



The Effect of Service Quality and Customer Satisfaction on Increasing Loyalty of Ro-Ro Ferry Passengers at Bakauheni

Reza Fauzi Jaya Sakti^{1*}, Prima Widiyanto², Primadi Candra Susanto³

^{1,2,3}Trisakti Institute of Transportation and Logistics, Jakarta, Indonesia

*Corresponding author: reza.jayasakti@gmail.com |

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Abstract

Purpose: This study uses a quantitative method with descriptive analysis, distributing questionnaires to passengers or users of the Ro-Ro ship in Bakaheuni, Merak, Indonesia.

Research Methodology: This study aimed to determine the following: the basis of the online ticket sales system, the handling of delays on roll-on/roll-off (ro-ro) ferries, the setup of parking management at the wharf, the optimization of dock operations, and the process of managing the operating fleet.

Results: The results of this research show that the magnitude of the positive relationship between service quality and customer satisfaction with service passenger loyalty is 75.8%, while the rest is the relationship of other factors that are not analyzed in this model.

Conclusions: This shows the magnitude of the positive relationship between service quality and customer satisfaction with service passenger loyalty of 75.8%, while the rest is the relationship of other factors that are not analyzed in this model.

Limitations: This study is limited to passengers of the Bakauheni–Merak Ro-Ro ferry and includes only 30 respondents, which may restrict the generalizability of the findings.

Contributions: The research provides empirical evidence that service quality and customer satisfaction positively influence passenger loyalty on Ro-Ro ferries.

Keywords: *Customer Satisfaction, Passenger Loyalty, Service Quality*

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1. Introduction

Indonesia is an archipelagic country; therefore, sea transportation facilities play an important role in connecting regions. Ferries are widely used for sea transportation. Ferry is a type of sea transportation that can be used as passenger and goods transportation using certain routes or routes (McGrath et al., 2020). The advantages offered by using the ferry, namely, the passengers who will cross to areas that are limited by waters or the sea, are speed and comfort. Ferry ships not only transport people but also motor vehicles, cars, trucks and buses (Amanda et al., 2020; Katorgin & Tarkhov, 2021). To serve people who need sea transportation, PT. ASDP Indonesia Ferry (Persero) already has several service branch offices throughout Indonesia, one of which is in the Peacock Banten Port. PT. ASDP Indonesia Ferry Limited Liability Company is a crossing service company that manages ferry ports for passengers, vehicles, and goods. The main function of the company is to provide access to public transportation between islands and to unite large islands as well as to provide access to public transportation to areas that do not have a

crossing to accelerate development ([Mitropoulos et al., 2022](#)).

Companies that want to grow and survive must provide customers with products, both goods and services, of better quality, competitive prices, faster delivery, and better service than their competitors. To ensure customer satisfaction in the service industry, it is important that the quality of service is well managed by the company. Service quality is the level of excellence expected and controlled to meet customer desires ([Bungatang & Reynel, 2021](#)).

One of the goals of the company is to create loyalty because satisfied customers are the basic capital for the company that can provide benefits, including the relationship between the company and customers being harmonious, providing a good basis for repurchasing, creating service user loyalty, and forming word of mouth (word of mouth), which is beneficial for the company. Service user loyalty is determined by customer perceptions of what they get from the service in terms of meeting customer expectations, with this the customer will be loyal to the company they use and use the company repeatedly. Customers are satisfied with good quality products and services and will be happy to make repeat purchases and introduce and provide recommendations to other parties regarding the good things of the product/service or company ([Asnawi et al., 2020](#)).

The quality of service (service quality) can be identified by comparing the perceptions of consumers on the real service they receive with the real service they expect for the service attributes of a company. If the service received or perceived (perceived service) is expected, then the service quality is perceived good and satisfying; if the service received exceeds consumer expectations, then the service quality is perceived to be very good. Conversely, if the service received is lower than expected, the quality of service is perceived as poor [Setiono and Hidayat \(2022\)](#).

One thing that has recently been questioned is the quality of public services, especially sea ferry services. ASDP is a service provider for the community, is required to provide quality services. The quality and innovation of INFA's services will be increasingly challenged to be optimal and able to meet the community's increasing demands, both in terms of quality and quantity of services. In developing countries, the quality of public transportation services is a problem that often arises because in developing countries generally the demand for services far exceeds the supply [Norawati et al. \(2021\)](#).

The government's ability to fulfill it so that the services provided by the government to the community are not fulfilled in terms of quality and quantity. Quality is a word that has a relative meaning because it is an abstract concept. Quality can be used to assess or determine the degree of adjustment of a thing to its requirements or its specifications. If the requirements or specifications are met, it means that the quality of something in question can be said to be good, on the other hand, if the requirements are not met, it can be said to be not good [Naini et al. \(2022\)](#). Indicators are required to determine quality. Because the specifications, which are an indicator, must be designed, it means that the quality is indirectly the result of the design, which can be repaired or improved.

