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An Assessment of Consumer Perceptions: Evidence from Krakatau International Port in Indonesia

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ABSTRACT

The main problem in this research was the decreased capacity of the companies at Krakatau International Port, indicating the lowered customer satisfaction with grain cargo services at Krakatau International Port and the necessity for paying attention to the causes of the decreased number of grain cargo customers. This research aimed to evaluate the level of customer satisfaction with the service quality of Krakatau International Port. The methods used in this research were Customer Satisfaction Index and Importance Performance Analysis. The results of this research showed the attributes that should be prioritized for improvement by Krakatau International Port, namely the clarity of procedures for work permit requirements and flow. Some efforts are needed to manage customer criticisms and suggestions and competitive service prices from Krakatau International Port. The key finding was that there should be improvements in service quality to enhance the satisfaction of Krakatau International Port customers, such as improving the procedures for work permits, socializing the flows, improving the system of managing criticisms and suggestions from customers, and determining the strategy to manage port service prices by the applicable policy.

1. Introduction.

In managing the port business from 2018 to 2022, Krakatau International Port experienced ups and downs in its service delivery. In 2022, the Port experienced a decrease in the quantity of dry bulk cargo compared to 2021. The number of dry bulk cargo companies using the port service of Krakatau International Port in 2018 was 58. The number decreased to become 17 companies in 2019. Although it increased to become 48 companies in 2020 and increased again in 2021, it returned to decline to become 44 companies in 2022. This indicates lower customer satisfaction for grain cargo at Krakatau International Port, and it needs to pay attention to the cause of the decreased number of grain cargo customers in 2022, whether port facilities, port services, or port tariffs. Concerning port management, the terminal operator should develop a port strategy to improve its port service quality and attain many more cargo containers in the tight competition among Asian ports (Lee & Hu, 2012). Companies must maintain and attract new customers through quality port services to add value to their business (Haris et al., 2023). Sayareh et al. (2016) stated that tangibles have the maximum gap, and empathy has the minimum gap between customers' expectations and perceptions.

The modern technology facilities used in the integrated warehouse are conveyor belts connected to the wharf facilities, including its unloading equipment and a continuous ship unloader. Therefore, the cargo movement process is much faster and more effective because it is supported by sophisticated technology. The measurements of price suitability that can influence purchase decisions are price level, discount, and payment requirements (McCarthy & O'Keeffe, 2012). Port facilities and equipment are provided to achieve standard port service performance. Kotler (2018) emphasizes three essential things in building customer satisfaction: quality, services, and value. Previous re-

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search on the use of IPA and CSI at ports has been conducted. In general, research using IPA is a valid management tool and will be able to give optimal inputs to the management in the process of decision-making (Feng et al., 2014; Hermanto et al., 2022; Sever, 2015; Mujahidin et al., 2021). Ha and Ahn (2017) found that using IPA analysis will enable the port manager to give input in seeking managerial and operational strategies for the sustainable growth of the Port.

2. Literature Review.

2.1. Integrated Warehouse.

The warehouse is theoretically a vital intersection point in the supply chain that can determine the cost and level of service to see the potential business success (Küçükdeniz & Erkal Sönmez (2022). The integration and implementation of warehousing and manufacturing systems are much needed because the information control system based on automation and warehouse is inconsistent with the production information system (Tong et al., 2023). An integrated warehouse is a warehouse that uses an integrated system. Integrated warehouses consist of two types: storage warehouses and vertical warehouses. Küçükdeniz and Erkal Sönmez (2022) categorize the unit of stock storage to design the layout of the warehouse by integrating the frequency and weight of the Integrated Warehouse system. Research concerning Integrated Warehouse will provide an in-depth understanding of current issues and trends, by which companies can enhance the efficiency and effectiveness of their reverse logistics operations and reduce the environmental impacts of their activities (Arab et al., 2024; Chen et al., 2024; Soekirman, 2024; Ricardianto et al., 2022).

