http://ejournal.stipjakarta.ac.id

METEOR STIP MARUNDA

pISSN : 1979 - 4746
eISSN : 2685 - 4775

Maritime Institute of Jakarta

User Perception of Service Quality Following Port Rehabilitation: A SERVQUAL and Modified Importance-Performance Analysis at a Non-Commercial Bulk Feeder Port

Tiyas Kurniawan[1], Samelia Jenny Satiah[2], Ram Priye Kumar Sahu[3]

[1]Master Marine Transportation Program, Hochschule Wismar, Rostock, Germany

[2] Planning Research and Economic Affairs/ National Port Authority, Liberia

[3]Master Marine Engineering Program, Hochschule Wismar, Rostock, Germany

**Email Correspondence: t.setiyono@stud.hs-wismar.de*

Submitted: 12/03/2026 ***Revised:*** 09/04/2026 ***Accepted:*** 13/05/2026 ***Published:*** 30/06/2026

ABSTRACT

Terminal Sluke, a publicly operated bulk and energy feeder port in Rembang, Central Java, underwent a partial berth and trestle rehabilitation in 2023-2024, and this study examines whether its users perceived a change in port service quality. Perception was measured with SERVQUAL, a Customer Satisfaction Index, and a modified importance-performance analysis, and compared with the terminal's berth occupancy ratio. In an exploratory sequential mixed-methods design, an open-ended survey in October 2024 (n = 12) identified the attributes that matter to vessel agents, stevedoring contractors, and the pilotage provider, and a four-point SERVQUAL questionnaire measured them in May 2025 (n = 19; Cronbach's alpha = 0.90). The basic and weighted indices both place users in the satisfied band (74.97% and 75.12%). Tangibles is the only dimension below the 70% threshold (69.57%), and basic landside facilities scored lowest. Reliability, Responsiveness, and Assurance fall in the keep-up-the-good-work quadrant and Tangibles and Empathy in the low-priority quadrant; because the importance weights were derived from performance, the map is read as a relative ranking. Reliability lies almost on both quadrant boundaries, and a 2025 average berth occupancy of 84.42% shows that traffic has outgrown the 2017 port master plan. Sustaining the post-rehabilitation gains requires an early revision of that plan and a resolution of the land status that blocks landside facilities.

*Copyright ©2026, **METEOR STIP MARUNDA**, pISSN: 1979-4746, eISSN: 2685-4775*

Keywords:

Port Service Quality; SERVQUAL; Customer Satisfaction Index; Importance-Performance Analysis; Berth Occupancy Ratio

1. INTRODUCTION

In an archipelagic state, ports carry a large share of the spatial economy. Indonesia is a demanding case: its development corridors are spread across thousands of islands, and regional growth depends on berths and trestles almost as much as on roads [1]. Terminal Sluke, on the north coast of Rembang Regency in Central Java, occupies a narrow niche in this system (Figure 1). It is neither a hub nor a container port. It handles coal, aggregate, and liquefied gas for regional power generation and construction supply chains, and this cargo mix shapes

what service quality means to the people who use it. The condition of the facilities matters as well. At Tanjung Priok, the performance of the stevedoring workforce and the state of port facilities both affect terminal productivity and, through it, operational performance [2], so user perception at Sluke has to be read against the condition of its physical assets.

Several regulations define Sluke's position. Minister of Transportation Regulation PM 77/2018 places the terminal under the Class III Port Management Unit (Unit Penyelenggara Pelabuhan, UPP) of Rembang [3]. The 2017 National Port Master Plan (KP 432/2017) classifies Sluke as a regional feeder port through 2022 and schedules its reclassification as a collector port for 2027-2037 [4]. Central Java Governor Regulation No. 69/2017 sets out its long-term development layout [5]. Construction funded by the state budget ran from about 2010 to 2018, a private dolphin for liquefied natural gas (LNG) was added in 2021, and the berth and trestle were partly rehabilitated in 2023-2024 (Figure 2). These documents explain why money was spent and when. They do not show whether the people who work at the berth noticed any difference.