The strategy of continuous improvement by means of Plan-Do-Check-Act and Standard-Do-Check-Act focuses on improving operational performance, service quality, and customer satisfaction to create passenger loyalty on ro-ro ferries. Therefore, service quality and customer satisfaction must be improved to achieve service user loyalty, which is one of the main targets to maintain this inter-island shipping transportation service business, customer loyalty increases if service quality and customer satisfaction are met. Efforts to improve the competitiveness of the services provided require continuous evaluation and improvement both from the internal side of the company, in terms of operational performance, service quality and customer satisfaction, which are still far from customer expectations, so the company must be able to change the work system that has been implemented previously with Plan-Do-Check-Act and Standard-Do-Check-Act are added with new innovations that focus on speed of berth time,

travel accuracy, safety of goods, employee friendliness, comfort and to increase employee productivity, competent human resources can improve, service quality and customer satisfaction who refer to service user loyalty, this can be achieved easily if the skills possessed by employees are optimal, for that all employees are required to attend education and training according to their position (Ikram et al., 2020).

One popular service quality approach used as a reference in marketing research is the SERVQUAL (Service Quality). SERVQUAL is built on a comparison of two main factors: customer perceptions of the real service they receive (Perceived Service) and the actual service expected/desired (Expected Service) (Patten et al., 2020). If the reality is more than expected, then the service can be said to be of good quality, whereas if the reality is less than expected, then the service is said to be of poor quality. If the reality is the same as the expectation, then the service is satisfactory. The general definition of service quality, often abbreviated as SERVQUAL, is a customer's judgment of the overall excellence or superiority of a service Dzakwan and Ubit (2025) and Septivianto and Sarwoko (2024).

Thus, service quality can be defined as the extent of the difference between reality and customer expectations for the service they receive. Customer expectations are basically the same as the type of service a company should provide to customers. These customers' expectations are based on word-of-mouth, personal needs, past experiences, and external communications (advertising and other forms of corporate promotion).

Parasuraman et al. (1991) used a scale of 1–7 (to respond to a statement on one aspect of service quality), namely strongly disagree (1) to strongly agree (7). According to research conducted by Parasuraman et al., it is concluded that from the 5 dimensions there are different relative interests among the five dimensions.

According to Parasuraman et al. (1991), there are five SERVQUAL dimensions: Tangibles, or physical evidence, refer to the ability of a company to show its existence to external parties. The appearance and capability of the physical facilities and infrastructure of the company and the condition of the surrounding environment are clear evidence of the services provided by the service providers. This includes physical facilities (buildings, warehouses, etc.), technology (tools and equipment used), and employee appearance. In short, it can be interpreted as the appearance of physical facilities, equipment, personnel, and communication tools (Parasuraman et al., 1991).

Reliability, or reliability, refers to the company's ability to provide services as promised, accurately and reliably. Being in tune with customer expectations means on-time performance, error-free service, sympathetic attitude, and high accuracy. In short, it can be interpreted as the ability to provide the promised service accurately, on time, and in a trustworthy manner (Parasuraman et al., 1991).

Responsiveness, or responsiveness, is a willingness to help and provide fast (responsive) and accurate service to customers, with clear information delivery. Leaving consumers to wait for no apparent reason causes them to have negative perceptions of service quality. In short, it can be interpreted as the willingness to help customers by providing good and fast service. Assurance, or guarantee and certainty, namely the knowledge, courtesy of compensation, and ability of company employees to foster customer trust in the company. It consists of the following components: communication, credibility, security, competence, and courtesy. In short, it can be interpreted as the knowledge and friendliness of personnel and the ability of personnel to be trusted. Empathy, namely giving sincere and individual or personal attention to customers by trying to understand consumer desires, where a company is expected to have an understanding and knowledge of customers, understand specific customer needs, and have a comfortable operating time for customers. In short, it can be interpreted as an effort to understand the needs of individual customers (Parasuraman et al., 1991).

Measuring the gap in SERVQUAL (Parasuraman et al., 1991) service quality model identifies the reasons

for the gap between consumer perceptions and expectations. There are five gaps (Gap), and it should be noted in advance that Gap 5 is the product of Gaps 1, 2, 3, and 4. If Gaps 1–4 can be closed, then Gap 5 will automatically close.

Gap 1 is the gap between what consumers expect and what company management assumes consumer expectations to be. Gap 2 occurs when management fails to design service standards that meet consumer expectations. Gap 3 occurs when a company's service delivery system, consisting of HR, technology, and processes, fails to meet predetermined standards. Gap 4 occurs when the communication between companies and consumers promises a level of service that cannot be provided by human resources, technology, and processes. To identify Gap 5, the SERVQUAL model, consisting of 22 items, plays an important role (Parasuraman et al., 1991).