2.2. Customer Satisfaction Index (CSI).

Theoretically, satisfaction is one's pleasure regarding job evaluation based on work performance (Kotler & Armstrong, 2018; Kotler & Keller, 2016). Satisfaction results from a strong desire and motivation to finish a job (Riyanto et al., 2021; Virgiawan et al., 2021). Passenger satisfaction is one of the critical factors in developing a transportation planning strategy (Xie et al., 2020). Passenger satisfaction is crucial in marketing to improve service quality (Ugboma et al., 2007; Park & De, 2015; Agusinta et al., 2024; Priyanto et al., 2023). Fenstad et al. (2016) explain that the pleasure of visiting other countries decreases because of a faster cycle in the Port due to efficient cargo handling operations. CSI is a structural model based on customer satisfaction assumptions considering several operational dimensions such as perceived value quality, customer expectation, and corporate image (Turkyilmaz et al., 2013). Chien et al. (2003) found that every country provides its national customer satisfaction index to analyze customer satisfaction.

2.3. Importance Performance Analysis (IPA).

Importance Performance Analysis (IPA) was developed by Martilla and James (1977) as a tool for analyzing customer satisfaction and was based on the attribute of service quality. IPA is a helpful method to check customer satisfaction and management strategy (Sever, 2015). IPA is used to help service companies prioritize a service improvement when the resources are limited (Feng et al., 2012). IPA is also a simple marketing model commonly used to identify a value proposition's main strengths and weaknesses, and it is also related to SWOT analysis. IPA is useful for identifying SWOT based on a customer satisfaction survey that results in SWOT prioritized by customer needs (Arbore & Busacca, 2011; Deng et al., 2008; Phadermrod et al., 2009).

Previous research has found several research gaps. Wicaksono and Djakfar (2022), in their research concerning the Tenau Container Port Terminal's operation in Kupang City using the methods of IPA and CSI, find a difference in environmental conditions and human resource characteristics. A comprehensive study using the SerQual method with five dimensions in the port industry finds a gap in service quality through interviews (Miremadi et al., 2011). A research gap also exists in the container liner shipping industry, indicating that the ability to offer long-term tariffs is ineffective in enhancing customer satisfaction (Hirata, 2019; Rizaldy et al., 2024). The goals to reach by the result of this research are (1) to evaluate the level of customer satisfaction at Krakatau International Port with the provided service facilities, regulating policy, and prevailing tariff, (2) to identify the attributes that become customer expectation, and (3) to formulate the proposal of service quality improvement to enhance the customer satisfaction at Krakatau International Port.

3. Research Methodology.

The research location is Krakatau International Port, considering that dry bulk unloading activities by port service users are the reference for the dry bulk unloading service system. The research variable in the survey of customer satisfaction in 2023 included five operational dimensions, namely: (1) facilities, (2) health safety environment, (3) Krakatau international port solutions, and invoicing, (4) anti-bribery and information security, and (5) external dimensions. This research used the Customer Satisfaction Index (CSI) to comprehensively know user satisfaction regarding service attributes' performance and expectation levels. Importance Performance Analysis (IPA) is a technique used to identify the attributes of a product or service that most consumers need. It is conducted in an area that generally represents the respondent population. Consignees are the respondents used as samples in this research. The users of Krakatau International Port facilities consist of three types of customers: consignees of as many as 38 companies, shipping agents of as many as ten companies, and stevedoring and sea logistic delivery service companies of as many as 15 companies, making a total sample of as many as 63 companies, with the minimum target of 80%. The data analysis technique used in the Survey of Customer Satisfaction 2023 was customer transactions using the Likert Semantic scale. Data processing was conducted based on the sequence, such as the CSI method, IPA method, and data processing of the survey result of Integrated Warehouse using a gap method.

4. Results and Discussion.

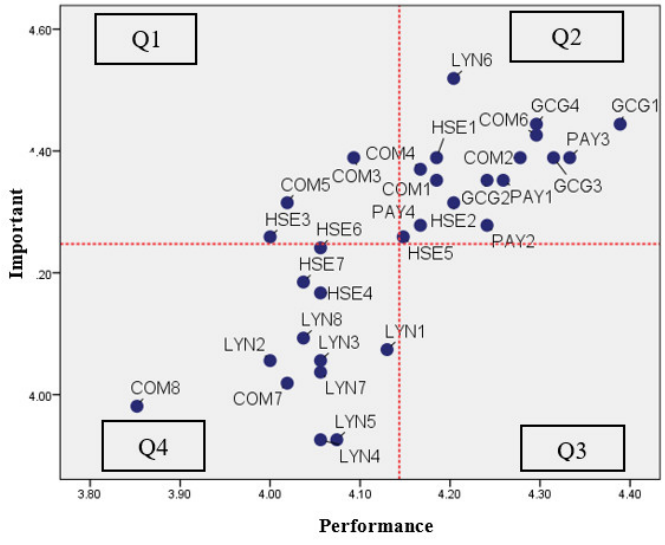
4.1. Customer Satisfaction Index (CSI) Analysis.