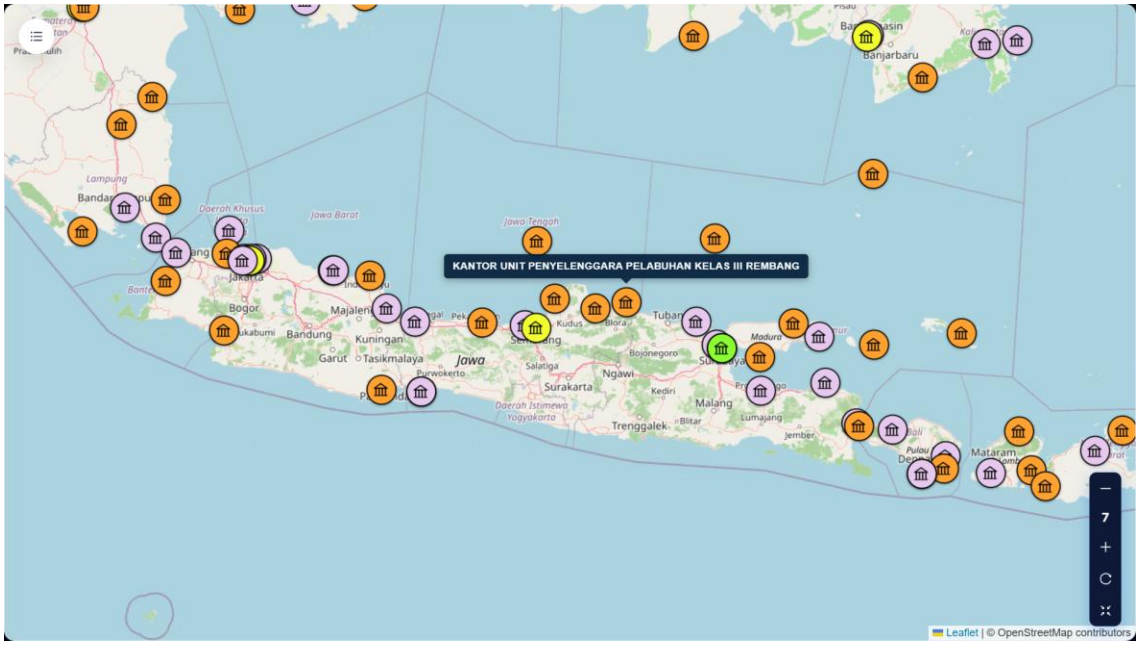


Figure 1. Location of UPP Class III Rembang Among the Technical Implementation Units of the Directorate General of Sea Transportation on Java [6]

The literature does not settle the question either. Research on port service quality has grown steadily since Parasuraman et al. [7] proposed the gap model of service quality and Martilla and James [8] introduced importance-performance analysis (IPA), but most empirical work still concerns large multipurpose or container gateways. Dirang and Iriani [9] measured the quality of the passenger waiting room at Tanjung Perak, a busy public-facing setting with little in common with a bulk terminal. Nguyen et al. [10] combined an extended fuzzy analytic hierarchy process with IPA at Dong Nai Port in Vietnam, where shipping companies and ocean freight forwarders gave empathy (21.07%) and tangibles (20.15%) the highest importance of six dimensions. At Sluke, the same two dimensions received the lowest performance scores. The contrast raises the possibility that users of a bulk and energy terminal judge service by different criteria. A vessel agent or stevedoring contractor handling coal or gas at the berth needs different things from a passenger or a freight forwarder at a commercial port, and one hierarchy of expectations is unlikely to fit both.



Figure 2. Berthing Facility at Terminal Sluke Before (Left) and After (Right) the 2023-2024 Rehabilitation

Small non-commercial feeder terminals are worth studying in their own right for this reason. We found no published study that examines user perception around a rehabilitation cycle at a port of this kind, that is, a publicly operated terminal built around bulk and energy cargo and used by a closed group of professional users.

The framework of Parasuraman et al. [7], [11] defines perceived service quality as the gap between what users expect and what they experience. It follows that public spending on a port improves service quality only if it narrows that gap for the people who use the asset, and tonnage figures or budget realization cannot show whether it has. Investment in Indonesian ports is usually justified on throughput or safety grounds and is seldom checked against user perception. Sluke offers a workable setting for such a check. Its physical condition before 2024 differs visibly from its condition afterwards (Figure 2), and its user base is small enough to be studied in depth.

Since no service-quality survey had been conducted at Sluke before, the study first had to establish which attributes this specialized population cares about and only then measure them. This is the logic of the exploratory sequential design described by Creswell and Plano Clark [12], in which a qualitative strand shapes the quantitative strand that follows. The objective of this study is to examine how users perceived the operational performance of Terminal Sluke before and after the completion of the 2023-2024 rehabilitation. It also identifies which SERVQUAL dimensions need continued attention, given that vessel traffic has run well above the forecast of the port master plan (Rencana Induk Pelabuhan, RIP) since 2021 (Figure 3). An open-ended survey in October 2024 identified the relevant attributes, and a SERVQUAL questionnaire in May 2025 measured them for a Customer Satisfaction Index (CSI) and an IPA map.