The benefits of SERVQUAL in Marketing can also be used for internal marketing purposes. The rationale is that every individual in an organization, especially service companies, must understand that they have customers to serve. Research shows a positive relationship between internal and external service quality and customer satisfaction, loyalty, and company profits. Marketing research can be adapted for employee relations. Employees can be given the opportunity to provide input to management regarding the work environment, company policies, and employees' personal understanding of the meaning of quality for consumers (Parasuraman et al., 1991).

Satisfaction is the feeling of happiness or disappointment that arises in someone because of comparing the perceived performance of services (results) with their expectations. If performance fails to meet expectations, customers will be dissatisfied (Mahendri & Astuti, 2025; Rachman & Ariyanti, 2025). If the performance is as expected, the customer will be satisfied. If the performance exceeds expectations, the customer will be satisfied. Customer ratings of service performance depend on many factors, especially the type of loyalty relationship the customer has with the company. Consumers often form a more favorable perception of a service with a company name that they already perceive positively. Customer-centric companies strive to create high customer satisfaction, but this is not their end goal. If a company increases customer satisfaction by lowering its prices or improving its service, profits may decrease. The firm may be able to increase its profitability in ways other than increasing satisfaction (for example, by improving manufacturing processes or investing more in R&D) (Ali et al., 2025). The company also has many stakeholders, including employees, distributors, suppliers, and shareholders. Spending more effort to improve customer satisfaction can divert funds away from increasing the satisfaction of other "partners." Finally, the company must operate on the philosophy that it strives to deliver a higher level of customer satisfaction while delivering a level of satisfaction that is acceptable to other stakeholders based on its total resources (Parasuraman et al., 1991).

PT ASDP Indonesia Ferry operates the executive dock at Bakauheni Port in Lampung. During the first three months, PT ASDP is still introducing promotional rates, which will be reviewed after evaluation while preparing all facilities so that when the regular rates apply, all facilities will be functioning properly. This executive pier is directly connected to the Trans Sumatra toll road (JTTS) and offers convenience and accuracy of crossing after service users are tired of traveling long distances via the Trans Sumatra toll road. This executive pier serves passengers and small vehicles and has a boarding lounge, valet parking, and food and beverage retail. This executive dock service can be enjoyed by service users who wish to cross, and various commercial and lifestyle facilities can be enjoyed by non-crossing visitors. Passengers who pass this executive dock are promised a special passenger ship without mixing with trucks and buses.

There are several problems in the field that inconvenience customers, and these must be addressed and corrected immediately. If left unchecked, it can damage the image of the services provided by the company. Ultimately, it is feared that customers will move to a competing company. Services provided

by the PT. ASDP Indonesia Ferry (Persero) Banten Merak Branch on board the ferry includes: safety, security, convenience, or affordability, equality. Apart from implementing service standards, people will choose sea transportation that has good security and affordable ticket prices in the community. The above problems highlight the need for this research.

Based on the background of the problems described above, the problems identified in this study are as follows: 1) there are still queues for manual ticket purchases, 2) there are still delays on the ro-ro ferries, 3) there are still long queues of vehicles when entering the ship, 4) there are still piers that are not being used optimally, and 5) there is still a lack of an operating fleet.

In the formulation of this research problem, the research question is put forward as follows: 1) How do you do an online ticket sales system? 2) How can delays on the Ro-Ro ferry be prevented? 3) What is the strategy for managing parking at the pier? 4) How are dock operations optimized? 5) How does the ASDP balance the needs of the ships?. Research purposes: this research was conducted with the objectives of the research being; 1) To find out how the on line ticket sales system is based, 2) To find out the handling of delays on ro-ro ferries, 3) To find out how to set up parking management at the what, 4) To find out how to optimize the dock operation, 5) To find out the process of managing the operating fleet.

2. Literature Review & Hypothesis Development

Service quality, which consists of interaction quality, physical quality, and service comfort, plays a direct role in shaping customer satisfaction and loyalty among ship passengers. PT. PELNI. Maintaining the quality of service that has succeeded in combining elements of interaction quality, physical quality, and service comfort appropriately increases passenger satisfaction. Factors such as friendliness, alertness, and employee competence must be maintained. The aspects that need to be improved are inadequate facilities, such as cleanliness of toilets, room capacity, and waiting room facilities, which must be added and repaired [Nonthapot and Nasoontorn \(2020\)](#).

The quality of services at the Gapura Surya Nusantara Passenger Terminal at PT Pelindo III (Persero) Tanjung Perak Branch can be said to have been good, as seen from the dimension of reliability concerning the ability of officers to provide services quickly and precisely (accurately), responsiveness regarding the responsiveness and concern of the officers in helping customers, assurance which includes the competence and attitude of the employees of the Gapura Surya Nusantara Passenger Terminal, empathy relating to the ease of obtaining information and concern for customer needs, and tangibles, which include the availability of modern international standard facilities as well as the appearance of good and polite employees. However, there are still some shortcomings related to the unavailability of a suggestion box and a special website to accommodate customer complaints, which are part of the responsiveness dimension, and related to the condition of the roof of the building, which is damaged due to wind and rain, and the condition of smoking areas that are not ready for use, which are part of the tangibles dimension [Nanda et al. \(2025\)](#).