The Customer Satisfaction Index of 2023, measured using the standard method, namely Customer Satisfaction Index (CSI), takes the importance level of an attribute into account and compares it with the level of satisfaction perceived by the users. The CSI value of Krakatau International Port is 83.71%, indicating a relatively high level of customer satisfaction with the services provided, which is included in the satisfied category. Customer satisfaction varies among the types of customers, with the CSI of Consignee achieving 84.41%, Agent 83.46%, and Stevedoring and Sea Logistic Delivery Service company 82.27%. These results indicate a relatively high level of customer satisfaction in all categories. Although there is a slight difference, all the CSI for each category or type of customer are in the category of being satisfied.

4.2. Importance-Performance Analysis (IPA).

Subsequently, after knowing CSI both whole and partially for each type of customer, it is essential to know the improvement priority Krakatau Bandar Samudera must make to improve the CSI in the future. Improvement priority analysis uses IPA for both all and each customer type. The attributes that become a whole improvement priority are depicted in Figure 1.

Figure 1: Quadrant of Importance-Performance Analysis.



Source: Authors.

From Figure 2, it can be seen that three attributes are included in Quadrant 1. Customers consider these attributes necessary, but Krakatau Bandar Samudera's performance in satisfying customers is still considered below average. Based on the priority attributes for improvement, three aspects emerge involving the clarity of work permit requirements and workflow procedures at Krakatau International Port. Krakatau International Port strives to manage customer criticism, suggestions, and competitive service levels. First, clarifying procedures for work permit requirements and flow becomes an essential focus since this transparency supports operational efficiency and minimizes potential mistakes. Second, managing customer criticisms and suggestions reflects the commitment to sustainable improvements and receiving constructive feedback. The last, the necessity to maintain competitive service prices aims to support competitiveness and customer satisfaction. By prioritizing improvements in these aspects, Krakatau International Port can improve its performance, strengthen its relations with customers, and ensure its competitiveness in the market.

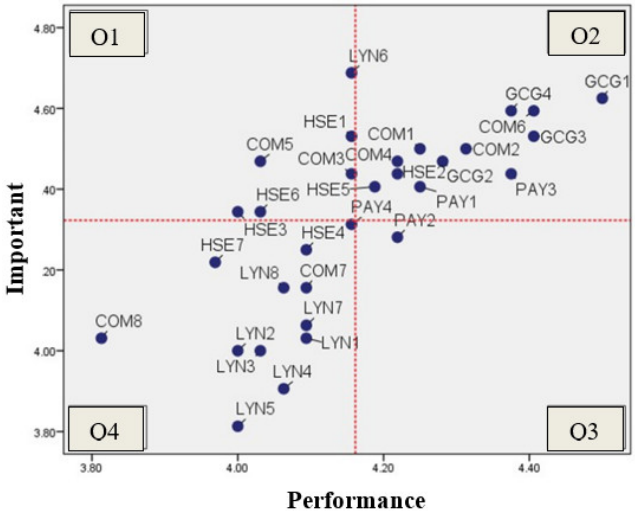
Quadrant 2 shows the high performance of Krakatau Internasional Port and high customer expectations for the Port's performance. The statement in this quadrant is excellence and, therefore, needs to be maintained. Whereas Quadrant 3 reveals low port performance and low customer expectations, it is not the customer's or the main improvement priority. As a result of the analysis, no attribute is included in Quadrant 3. Quadrant 4 reveals high port performance and low customer expectations, and the statement in this quadrant can be slightly reduced to optimize the statement in Quadrant 1.

4.3. The Results of Analysis of Three Respondents at Krakatau International Port.

4.3.1. Consignee.

Subsequently, an analysis of customers in the consignee category is conducted. The result of the IPA for the Consignee can be seen in Figure 3.

Figure 2: Consignee's Importance-Performance Analysis.



Source: Authors.