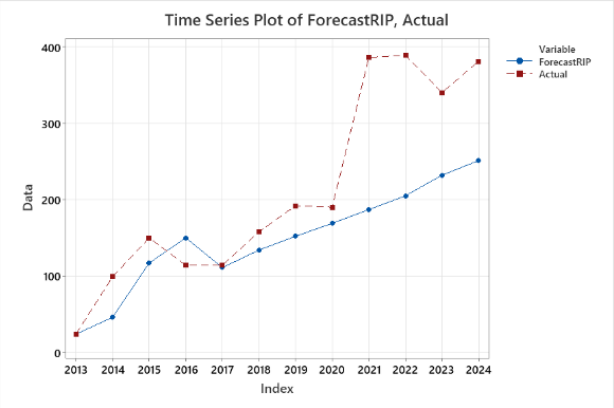


Figure 3. Actual Vessel Arrivals Versus the RIP Forecast at Terminal Sluke, 2013-2024

2. RESEARCH METHOD

Research Design

The study used an exploratory sequential mixed-methods design. In this design a qualitative strand is collected and analyzed first, and its results shape the instrument and constructs of the quantitative strand that follows [12]. The sequence was chosen for a practical reason. No SERVQUAL-type survey had been given to Sluke's users before, and there was no evidence about which service dimensions this small, specialized group would regard as relevant. Phase 1 was used to build the instrument, and Phase 2 measured what Phase 1 had brought to light.

Research Setting and Participants

The study was conducted at Terminal Sluke, Rembang Regency, Central Java, which is administered by UPP Rembang. The terminal serves a closed, well-defined population of 26 shipping agencies, 7 stevedoring (loading and unloading) contractors, and one pilotage and towage provider, or 34 eligible entities in total. Phase 1 used a purposive sample of 12 respondents in October 2024. Phase 2, in May 2025, received 19 responses from shipping-agency representatives, stevedoring contractors, the terminal operator, the pilotage and towage provider, and several ancillary service firms.

Compared with port users in general, both samples are small. The relevant population, however, is only 34 entities, and 19 responses correspond to roughly 56% of that number. The Phase 2 sample is closer to a partial census of a specialized business-to-business user group than to a convenience sample. It also fits the case Creswell and Plano Clark [12] make for depth over breadth when the population itself is

small, since Sluke has no larger pool of agents and stevedoring firms to draw from.

Data Collection

Phase 1 used an open-ended questionnaire distributed through Google Forms. It collected respondent background data and contained 17 substantive questions and a closing narrative prompt on physical condition, operational effectiveness, safety procedures, environmental care, and communication. The narrative answers were analyzed with the six-stage thematic analysis of Braun and Clarke [13]: familiarization, initial coding, searching for themes, reviewing themes, naming themes, and writing up. This step identified the service attributes that recurred in the respondents' own words before any external framework was imposed. Each answer was then given an ordinal score from 1 to 5 according to its content; an answer describing the facilities as "poor, because..." was coded 2, for example. Item means were rounded to the nearest category, with fractions of 0.5 or more rounded up.

The themes that emerged (physical condition, accessibility, safety, environmental care, and information flow) were assigned to the five SERVQUAL dimensions of Parasuraman et al. [11]: tangibles, reliability, responsiveness, assurance, and empathy. This mapping became the basis of the Phase 2 instrument, a 27-item closed questionnaire, also distributed through Google Forms and scored on a four-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Three open-ended items on short- and long-term expectations closed the questionnaire.

The internal consistency of the 27 Phase 2 items was tested with Cronbach's alpha. The coefficient was 0.90, well above the conventional threshold of 0.70. Two cautions apply. With 19 respondents the estimate is imprecise, and a high alpha shows that the items vary together without showing that they measure five separate dimensions. The content validity of the instrument rests mainly on the fact that its items came from the Phase 1 findings of the same population.

Data Analysis

Phase 2 responses were averaged by item and by dimension. A basic CSI was computed for each dimension j as the ratio of its mean score to the maximum score of the scale:

$$CSI_j = \frac{\bar{x}_j}{4} \times 100\% \quad (1)$$

where $\bar{x}_j$ is the mean score of dimension j on the 1-4 scale. The overall basic CSI is the mean of the five dimension values. The index was read against a five-band scale running from very poor (below 40%) to excellent (85-100%), in which 70% is the lower limit of the satisfied band and values just below it are read as fairly satisfied.

A weighted CSI was computed for comparison. The Phase 2 questionnaire recorded agreement with performance statements only and collected no separate importance or expectation ratings, so the weight of each dimension was taken as its share of the summed dimension means:

$$w_j = \frac{\bar{x}_j}{\sum_{k=1}^{5} \bar{x}_k} \times 100\% \quad (2)$$

$$CSI_w = \sum_{j=1}^{5} \frac{\bar{x}_j}{4} w_j \quad (3)$$

The same weights served as the importance axis of an IPA following Martilla and James [8]. Each dimension was plotted by its weight (importance) and its mean score (performance). The map was divided into four quadrants at the grand means of both axes: Quadrant I (concentrate here), Quadrant II (keep up the good work), Quadrant III (low priority), and Quadrant IV (possible overkill). Because the importance values are computed from performance instead of being collected independently, the procedure is referred to here as a modified performance-weighted IPA. Its interpretive limits are discussed in Section 3.2.