[Pituşcan and Ioncu \(2024\)](#) states that quality is conformity to requirements. The requirements must be clearly specified so that everyone knows what to expect. Product quality is one of the main positioning tools used by marketers. Quality has a direct impact on product or service performance; therefore, quality is closely related to customer value and satisfaction. Quality can be defined as being free from damage; however, most customer-centric companies define quality based on value creation and customer satisfaction.

[Lepistö et al. \(2024\)](#) states that service is basically something intangible, which can meet the needs and desires of consumers. In producing a service, you can use the help of a physical product, but you may not.

Services do not result in a physical or tangible transfer of rights to items. Therefore, if someone provides services to other people, there is no transfer of physical property rights. Good service is a service that is carried out in a friendly, fair, precise, and ethical manner to meet the needs and satisfaction of those who receive it. Therefore, if quality is managed properly, customer satisfaction and loyalty will be realized in the company.

[Mahsyar and Surapati \(2020\)](#) states that service quality will encourage customer satisfaction and customer satisfaction is a determining factor for loyalty; if customer satisfaction is formed, then company growth is guaranteed.

[Arslan \(2020\)](#) states that to win the competition, companies must be able to provide value and satisfaction to customers through the delivery of quality products and services and competitive prices. All organizations have strategies for the future, and all of these strategies are expected to bring significant progress to the organization or company, which is reflected in market success. Marketing success occurs because of good quality, and consumer response to products is also good. Of course, with the quality principle, employee involvement is absolute and important, and the goal of all of this is to create customer satisfaction. Efforts to realize quality services cannot be separated from the important role of employees and human resources owned by the company. Every employee needs to be given understanding and motivation to provide the best service for consumers. In addition, employees must be aware that those who provide them with salaries are consumers, not companies. Companies earn income because consumers are willing to consume their products and services. Therefore, every company needs to make efforts to improve the quality of human resources in the hope that the quality of their service will improve. Good service is the company's ability to provide services that satisfy customers with predetermined standards. What is said to be the ability in it can be seen from the human resources and facilities and infrastructure owned. Therefore, it can be concluded that the quality of service is whatever can bring full satisfaction to every passenger who uses a crossing service according to the expectations and needs desired by a passenger.

[Supriyanto et al. \(2021\)](#) states that there are five main dimensions of service quality: 1) Tangibles include physical facilities and means of communication; 2) Reliability, namely the ability to provide the promised service immediately and satisfactorily; 3) Responsiveness, namely the desire of the staff to help customers and provide services with responsiveness; 4) Assurance, including the ability, courtesy, and trustworthiness of staff, free from danger, risk, or doubt; 5) Empathy, which includes the ease of making relationships, good communication, and understanding the needs of customers. Basically, service to consumers depends on the employee's background, be it ethnicity, education, experience, culture, or customs. However, to ensure high quality and uniformity of service, every employee must be equipped with in-depth knowledge of the basics of service. Marketers should understand the characteristics of each consumer. This is because each person has different characteristics influenced by ethnicity, religion, education, experience, and others.

However, in general, every consumer has the same desires, namely wanting to fulfill their wants and needs and always wanting to get attention. Here are the characteristics of consumers that must be recognized, namely:

1. Consumers want to be considered kings, which means that all their wants and needs must be fulfilled. The services provided must be like serving a king in the sense that they are still within the boundaries of ethics and morals without degrading the company;
2. Want to be fulfilled wants and needs. The arrival of consumers to the company is so that their needs and desires are met;
3. Do not want to be debated and do not want to be offended. We try to provide every service in a relaxed and family atmosphere. Marketers must be wise in expressing opinions so that consumers

are not offended;

4. Consumers want to be noticed. Consumers who come to the company essentially want to get attention. Never underestimate or ignore them; give them your full attention so that they feel cared for and valued;
5. Consumers are a source of income for companies. A company's main income comes from the sale of its products and services. Therefore, if consumers are not used optimally, it means wasting the company's revenue sources.

As a provider of sea transportation services, the community is required to fix and improve the safety and comfort of the service users. The gap between the service perceived by the customer and the quality of service provided must be fixed so that the customer gets the best service. The main thing that must be prioritized is passenger satisfaction so that the company can survive, compete, and dominate the market share. Improved services to achieve customer satisfaction must be achieved through various supporting activities, including setting minimum service standards both at the port and on board, as well as adding public port facilities and making efforts to support the improvement of production and service quality [Dzakwan and Ubit \(2025\)](#).