Figure 2 shows that six attributes belong to Quadrant 1, which is different from the whole IPA, which only includes three attributes. In the category of Consignee, the improvement priority of Krakatau International Port can be focused on some key aspects. First, it is necessary to improve the port facilities, such as the harbor, road, parking area, lighting, and signs, to provide Consignees with more optimum experiences in cargo unloading. Subsequently, the clarity of procedures for

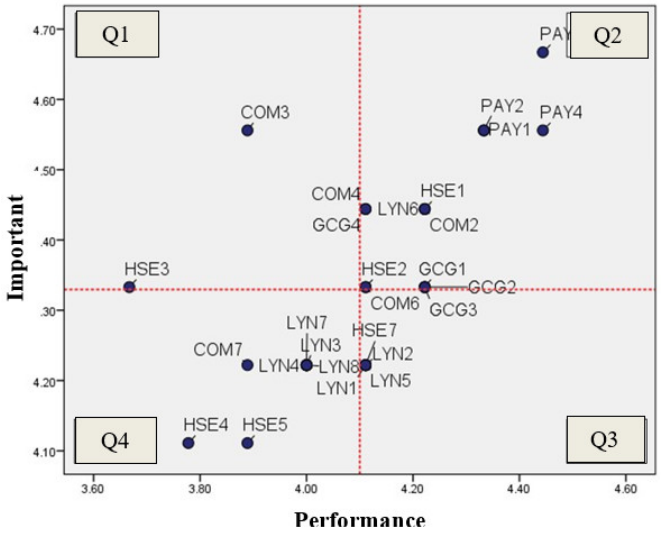
work permit requirements and flow needs to be strengthened to enhance operational efficiency. Security services must be improved to ensure maximum protection over goods and personnel. Efficiency in document handling needs to be enhanced, and the efforts to manage customer criticism and suggestions must be strengthened to respond to customer needs more effectively. Lastly, maintaining a competitive service price rate remains the focus, assuring the Consignee feels satisfied with the value provided by Krakatau International Port. By coping with these aspects, the company can improve its services and enhance customer satisfaction in the category of Consignee.

Based on the whole IPA analysis related to the attribute of improvement priority, the category of Consignee can be linked to specific attributes as the focus of improvement. First, it is essential to clarify work permit requirements and flow procedures at Krakatau International Port. This clarity contributes to customer satisfaction by reducing uncertainties and speeding up the operational process. Subsequently, it needs to pay attention to the provided port facilities such as a pier, road, parking area, lighting, and signs to support the Consignee's needs and improve their experience. Security services, efficiency in document handling, and the efforts to manage customer criticisms and suggestions are also the key factors influencing the Consignee's CSI category. Lastly, the competitive service price rate needs to be maintained so that this category gets optimum customer satisfaction. By prioritizing improvements on these aspects, Krakatau International Port can enhance the CSI in the category of Consignee and strengthen the company's positive image in customers' eyes.

4.3.2. Agent.

In the next step, the analysis of customer types included in the agent category is carried out. The result of the Agent's IPA is shown in Figure 3.

Figure 3: Agent's Importance-Performance Analysis.



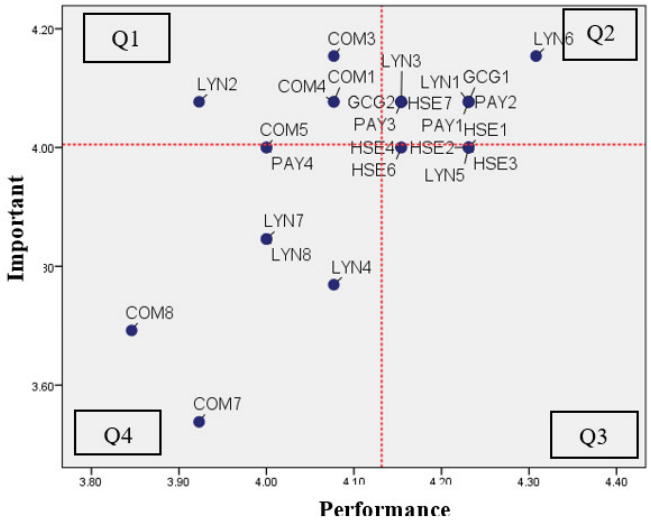
Source: Authors.

Figure 3 shows that only two attributes belong to Quadrant 1 in the customer type of Agent. The two attributes prioritized for improvement are not different from those prioritized for improvement as a whole, meaning that by improving the performance of all attributes prioritized for all customers, the problems faced by the customer type of Agent can be solved. This can indeed be made as a form of effective improvement for Krakatau Bandar Samudera.

