service quality and price have positive and significant effects on service user satisfaction. Professional, responsive, accessible, and timely services, supported by clear procedures, are able to create positive user experiences. Similarly, prices perceived as fair, transparent, competitive, and commensurate with the benefits received can enhance perceived value and user satisfaction. Furthermore, user satisfaction was found to have a positive and significant effect on loyalty, indicating that users who experience services that meet or exceed their expectations are more likely to reuse the service, provide recommendations, maintain their relationship with the service provider, and have a lower tendency to switch to alternative service providers.

User satisfaction was also found to function as an intervening variable in the relationship between service quality and price and service user loyalty. This finding indicates that improvements in service quality and price management not only have direct effects on loyalty but also contribute to loyalty through increased user satisfaction. Therefore, strategies for enhancing ship pilotage service user loyalty should be implemented in an integrated manner by positioning service quality, price fairness, and user satisfaction as key components of customer relationship management. The research model demonstrates that loyalty is not formed merely because users receive a service, but rather through an evaluation process involving service quality, costs, benefits, and the overall service experience, which subsequently generates satisfaction and strengthens long-term user commitment.

Based on these findings, PT Pertamina (Persero) Tanjung Uban Terminal is recommended to continuously improve service quality through the standardization of service procedures, enhancement of the competence and professionalism of marine pilots, strengthening of responsiveness and empathy, and improvement of supporting facilities, equipment, and infrastructure. The company should also strengthen the transparency and fairness of its pricing structure by providing clear tariff information and ensuring that the costs incurred are commensurate with the quality, safety, efficiency, and benefits received by service users. User satisfaction should be established as one of the key service performance indicators and monitored regularly through surveys, feedback systems, and prompt and measurable complaint-handling mechanisms.

From a managerial perspective, the findings imply the need to implement a customer-oriented service strategy by positioning satisfaction as a strategic instrument for building loyalty. An integrated satisfaction evaluation system can provide empirical information for the company to identify user needs, improve service quality, anticipate potential complaints, and develop customer retention strategies. Price transparency can also enhance users' perceptions of fairness and trust, while improving the quality of interactions between personnel and users can strengthen positive service experiences. In the long term, a combination of consistent

service quality, proportionate pricing, high levels of satisfaction, and sustainable customer relationship management is expected to strengthen service user loyalty, enhance the company's reputation, maintain sustainable business relationships, and strengthen the competitiveness of PT Pertamina (Persero) Tanjung Uban Terminal in the provision of port and ship pilotage services.

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