Various programs implemented by the company create customer satisfaction. Customers who are satisfied with the service are the basic capital for the company in forming customer loyalty. Choosing loyal customers is the ultimate goal of all companies, but most companies or service providers do not know that customer loyalty can be formed through several stages, starting from looking for potential customers to advocating customers who bring great benefits to the company. The concept of customer satisfaction occupies a central position in marketing and practice. Satisfaction is the main result of marketing and service activities that link marketing processes culminating in purchase and consumption with post-purchase phenomena such as changes in attitude, repeat purchases, and brand loyalty. The centrality of the marketing concept is reflected in the benefits generated through consumer satisfaction and desire [Setyawati et al. \(2021\)](#).

Customer satisfaction is known as a result of service quality, in the sense that the quality of the product or service is provided to customers positively. It is also believed that the level of customer satisfaction increases with an increase in the quality of the product or service that customers perceive. In particular, customer satisfaction is considered an intrinsic variable that explains customer return and post-purchase behavior for products and services ([Hamzah & Shamsudin, 2020](#)). Customer satisfaction is one of the company's goals because the long-term benefits obtained if the customer is satisfied is a positive value of mouth, customer loyalty, and creates sustainable profitability for the company. Customer satisfaction is considered to be the primary driver of the long-term relationship between suppliers and buyers ([Al Kurdi et al., 2020](#); [Rifai et al., 2021](#)).

[Otto et al. \(2020\)](#) explain customer satisfaction as a person's feeling of pleasure or disappointment resulting from comparing the performance or perceived results of the product with its expectations. [Alam and Mondal \(2019\)](#) and [Ok et al. \(2018\)](#) measured customer satisfaction with High-Speed Rail (HSR) in Taiwan using three indicators: 1) satisfied with HSR services; 2) wise decision to travel with HSR; and 3) traveling with HSR was the right decision.

Customer loyalty needs to be earned because loyal customers actively promote, provide recommendations to family and friends, make products their first choice, and are not easily moved. Researchers seem to agree that customer satisfaction is the main factor that attracts customer loyalty. Customer satisfaction can be seen from the pride in the institution, the fulfillment of customer desires, the institution being ideal for customers, and customer satisfaction with the product provider institution. Please note that a satisfied customer does not necessarily become a loyal customer ([Mahsyar & Surapati, 2020](#)).

According to Romadhoni et al. (2025), consumer loyalty is a customer commitment to a brand, store, or supplier based on very positive traits in long-term purchases. From this understanding, it can be interpreted that brand loyalty is obtained because of a combination of satisfaction and dissatisfaction. Customer satisfaction comes from how much the company's performance causes satisfaction by minimizing complaints so that long-term purchases made by consumers are obtained (Fanggidae & Wahyoedi, 2025).

Loyalty in the Oxford English Dictionary, quoted in Yansah et al. (2025), is a strong feeling of support and allegiance; a person showing firm and constant support. From this definition, there is the word strong feeling, which refers to the depth of human feelings towards something, whether family, friends, organizations, or brands. This feeling determines customer closeness and loyalty.

According to Riswanda and Millanyani (2025), customer loyalty is a commitment to persevere deeply to make repeat purchases or re-subscribe to selected products or services consistently wherever in the future, although the influence of the situation and marketing efforts can cause changes in behavior. Loyal customers have a kind of fanaticism that is relatively permanent in the long run towards a product or service that they have chosen.

Customer loyalty needs to be earned because loyal customers actively promote, provide recommendations to family and friends, make products their first choice, and are not easily moved. Researchers seem to agree that customer satisfaction is the main factor that attracts customer loyalty (Mahendri & Astuti, 2025). Customer satisfaction can be seen from the pride in the institution, the fulfillment of customer desires, the institution being ideal for customers, and customer satisfaction with the product provider institution. Please note that a satisfied customer does not necessarily become a loyal customer. In essence, humans are curious and try something new. Therefore, an appropriate strategy is required to prevent customers from moving to competing products. For example, discounts can be given to loyal customers. Barriers to relocation are created with due regard to prevailing business ethics (Fanggidae & Wahyoedi, 2025). Customer loyalty at the cognitive stage can be maintained by increasing the value of the product, especially by reducing prices and increasing the benefits and quality of the product. Customer loyalty at the affective stage can be maintained by providing satisfaction, adding value, and creating switching barriers, such as discounts for loyal customers. Meanwhile, customers whose loyalty is at the conative and action stages, in addition to providing satisfaction, loyalty can be achieved by having a sustainable relationship so that, in the end, there will be emotional costs if they want to switch to competing products (Yansah et al., 2025).