3. RESULTS AND DISCUSSIONS

3.1. Results

Phase 1 Survey (October 2024)

The Phase 1 survey (n = 12) gave a mixed picture (Table 1). Overall satisfaction averaged 3.58, which rounds to "satisfied" under the study's rule. Yet five of the ten items scored below 3.00, all related to physical condition or on-site procedure: berth condition (2.83), basic facilities (2.08, the lowest score recorded), cleanliness and maintenance (2.58), safety procedures (2.25), and environmental care (2.67). Communication between UPP Rembang and its users scored highest (4.00). Phase 1 thus shows specific complaints about hardware and procedure within a generally tolerant overall judgment. A single closed questionnaire would probably have flattened that distinction.

Table 1. Summary of Phase 1 Questionnaire Responses (October 2024, n = 12)

Question	Mean	Condition	Respondents' answers (%)				
			1	2	3	4	5
Physical condition of port facilities (berth)	2.83	Fair	0	42	33	25	0
Accessibility to the port	3.50	Adequate	0	25	0	75	0
Effectiveness of the loading and unloading process	3.50	Good	0	25	0	75	0
Condition of basic facilities at the port	2.08	Poor	17	67	8	8	0
Cleanliness and maintenance of port facilities	2.58	Fair	0	67	17	8	8
Communication between port operators and service users	4.00	Good	0	0	33	33	33
Safety procedures implemented at the port	2.25	Poor	0	75	25	0	0
Awareness of preserving the surrounding environment	2.67	Fair	0	58	17	25	0
Availability of information (weather, schedules, and berth availability)	3.00	Good	0	17	67	17	0
Overall satisfaction with Terminal Sluke, Rembang Port	3.58	Satisfied	0	0	58	25	17

Note: Narrative answers were coded from 1 (lowest) to 5 (highest); the condition label follows the rounded mean.

Phase 2 Survey (May 2025)

The Phase 2 survey (n = 19) was run after the rehabilitation and used the SERVQUAL questionnaire on a 1-4 scale (Table 2). All items but one averaged in the "agree" range. The exception was basic facilities such as parking, waiting rooms, and toilets, which scored 2.47 and was the only item in the "disagree" range. The highest score (3.47) went to the wish that operating hours, facilities, and services keep improving, and all 19 respondents agreed or strongly agreed with it. Users, then, did not regard the rehabilitation as finished. They wanted the improvement to continue.

Table 2. Summary of Phase 2 Questionnaire Responses (May 2025, n = 19)

Statement	Mean	Condition	Respondents' answers (%)			
			1	2	3	4
Tangibles (physical facilities)						
The physical condition of the port environment roads is good and supports operations.	2.95	Agree	0.0	21.1	63.2	15.8
The physical condition of the trestle and causeway is good and supports operations.	2.79	Agree	0.0	31.6	57.9	10.5
The physical condition of the wharf/pier is good and supports operations.	2.89	Agree	0.0	21.1	68.4	10.5
The physical condition of the lighting is good and supports operations.	2.74	Agree	0.0	31.6	63.2	5.3
Basic facilities such as parking areas, waiting rooms, and toilets are adequate.	2.47	Disagree	5.3	47.4	42.1	5.3
Loading and unloading equipment (ramp door, excavator, piping, etc.) is available and functioning well.	3.00	Agree	0.0	10.5	78.9	10.5
Safety facilities (first aid kits, fire extinguishers, signs) are adequately available.	2.74	Agree	5.3	31.6	47.4	15.8
Cleanliness and maintenance of the port area are carried out routinely.	2.68	Agree	5.3	31.6	52.6	10.5
Reliability (service reliability)						
The loading and unloading process is timely and efficient.	3.11	Agree	0.0	5.3	78.9	15.8
Road access to the port is adequate for logistics distribution.	2.89	Agree	0.0	21.1	68.4	10.5
Port services are consistent and reliable.	3.05	Agree	0.0	5.3	84.2	10.5