4.3.3. Stevedoring and Sea Logistics Delivery Service Company.

The next step involves carrying out the customer type analysis for the Sea Stevedoring and Sea Logistics Delivery Service company category. The resulting IPAs of these companies are shown in Figure 4.

Figure 4: The Importance-Performance Analysis of Stevedoring and Sea Logistics Delivery Service company.



Source: Authors.

From Figure 4, it is known that there are four attributes belonging to Quadrant 1. The priority of service improvement for the customer type of Stevedoring and Sea Logistics Delivery Service company can be focused on some key attributes. First, optimizing heavy equipment, such as the provided Excavator and Front Loader, becomes essential to ensure the smooth operation of the Stevedoring and Sea Logistics Delivery Service companies. Krakatau International Port needs to enhance its efforts to understand customer needs and expectations by strengthening the aspect of empathy so it can give solutions that are more suitable to the business demands of Stevedoring and Sea Logistics Delivery Service companies. Subsequently, enhancing the effort to manage customer criticisms and suggestions will support sustainable service improvements. Information and communication technology systems need to be strengthened to enhance operational efficiency and provide more modern and integrated services with Sea Logistics Delivery Service companies. By focusing on these attributes, Krakatau International Port can strengthen its relations with customers of the Sea Logistics Delivery Service company type and enhance

their satisfaction with the provided services.

4.3.4. Analysis of Facilities Dimension.

In conducting the survey, the questionnaire is divided into several dimensions, and each dimension has attributes of statements used to measure the level of customer satisfaction. The first dimension to analyze is the service facilities provided by Krakatau International Port. The analysis is conducted by counting the average of respondents' answers, both in importance and satisfaction level. The importance level higher than the satisfaction level indicates that customer expectation has not been fulfilled yet, becoming a "gap" between expectation and reality. Most customers have a higher satisfaction level than the level of importance or customer expectation. This means that in most attributes of customer service facilities, Krakatau International Port can fulfill even exceed customer expectations.

On the other hand, there are still attributes with satisfaction levels lower than their importance, especially the attributes of provided port facilities such as wharf, road, parking area, lighting, and signs, which are still considered not able to fulfill customer expectations. This survey also captures customers' aspirations from the dimension of provided service facilities. Customer aspirations are analyzed through the word cloud, which can show the words most frequently appearing in customer aspirations.

Based on the analysis of the facilities dimension, the most frequently appearing words are wharf, followed by unloading, ship, and enter. These words represent the aspiration of customers who are less satisfied with the port facilities provided by Krakatau International Port, especially those related to the access to roads, facility extensions like additional Ship Unloader, and the improved performance of Ship Unloader in the Jetty. Some customers highlight the need to repair improper infrastructures and facilities. While praise is given to good services, there are suggestions concerning the improvement in the process of gate access administration, work permits, and parking arrangements. Customers generally emphasize the importance of maintaining loading-unloading facilities and infrastructures, increasing the harbor's depth, and continuing the corporate transformation. The average satisfaction score with the attributes in 2023 was 4.082; from the calculation, the CSI score reached 81.63%.

4.4. Result of Dimension Analysis.

4.4.1. Health, Safety & Environment (HSE) Dimension.

The same analysis is done for the HSE dimension. In socializing the use of personal protective equipment, it is seen that this aspect is considered very important, with a score of 4.389, whereas the level of satisfaction is 4.185. Although the satisfaction level is still high, there is a potential for further enhancement. The experience of obtaining safety induction from the HSE unit is also regarded as necessary, with a score of 4.315 for importance and 4.204 for satisfaction, indicating a pretty high level of satisfaction. However, the clarity of procedures for work permit requirements and flow gets a lower satisfaction score (4.000), although it is considered necessary (4.259), indicating the potential need for improvement. HSE and security services at Krakatau International Port and the ability to track and trace cargo delivery obtain high scores for importance and satisfaction. Finally, implementing an online HSE licensing system (4.167) with an adequate satisfaction level (4.056) is essential. In conclusion, this evaluation is the basis for improving and enhancing certain aspects of the work environment of the Krakatau International Port area.