2.1 Hypothesis Development

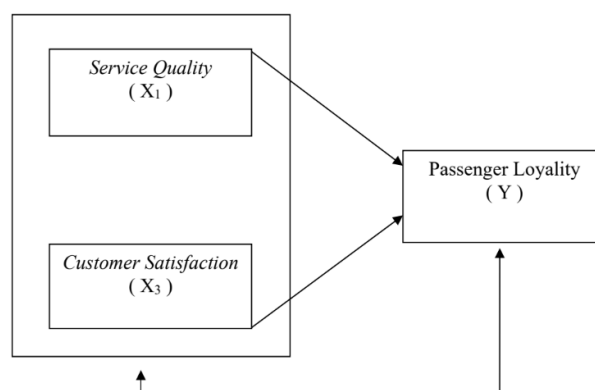


Figure 1. Model Constilation Problem

Based on Figure 1, the hypothesis in this study can be formulated as follows:

1. H_1 : It is suspected that there is a relationship between the online-based ticket sales system and the loyalty of ro-ro ferry passengers.
2. H_2 : It is suspected that there is a relationship between handling delays in ro-ro ships and the loyalty of passengers on ro-ro ferries.
3. H_3 : It is suspected that there is a relationship between the way parking management at the dock affects the loyalty of passengers on ro-ro ferries.
4. H_4 : It is suspected that there is a relationship between operating the way of optimizing the dock and the loyalty of passengers on ro-ro ferries.
5. H_5 : It is suspected that there is a relationship between the influential fleet management process and the loyalty of passengers on ro-ro ferries.

3. Methodology

The characteristics that will be tested in this study are service quality and customer satisfaction, which are thought to have a positive and significant effect on the loyalty of the ferry passengers. This research was conducted in 2019 through a survey of the Bakauheni-Merak River Transportation sector company. The purpose of survey research is to generalize a population from several samples so that conclusions or provisional conjectures can be made from the characteristics, behaviors, or attitudes of the population (Sugiyono, 2007). The survey was chosen as a data collection procedure in this study because of the relatively low cost and speed of presenting research data. The nature of the survey in this study is cross-sectional (one-shot) by collecting data one at a time. This research is descriptive verification, referring to the research objectives to be carried out, namely to examine more deeply the research variables to be studied, namely service quality and customer satisfaction. The descriptive research in this study aims to obtain a description of service quality and customer satisfaction. Meanwhile, verification research determines the relationship between variables through hypothesis testing based on field data (Sugiyono, 2009).

The unit of analysis in this research is the Merak-Bakauheni River and Lake Transportation Company. The observation unit in this study was a ro-ro ferry passenger in the inter-island shipping sector. The population in this study was all passengers using the Merak-Bakauheni sea crossing services.

The number of samples to be used was determined based on the Slovin formula as follows: Information:

N = sample size

N = population size

e = desired critical value (accuracy limit) (percent allowance of inaccuracy due to drawing errors sample).

With a critical value (e) of 10%, the research sample was obtained as follows:

The sampling technique used is probability sampling, which is a sampling technique that provides equal opportunities for each element (member) of the population to be selected as a member of the sample, a sample of 56 people.

4. Results and Discussion

4.1 Validity Test

1. Quality of Service (X1) In the table above, where $df = 30 - 2 = 28$, $r_{table} = 0.3379$ with $\alpha = 0.05/2$. After comparing with r_{count} , it was found that 28 questions were valid.
2. Customer Satisfaction (X2) In the table above, where $df = 30 - 2 = 28$, $r_{table} = 0.3525$ with

$\alpha = 0.05/2$. After comparison with r_{count} , 28 questions were valid.

3. Passenger Loyalty (Y) In the table above, where $df = 30 - 2 = 28$, $r_{table} = 0.3942$ with $\alpha = 0.05/2$. After comparison with r_{count} , 28 questions were valid.

4.2 Reliability Test

Reliable means consistency or stability. After all questions were declared valid, the next step was to test the reliability of the questionnaire. The following are the results of the reliability tests for each variable:

1. Quality of Service (X1) Because $0.736 > 0.60$, the questionnaire is reliable. Because the questionnaire has been declared valid and reliable, it is worthy of analysis.
2. Customer Satisfaction (X2) Because $0.742 > 0.60$, the questionnaire was reliable. Because the questionnaire has been declared valid and reliable, it is worthy of analysis.
3. Passenger Loyalty (Y) Because $0.703 > 0.60$, the questionnaire is reliable. Because the questionnaire has been declared valid and reliable, it is worthy of analysis.

Questionnaire testing was conducted with 30 respondents with good results, namely, reliability of 0.736, 0.742, and 0.703. The researchers then distributed 30 questionnaires to 30 respondents (passengers of the Merak-Bakauheni ferry route).

4.3 Regression Test

It aims to determine whether there is linearity between the independent and dependent variables.