Statement	Mean	Condition	Respondents' answers (%)			
			1	2	3	4
Sufficient information is available regarding weather, ship schedules, and berths.	3.00	Agree	0.0	5.3	89.5	5.3
Safety procedures are properly implemented for gas handling.	3.05	Agree	0.0	10.5	73.7	15.8
Safety procedures are properly implemented for handling coal and other mining products.	2.89	Agree	5.3	10.5	73.7	10.5
Responsiveness (staff responsiveness)						
Port staff/port operators respond quickly to requests and complaints from service users.	3.16	Agree	0.0	0.0	84.2	15.8
Information on schedule and operational changes is communicated clearly and quickly.	3.26	Agree	0.0	0.0	73.7	26.3
Port officers are open to suggestions and feedback from service users.	3.16	Agree	0.0	0.0	84.2	15.8
Assurance (trust and security guarantee)						
I feel safe while conducting activities at Sluke Port.	2.84	Agree	0.0	26.3	63.2	10.5
Port staff possess sufficient knowledge in handling port operations.	3.16	Agree	0.0	0.0	84.2	15.8
Safety training or guidelines for port users need to be provided routinely.	3.21	Agree	0.0	5.3	68.4	26.3
Empathy (care for users)						
Port operators pay attention to the needs and comfort of service users.	3.05	Agree	0.0	5.3	84.2	10.5
Port operators have shown concern for environmental sustainability.	2.95	Agree	0.0	10.5	84.2	5.3
Waste management and environmental impact procedures have been carried out well.	2.84	Agree	5.3	5.3	89.5	0.0
Overall assessment						
I am overall satisfied with the services and facilities at Sluke Port.	2.84	Agree	5.3	10.5	78.9	5.3
I would like the operational hours, facilities, and services of Sluke Port to be continuously improved in the future.	3.47	Agree	0.0	0.0	52.6	47.4
I am willing to continue using Sluke Port as part of our business operations.	3.37	Agree	0.0	0.0	63.2	36.8

Note: 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree.

Customer Satisfaction Index

The overall basic CSI was 74.97%, in the satisfied band (Table 3). Tangibles, at 69.57%, was the only dimension below the 70% line and was read as fairly satisfied, while Responsiveness scored highest at 79.82%. The derived weights span a narrow range, from 18.56% for Tangibles to 21.30% for Responsiveness, and the weighted CSI was 75.12%, also in the satisfied band (Table 4).

Table 3. Basic Customer Satisfaction Index (CSI) by Dimension

Dimension	Items	Mean	CSI (%)	Interpretation
Tangibles	8	2.78	69.57	Fairly satisfied
Reliability	6	3.00	75.00	Satisfied
Responsiveness	3	3.19	79.82	Satisfied
Assurance	3	3.07	76.75	Satisfied
Empathy	3	2.95	73.68	Satisfied
Total	**23**	**3.00**	**74.97**	**Satisfied**

Note: CSI = (mean/4) × 100%; the total row is the mean of the five dimensions.

Table 4. Importance Weights and Weighted Customer Satisfaction Index (CSI)

Dimension	Mean	Weight calculation	Weight (%)	Weighted score calculation	Weighted score (%)
Tangibles	2.78	(2.78/14.99) × 100	18.56	(2.78/4) × 18.56%	12.91
Reliability	3.00	(3.00/14.99) × 100	20.01	(3.00/4) × 20.01%	15.01
Responsiveness	3.19	(3.19/14.99) × 100	21.30	(3.19/4) × 21.30%	17.00
Assurance	3.07	(3.07/14.99) × 100	20.48	(3.07/4) × 20.48%	15.72
Empathy	2.95	(2.95/14.99) × 100	19.66	(2.95/4) × 19.66%	14.48
Total	**14.99**		**100.00**	**Weighted CSI**	**75.12**

Note: Weights follow Equation (2) and weighted scores Equation (3); all values were computed from unrounded mean scores.

Importance-Performance Map

Table 5 lists the coordinates used for the IPA, and Figure 4 shows the resulting map. Reliability, Responsiveness, and Assurance fall in Quadrant II, and Tangibles and Empathy fall in Quadrant III. No dimension falls in Quadrant I or IV. Reliability lies almost exactly on both grand means, with an importance of 20.01% against a mean of 20.00% and a performance of 3.00 against 2.99.