This survey also catches customer's aspirations for the HSE dimension. Some customer input is related to specific areas in the restricted area of Krakatau International Port, especially the addition of signs and directions to cope with the congestion of parking queues. There is still congestion because there is only one scale at the exit gate. Some customers expect an improvement in road signs and markings, especially at night, while emphasizing consistency. They also highlight the importance of supervision in the wharf area and the need for convenience in permit services. Although they consider safety necessary, some suggest that the permit should not be complicated. Customers also suggest that the Port maintain its performance and reasonable facilities and encourage improved services and safety in the field, mainly cargo security. Although most customers give favorable judgment, they highlight certain aspects that need improvement or enhancement. The following analysis compares the satisfaction score of the HSE dimension to customer satisfaction with the provided services. The average satisfaction score of the attribute of the HSE dimension in 2023 was 4.086, and the CSI was 81.73%.

4.4.2. The Dimension of Krakatau International Port Solutions and Invoicing.

The next dimension to analyze is the dimension of Krakatau International Port Solutions (KPIS) and Invoicing. The evaluation of several attributes related to the Krakatau International Port Solutions service focuses on the level of importance and user satisfaction. The first attribute is "The services provided by KPIS," with a level of importance at 4.351 and satisfaction at 4.259. The following attribute, "The conformity between the use of service by customers and the bill made by Krakatau International Port," shows a high level of importance and satisfaction, with scores of 4.389 and 4.333, respectively. This shows the conformity between the use of the service and the bill received by customers. The last attribute is "The efficiency of document handling at Krakatau International Port," with a level of importance of 4.278 and satisfaction of 4.167. The level of importance is high, but the satisfaction level is slightly lower, indicating the opportunity to enhance document handling efficiency. Overall, this analysis describes how far the attributes fulfill customer needs and expectations at Krakatau International Port.

This survey also catches customers' aspirations from the dimension of KPIS and Invoicing. The most frequently appearing aspiration is "service," where the word is related to the use of KPIs, which still faces some obstacles, and the services are expected to improve. Although most customers consider the services good, there is an aspiration that the assistance to service users can be enhanced further. Some other customers want the improvement of the KPIS service system to avoid the mistakes

that frequently occur. Most users feel satisfied with the services, but some expect improvements, including process acceleration and consistency. Apart from some critical inputs, many users still appreciate and consider the integrated system of KPIS to have run well. The average satisfaction score in 2023 was 4.222; based on the analysis, the CSI score reached 84.44%. Thus, on average, customers feel satisfied with the dimension of KPIS and invoicing.

4.4.3. The Dimension of Anti-Bribery and Information Security.

The fourth dimension to analyze is related to Good Corporate Governance or the dimension of anti-bribery and information security. The analysis is conducted in the same way as the previous dimension. The dimension of anti-bribery and information security is critical in all the attributes analyzed. The transparency and effectiveness of implementing the anti-bribery and gratification policy at Krakatau International Port get a high score in importance (4.444) and satisfaction (4.389). Implementing the integrity zone and the efforts of Krakatau International Port to protect customers from potential fraud or false information are also considered necessary, with scores of importance 4.352 and 4.389, respectively, and relatively high satisfaction, with scores of 4.241 and 4.315. The effort of Krakatau International Port to keep the confidentiality of company data and information is also considered necessary (4.444), and it is a source of fair satisfaction (4.296). These results reflect that customers consider Krakatau Bandar Samudra to earnestly implement anti-bribery policies and integrity zones and keep information secure. Although there is little difference between the level of importance and satisfaction, all the high scores express success in fulfilling customer expectations. However, attention still needs to be paid to maintaining or improving the service quality in the future. The average score of satisfaction attribute in 2023 was 4.296, and based on CSI analysis, it scored 85.93%. In the dimension of customer satisfaction, on average, customers feel satisfied with the dimension of anti-bribery and information security at Krakatau International Port.

4.4.4. External Dimension.

The last dimension to analyze is the External Dimension. Most of the satisfaction levels are below the level of importance. These indicate that customer expectations still need to be fulfilled. These also illustrate the importance of customer satisfaction levels in various aspects of services provided by Krakatau International Port. Regarding Krakatau International Port's effort to understand customer needs and expectations, the importance and satisfaction levels are relatively high, with scores of 4.35 and 4.19, respectively. These scores indicate that customers appreciate the effort of Krakatau International Port to understand and respond to their needs. The effort of Krakatau International Port to build a collaboration with customers to manage their criticisms and suggestions also gets a favorable judgment. However, there is a slight decrease in the satisfaction level of the second aspect. The use of information and communication technology systems and Krakatau International Port's competitive service price are also judged high, both in importance and satisfaction, showing a recognition of the use of technology and competitive price policy. The easy payment procedure is considered high in both dimensions, showing that customers give positive value to the ease of payment.