- a. X1 and Y Regression (Simplified). The results of the calculations carried out with SPSS V.25 are as follows:

Table 1. Regression Test between X1 and Y

Model	B	Std. Error	Beta	t	Sig.
(Constant)	78.223	14.670	-	0.567	0.574
X1	0.087	0.168	1.095	5.421	0.000

Dependent Variable: Y

Based on Table 1, the calculations a of 78,223 and b of 0.087 were obtained, and the form of a simple linear regression equation is as follows: $Y = 78,223 + 0.087X_1$

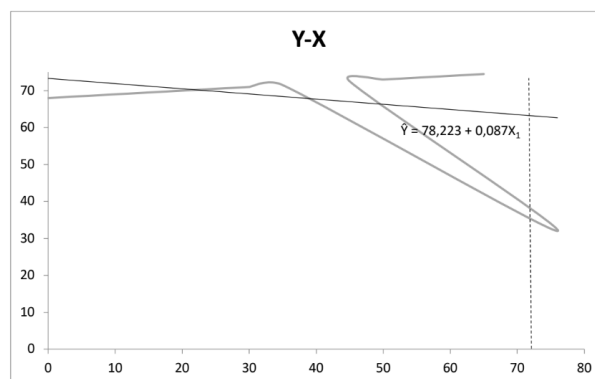


Figure 2. Regression Equation

Based on Figure 2, it can be seen that the relationship between service quality and passenger

loyalty is unidirectional (positive), as shown in the regression coefficient or the value of b in the regression equation, which shows a positive number of 0.087, which means that each increase in operational performance is 0.087 units. If the quality of service decreases by one unit, the quality of service tends to decrease by 0.087 units. And the value of the coefficient a (intercept) is 78,223, which means that if there is no quality of service ($X = 0$), it is estimated that passenger loyalty is 78,233 units.

b X2 and Y Regression (Simplified)

Table 2. Regression Test between X1 and Y

Beta	t	Sig.
1.244	-1.490	.145
	7.461	.000

Dependent Variable: Y

Based on Table 2, a was 107,512, and b was -0.321. The form of a simple linear regression equation is as follows: $Y = 107,512 + -0.321X_2$

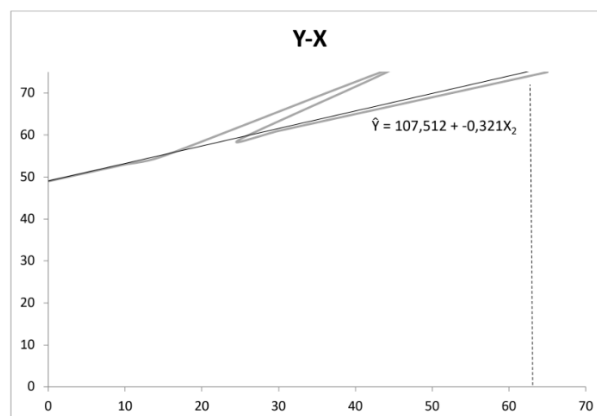


Figure 3. Regression Equation

Based on Figure 3, it can be seen that the relationship between customer satisfaction and passenger loyalty is unidirectional (positive), as shown in the regression coefficient or the value of b in the regression equation, which shows a positive number of -0.321. This implies that each increase in service quality is -0.321 units. . If the loyalty of service passengers decreases by one unit, the loyalty of passengers will also tend to decrease by -0.321 units. The value of the coefficient a (intercept) is 107,512, which means that if there is no customer satisfaction ($X = 0$), it is estimated that passenger loyalty is 107,512 units.

c. X1 and X2 with Y (Multiple)

Table 3. Regression Coefficients X1 and X2 with Y (Multiple)

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	94.693	21.878	-	4.328	0.000
X1	-0.087	0.177	-0.087	-0.116	0.909
X2	-0.321	0.177	-0.321	-1.857	0.072

Dependent Variable: Y

Based on Table 3, it was obtained a of 94,693; b1 equal to -0.087 b2 -0.321 the form of the multiple linear regression equation is US follows: $Y = 94.693 + -0.087X_1 + -0.321X_2$

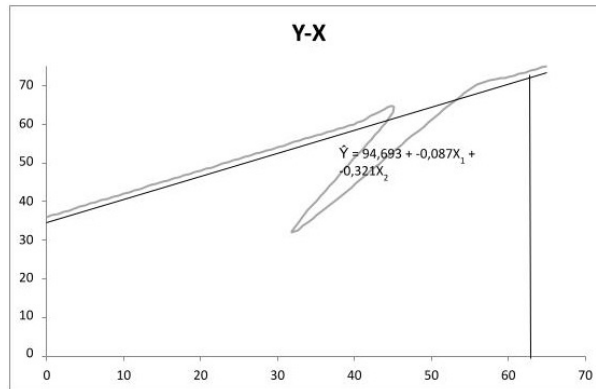


Figure 4. Regression Equation

Based on Figure 4, the relationships between service quality, customer satisfaction, and passenger loyalty are positive but varying in magnitude. Specifically, a one-unit increase in service quality corresponds to a 0.087-unit increase in passenger loyalty, while a one-unit increase in customer satisfaction corresponds to a -0.321-unit change in passenger loyalty. Overall, considering both service quality and customer satisfaction together, the regression model shows that passenger loyalty tends to change by 94.693 units, reflecting the combined effect of these independent variables on loyalty.