Table 5. Importance and Performance Values Used in the IPA

Dimension	Importance (%)	Mean performance	Quadrant
Tangibles	18.56	2.78	III
Reliability	20.01	3.00	II
Responsiveness	21.30	3.19	II
Assurance	20.48	3.07	II
Empathy	19.66	2.95	III
Grand mean	**20.00**	**2.99**	

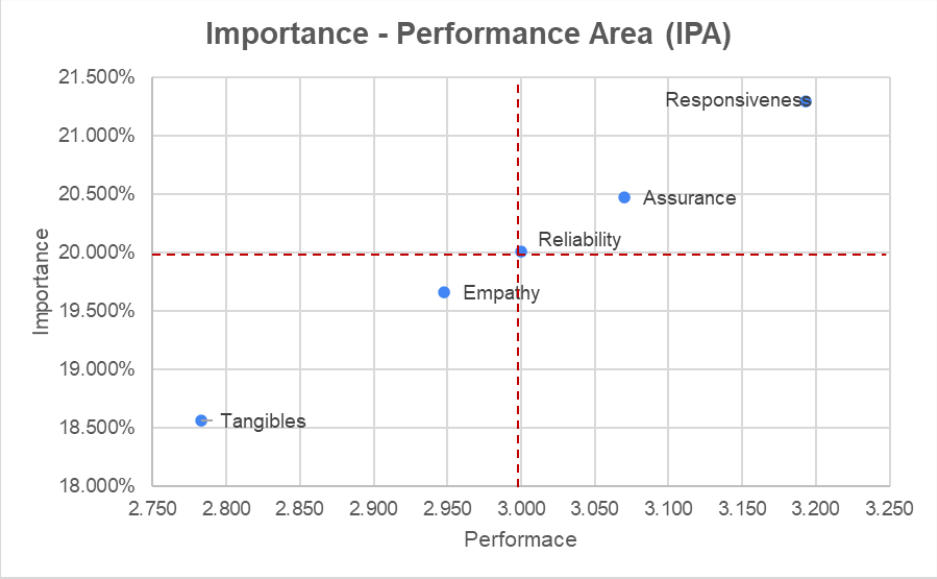


Figure 4. Modified Importance-Performance Map of the Five SERVQUAL Dimensions (Cross-Hairs at the Grand Means of 20.00% Importance and 2.99 Performance)

Vessel Traffic and Berth Occupancy

Actual vessel arrivals followed the RIP forecast loosely until 2020, then roughly doubled in 2021 and stayed well above the forecast through 2024 (Figure 3). In 2025 the berth occupancy ratio (BOR) averaged 84.42%, and six months (March, May, July,

August, September, and October) were at or above 90%.

3.2. Discussion

Basic and Weighted Satisfaction Indices

Both indices say the same thing: users are satisfied overall, at about 75%. The closeness of the two values follows from how the weights were built. Since each weight is proportional to the dimension's own mean, Equations (1) to (3) reduce to

$$CSI_w - CSI = \frac{s^2}{4\bar{X}} \times 100\% \quad (4)$$

where CSI is the overall basic index, $\bar{X}$ is the grand mean of the five dimension means, and s^2 is their population variance. The difference can never be negative, so a performance-derived weighting always rewards the dimensions that already score well. With dimension means packed between 2.78 and 3.19, the difference here is only 0.15 percentage points, and the weighting adds almost no information. The more useful signal lies in the spread between dimensions, above all in the Tangibles score of 69.57%, just under the satisfied band.

Reading the Modified IPA

The IPA map calls for a similar caution. Classical IPA measures importance and performance separately, usually through distinct expectation and perception items, so that the quadrant map reflects two different constructs [8]. Here the importance of each dimension is its performance divided by a constant, as Equation (2) shows. A dimension therefore lies above the importance line exactly when it lies to the right of the performance line, and the five points fall on one straight line (Figure 4). Quadrants I and IV cannot be reached. The empty Quadrant I is a property of the procedure and should not be taken as evidence that no dimension needs urgent attention. What the map does offer is a ranking of the five dimensions by relative performance within this dataset, and its quadrant boundaries are treated below as indicative.

Reading the Quadrants Against the Cargo Profile

Read as a ranking, the pattern fits what one would expect of a bulk and energy terminal. The three dimensions tied to cargo operations (Reliability, Responsiveness, and Assurance) rank above the two tied to facilities and personal attention (Tangibles and Empathy). Nguyen et al. [10] found the opposite emphasis at Dong Nai, where shipping companies and freight forwarders gave empathy and tangibles the highest importance. The two results are not strictly comparable, because the Vietnamese weights measure elicited importance whereas the Sluke weights reflect performance. They do suggest a real difference in what the two user groups deal with. A forwarder working through a commercial port encounters waiting rooms, signage, and front-desk staff much more often than a stevedoring contractor unloading coal or an LNG operator at Sluke. For the latter, good service means a free berth when the ship arrives, gas and coal procedures that are followed every time, and a quick answer on the radio when a schedule changes; in SERVQUAL terms, Reliability, Assurance, and Responsiveness. Tangibles and Empathy still matter to these users, but they are less central to the transaction. This reading agrees with the view that SERVQUAL dimensions carry different weight in functionally different services, although it remains a hypothesis until importance is measured independently.