The availability of Integrated Warehouse service facilities and the conformity of price rates to use Integrated Warehouses get pretty good judgment. However, there is a slight decrease in satisfaction in the second aspect. Overall, the analysis results show that Krakatau International Port received a favorable decision in most service aspects based on customer evaluation. However, it still needs to pay attention and improve the elements experiencing decreased satisfaction to provide better services in the future. The average satisfaction score of attributes in 2023 was 4.204, and based on CSI analysis, it reached 84.07%. In the external dimension, customers feel satisfied with the dimension of customer satisfaction at Krakatau International Port.

4.4.5. Criticisms and Suggestions from Customers in General.

Based on the most frequently appearing words, services and facilities represent most customers' criticisms. Customers express various criticisms and suggestions related to the services at Krakatau International Port. Some customers appreciate the maintained performance and service quality, whereas others expect the emphasis on logistic cost with a more competitive port tariff. There are also suggestions to bravely make innovations in the port business development in the national maritime ecosystem to compete better at the national level. Some criticisms include the request that the port tariffs not be more expensive, improvement of unloading facilities, and repair of room checker. Although there is general satisfaction with the services, some customers express their expectation of a comprehensive repair of facilities, such as deepening two wharves and providing shelters in the harbor. In addition, there are some notes concerning slow response by instant messages, complaints on the long process of the permit, and a suggestion to pay attention to the access to the warehousing area. Despite the criticisms, the general impression is that Krakatau International Port has provided satisfying services while maintaining the expectation for improvement and innovation in the future.

Some suggestions from customers to Krakatau International Port involve various aspects of services. One of the suggestions concerns the rotation of the marketing team according to customer needs, expecting faster adaptation. Some customers also expressed the need for toilet facilities that are easier to access on the pier for the workers' convenience. There is an encouragement to use an information system free from constraints and reduced tariffs. Requests for facility improvements such as ship unloader and wharf deepening are also expressed. Some customers want improved shuttle bus services, a more straightforward permit process, and unimpeded access. In addition, there are suggestions related to the unloading equipment that needs to be renewed, the loading and unloading speed that can still be increased, and the additional tug assistance facilities to avoid delays in pilotage. A focus on safety is also highlighted, especially for the members working in Krakatau International Port. Some suggestions concern accurate schedules, more flexible

entry and exit permit services, and better coordination among divisions. Besides, some customers highlight the need for improvement in the regulations related to the findings from the related parties to avoid any loss. The customer suggestions are to maintain and improve the service quality, including team, facilities, and internal coordination.

4.5. Gap Analysis of Integrated Warehouse.

The analysis of Integrated Warehouse is conducted using a gap analysis by counting the difference between the level of importance and satisfaction. In the importance, there are two attributes, namely the availability of Integrated Warehouse service facilities and the suitability of service tariff, which scored 4.75, indicating that the users or customers give a very high level of importance to the availability of Integrated Warehouse service facilities. Besides, the same score in satisfaction, which is 4.75, indicates that the users feel satisfied with the availability of those facilities. On the other hand, the attribute of the conformity of the Integrated Warehouse service usage tariff has a level of importance as high as 4.125, indicating that the users consider that the price tariff is also essential, although slightly lower than the availability of facilities. Nevertheless, a difference between satisfaction level (**??**) and importance (**??**) in this attribute is reflected in the gap value as immense as -0.75. This negative gap indicates users' dissatisfaction with the conformity of the Integrated Warehouse service usage tariff, requiring attention and improvements to enhance customer satisfaction with this aspect.

This research related to the availability of Integrated Warehouse service facilities supports some previous studies by Aravindaraj and Chinna (2022), Falkenberg and Spinler (2023), Ricardianto et al. (2023), Soekirman (2024), and Vongsumedh and Sukstrienwong (2020). The company can enhance the efficiency and effectiveness of logistic operations at the Port and reduce its environmental impacts. This research is in line with the study concerning the service facilities of Krakatau International Port. Appropriate arrangements by shipping agents and warehouse staff during the ship loading and unloading ensure cargo security is in good condition (Razak, 2024). The results of this research align with the findings by Sahara and Aamer (2022), proving that data integration plays a vital role in developing the combination of various kinds of data in the IoT-based warehouse.