4.4 Correlation Test

Table 4. Correlation Test of X1 and X2 with Y

	Y	X1	X2
Pearson Correlation	1	1.055	1.364
Sig. (2-tailed)		0.574	0.145
N	30	30	30
Pearson Correlation	0.095	1	-0.076
Sig. (2-tailed)	0.574		0.653
N	30	30	30
Pearson Correlation	-0.244	-0.076	1
Sig. (2-tailed)	0.145	0.653	
N	30	30	30
Pearson Correlation	0.169	0.341*	0.285

Based on Table 4, r is equal to 1. It appears that the quality of service and customer satisfaction with passenger loyalty are very strong and unidirectional (positive). The Coefficients of Determination X1 and X2 with Y (double), Following are the results of the coefficient of determination from R square:

By looking at the results of the above calculations, where the R square is 0.758 or 75.8%. This shows the magnitude of the positive relationship between service quality and customer satisfaction with service passenger loyalty of 75.8%, while the rest is the relationship of other factors that are not analyzed in this model.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.446	0.042	0.758	4.84163	1.130

Predictors: (Constant), X2, X1

Dependent Variable: Y

Based on Table 5, $a = 107.512$ and $b = -0.321$, respectively. The simple linear regression equation is as follows: $Y = 107,512 + -0.321X2$

By looking at the results of the above calculations, where the R square is 0.758 or 75.8%. This shows the magnitude of the positive relationship between service quality and customer satisfaction with service passenger loyalty of 75.8%, while the rest is the relationship of other factors that are not analyzed in this model.

4.5 Hypothesis Test X1 and X2 with Y (double)

Correlations			
Control Variables		X1	Y
X1	Correlation	1.000	.579
	Significance (2-tailed)	.	.645
	Df	0	30
X2	Correlation	.579	1.000
	Significance (2-tailed)	.645	.
	Df	30	0

Figure 5. Hypothesis Test X1 and X2 with Y (double)

Figure 5 shows the correlation values between the variables X1, X2, and Y. The correlation between X1 and Y is 0.579, indicating a moderate positive relationship, though the significance value ($p = 0.645$) suggests it is not statistically significant. Similarly, X2 and Y also have a correlation of 0.579 with a significance value of 0.645, showing a similar pattern. This suggests that while there is a positive association between the independent variables (X1 and X2) and the dependent variable (Y), the relationships are not statistically significant at the conventional 5% level. The degrees of freedom (df) for these correlations are 30.

This study aims to determine whether there is a multiple relationship between service quality and customer satisfaction with passenger loyalty. The steps for testing this hypothesis are as follows:

4.5.1 Formulation of Hypotheses

- $H_a: \beta_{X1}, \beta_{X2} \leq 0$
There is no multiple relationship between service quality and customer satisfaction with passenger loyalty.
- $H_0: \beta_{X1}, \beta_{X2} \geq 0$
There is a multiple relationship between service quality and customer satisfaction with passenger loyalty.

4.5.2 Significance Level

The confidence level is set at 95%, thus the significance level $\alpha = 5\%$.

4.5.3 Statistical Test

The F-test is used, with the F-table determined as:

$$F_{\text{table}} = F_{(1-\alpha), \text{df}_{\text{numerator}}, \text{df}_{\text{denominator}}} = F_{0.95, (2, 27)} = 3.335$$

4.5.4 Calculation of F-test Statistic

$$F_{\text{count}} = \frac{R^2/k}{(1-R^2)/(n-k-1)} = \frac{0.057/2}{0.943/27} = \frac{0.0285}{0.034} = 0.838$$

The test statistic is then compared with the critical value to determine acceptance or rejection of H_0 .

4.6 Limitations of Instrument Testing

The research instrument was tested only once, although statistical calculations indicate it is valid and reliable. The limitations include:

- Only 30 respondents were surveyed, limiting generalizability.
- The accuracy of respondents' answers may vary.
- The research was conducted only on service users or passengers of the Ro-Ro ferry.

In addition, the questionnaire depends on the honesty of respondents. To mitigate this, the following steps were taken:

1. The identity of respondents was not included on the answer sheet.
2. Respondents were appealed to answer honestly.
3. Respondents were informed that answers were not related to occupation or position.

5. Conclusions

This shows the magnitude of the positive relationship between service quality and customer satisfaction with service passenger loyalty of 75.8%, while the rest is the relationship of other factors that are not analyzed in this model.

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Author Contributions

RFJS contributed to conceptualization, methodology, and writing of the original draft. PW was responsible for data collection, formal analysis, supervision, and review. PCS handled the literature review, validation, and project administration.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. This research was conducted independently, and no financial or personal relationships influenced the results or interpretation of the findings.

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