Reliability deserves the closest watch. Its position on both grand means makes its classification the least stable of the five. In a classical IPA with independent importance ratings, a dimension that users value highly but whose performance declines moves into Quadrant I, the zone marked "concentrate here". The capacity data suggest that this is a realistic risk for Reliability at Sluke.

Berth Capacity Behind the Reliability Score

Vessel arrivals have run well above the RIP forecast since 2021 (Figure 3), and the 2025 BOR shows what this means at the berth. UNCTAD's planning guidance recommends a maximum berth occupancy of about 50% for a two-berth facility [14]. The 2016 expansion assessment for the Port of Townsville cites Australia's Bureau of Infrastructure, Transport and Regional Economics in treating a utilization of 80% as a sign that a berth is at or near full capacity [15]. The same assessment notes that the practical limit can be much lower depending on berth layout, and it reports an optimum of 65% even for the port's best-placed single-cargo berth. Sluke exceeds all of these benchmarks on average, and by a wide margin in six months of 2025.

The 84.42% average should not be read as a traffic story alone. Sluke's berths lie on an open, unsheltered stretch of Java's north coast. Berths of this kind are often exposed to swell and wind that close or shorten safe loading windows, however many ships are waiting. At a terminal that handles coal and aggregate with ramps, excavators, and conveyors instead of gantry cranes, a few lost working hours

lengthen each vessel's stay at the berth, and the BOR cannot distinguish that from growth in demand. The average may combine two problems, only one of which extra berth length would solve.

Forecasts also need revisiting. De Langen et al. [16] show that throughput projections resting on stable links between cargo volume and economic growth miss commodity-specific breaks, and they combine models with commodity-chain research to capture such breaks. The sharp rise in vessel calls at Sluke from 2021 onward is the kind of break that a trend-based forecast cannot anticipate. Seen this way, the marginal position of Reliability on the IPA map is an early perceptual sign of a capacity ceiling that the RIP no longer describes. Port authorities are expected to plan ahead as well as administer [17], [18]. The occupancy figures at Sluke are the kind of signal such planning is meant to catch before users notice the problem themselves.

Landside Constraints on Tangibles

The Tangibles gap adds to this picture. Basic facilities received the lowest item score (2.47). The regional office building that users asked for has not been built, partly because the legal status of the reclaimed land set aside for landside expansion is still unresolved; the land is not yet "clean and clear" [19]. Land availability appears to limit improvement here as much as budget does, which makes a quick fix unlikely.

Implications for the Rehabilitation Investment

In the service-quality sense set out in the Introduction, the investment has paid off in part. After the rehabilitation, Reliability, Responsiveness, and Assurance are rated in the satisfied range, which is where a port administrator would want them. Tangibles lags, and its weakest element is tied to unresolved land status more than to a shortage of spending. Together with a master plan that vessel traffic has outgrown, this supports an early revision of the Rembang RIP. Minister of Transportation Regulation PM 50/2021 places the preparation of the port master plan among the duties of the port administrator [20], which gives the procedural route. The stronger argument comes from planning practice itself: a facility whose actual use has moved far from its planning assumptions is due for a new planning cycle.

Research Limitations

Four limitations bound these results. First, the purposive samples of 12 respondents in 2024 and 19 in 2025 suit an exploratory sequential design aimed at depth [12], but they do not support statistical generalization to all of Sluke's agents, stevedoring firms, and the pilotage provider. Second, the two phases used different instruments, scales (1-5 and 1-4), and respondents, so they describe perception at two points in time and do not form a controlled before-and-after comparison. Third, the research team converted the Phase 1 narrative answers into ordinal scores without an independent inter-rater check; the themes are defensible, but the numbers attached to them carry researcher judgment. Fourth, the importance weights were derived from performance scores, because no separate expectation construct was measured. The Phase 2 instrument showed high internal consistency (Cronbach's alpha = 0.90), yet port management should treat the quadrant boundaries of the modified IPA as indicative until importance is measured directly. A follow-up survey that asks the same user group to rate importance would allow a classical IPA and a test of the cargo-profile explanation.

4. CONCLUSION

The evidence gives qualified support to the rehabilitation of Terminal Sluke. After the works, users rate the dimensions that govern cargo operations (consistent handling, responsive staff, and confidence that gas and coal procedures are followed) in the satisfied range, and these gains should be protected. Tangibles trails behind, but its weakest element, basic landside amenities, depends on reclaimed land whose legal status is unresolved, so it is as much a land administration problem as a service-quality one. Users seem to share this view: their strongest response, endorsed by every respondent, was that services should keep improving.

The data give no comfort on capacity. A 2025 berth occupancy of 84.42%, well above common planning benchmarks, shows that traffic has outgrown the assumptions of the 2017 master plan. The marginal position of Reliability on the IPA map is the perceptual counterpart of that pressure and is likely to worsen if traffic keeps rising. The next step for Sluke is a planning process that revises the Rembang RIP as throughput data accumulate, so that capacity is added before congestion shows up in user ratings.