The increased legal risk due to unclear procedures puts Krakatau International Port at a potential risk of facing lawsuits from the parties who feel disadvantaged due to injustice in the process of granting work permits. This lawlessness can harm the reputation of Krakatau International Port and result in additional costs in the form of fines or lawsuits. The implication of Krakatau International Port's effort to manage customer criticisms and suggestions is that the Port will lose the trust of customers who think their criticisms are not responded to seriously or their suggestions need to be better implemented. Its competitiveness in the market will be lower because it is not responsive to customers' inputs. It will lose attractiveness to customers due to uncompetitive service tariffs, making customers look for a port location that offers lower operational costs to increase their potential profit. The increased operational costs will burden those operating at Krakatau International Port with high service tariffs, and high operational costs can reduce customers' business profitability.

This research is in line with the study related to the improvement of port service quality and its positive influence on customer satisfaction, which has a significant impact on the performance of port services (Phan et al., 2021; Thai, 2016; Ugboma et al., 2007; Marina et al., 2023; Utomo & Saragih, 2023; Yeo et al., 2015). This finding supports the study by Le et al. (2020), showing that the quality of port logistic services is positively determined by five factors: responsiveness, guarantee, reliability, physical evidence, and empathy. Customer satisfaction and service quality influence the users of cargo delivery services at the Port. Thus, these researches support each other (Lermatan et al., 2023). Support comes from another study in Cilegon that records a positive and significant influence of the management of Port Business Entity by Cilegon Mandiri Port on customer satisfaction (Thai, 2016). Concerning customer satisfaction, this research supports the study at Kaohsiung Port, which has to improve service quality to enhance customer satisfaction (Chang & Thai, 2016).

Based on the description above, this research aligns with some previous studies, especially its implementation at Port using the methods of Importance Performance Analysis (IPA) and Customer Satisfaction Index (CSI). This research is also in line with the findings by Wicaksono and Djakfar (2022). Saribanon et al. (2018), in some strategies through the methods of IPA and CSI, such as the readiness of trucks and workers, the utilization of tugboats, the preparation of stacking yard for additional containers, and extra training for operators are recommended to improve the port operational services. This research supports the other research using IPA at the Port, stating that passengers generally are satisfied with the provided services. However, it still needs improvement to maintain its service performance and customer satisfaction (Saransi & Erlinda, 2024; Suryawan et al., 2023). The use of the IPA method at the Port is also in line with some previous findings related to customer satisfaction (Amehati et al., 2022; Esichaikul & Chansawang, 2020; Ha & Ahn, 2017; Lee & Hu, 2012; Nguyen et al., 2022; Widodo & Suprayitno, 2020). The particular use of the CSI method also supports some previous studies in which, from the CSI score, most customers feel satisfied with the port services.

Conclusions.

The Customer Satisfaction Index level of Krakatau International Port in 2023 was 83.71%, which belongs to the category of being satisfied with the services starting before the vessel berths until the vessel sails and until the invoicing. The attributes to be the priority of improvement by Krakatau International Port are the clarity of procedures for work permit requirements and flow at the Port and the effort of Krakatau International Port to manage criticisms and suggestions from customers as well as competitive service price rate. The recommendations for improving service quality to enhance customer

satisfaction are to improve the procedures of granting work permits, socialize the procedures and flow for granting work permits both orally and in writing, improve the system of managing criticisms and suggestions from customers, and build a strategy in managing the port service prices by the applicable policy.

It is recommended that the price rate be evaluated periodically, considering factors such as operational costs, investment in facility improvement, and the tariff offered by competitors. Krakatau International Port needs to ensure that its tariffs stay competitive in the market without sacrificing service quality. Regular review and collaboration with customers to understand their needs can help determine fair and competitive tariffs. The clarity of procedures for work permit requirements and flow, managing criticisms and suggestions from customers in a good way, and keeping competitive service tariffs are essential to maintain the attractiveness of Krakatau International Port in customers' eyes. In addition, these can maintain customer satisfaction, develop a strong reputation, prevent corrupt practices, and create a fair and transparent business environment.

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