REFERENCES

[1] I. T. Yunianto, H. I. Nur, E. W. Ardhi, and B. P. Adhitya, "Optimalisasi model jaringan rute

multiport tol laut di negara kepulauan: Studi kasus evaluasi rute di Maluku dan Papua bagian selatan," *Jurnal Penelitian Transportasi Laut*, vol. 21, no. 2, pp. 83-95, 2019, doi: 10.25104/transla.v21i2.1309.

[2] F. Syayuti, M. Thamrin, S. A. Majid, S. Sihombing, and E. Liana, "Produktivitas terminal dan kinerja operasional di Pelabuhan Tanjung Priok," *Jurnal Manajemen Transportasi & Logistik (JMTRANSLOG)*, vol. 10, no. 2, 2023, doi: 10.54324/j.mtl.v10i2.1135.

[3] Ministry of Transportation of the Republic of Indonesia, "Regulation of the Minister of Transportation No. PM 77 of 2018 on the third amendment to Regulation No. KM 62 of 2010 on the organization and work procedures of port management unit offices," Jakarta, 2018. [Online]. Available: https://jdih.kemenhub.go.id

[4] Ministry of Transportation of the Republic of Indonesia, "Decree of the Minister of Transportation No. KP 432 of 2017 on the National Port Master Plan," Jakarta, 2017. [Online]. Available: https://jdih.kemenhub.go.id

[5] Governor of Central Java, "Central Java Governor Regulation No. 69 of 2017 on the Rembang Port Master Plan," Semarang, 2017.

[6] Directorate General of Sea Transportation, "Distribution of technical implementation units (UPT) on Java Island," MaritimHub, Ministry of Transportation of the Republic of Indonesia, 2026. [Online]. Available: https://maritimhub.kemenhub.go.id/upt

[7] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "A conceptual model of service quality and its implications for future research," *Journal of Marketing*, vol. 49, no. 4, pp. 41-50, 1985, doi: 10.1177/002224298504900403.

[8] J. A. Martilla and J. C. James, "Importance-performance analysis," *Journal of Marketing*, vol. 41, no. 1, pp. 77-79, 1977, doi: 10.2307/1250495.

[9] M. Dirang and I. Iriani, "Analisis kualitas pelayanan terhadap tingkat kepuasan pengguna ruang tunggu penumpang Pelabuhan Tanjung Perak dengan metode Servqual dan TRIZ," *JUMINTEN: Jurnal Manajemen Industri dan Teknologi*, vol. 2, no. 1, pp. 49-60, 2021, doi: 10.33005/juminten.v2i1.141.

[10] T. Q. Nguyen, L. T. T. Ngo, N. T. Huynh, T. L. Quoc, and L. V. Hoang, "Assessing port service quality: An application of the extension fuzzy AHP and importance-performance analysis," *PLoS ONE*, vol. 17, no. 2, Art. no. e0264590, 2022, doi: 10.1371/journal.pone.0264590.

[11] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality," *Journal of Retailing*, vol. 64, no. 1, pp. 12-40, 1988.

[12] J. W. Creswell and V. L. Plano Clark, *Designing and Conducting Mixed Methods Research*, 3rd ed. Thousand Oaks, CA, USA: SAGE, 2017.

[13] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, vol. 3, no. 2, pp. 77-101, 2006, doi: 10.1191/1478088706qp063oa.

[14] UNCTAD, *Port Development: A Handbook for Planners in Developing Countries*, 2nd ed., TD/B/C.4/175/Rev.1. New York, NY, USA: United Nations, 1985.

[15] Port of Townsville Limited, "Section 21: Economic development," in *Townsville Port Expansion Project: Additional Environmental Impact Statement*. Townsville, QLD, Australia, Oct. 2016, pp. 243-275. [Online]. Available: https://eisdocs.dsdip.qld.gov.au/Townsville%20Port%20Expansion/AEIS/chapter-21-economics.pdf

[16] P. W. de Langen, J. van Meijeren, and L. A. Tavasszy, "Combining models and commodity chain research for making long-term projections of port throughput: An application to the Hamburg-Le Havre range," *European Journal of Transport and Infrastructure Research*, vol. 12, no. 3, pp. 310-331, 2012, doi: 10.18757/ejtir.2012.12.3.2968.

[17] T. E. Notteboom and W. Winkelmans, "Reassessing public sector involvement in European seaports," *International Journal of Maritime Economics*, vol. 3, no. 2, pp. 242-259, 2001, doi: 10.1057/palgrave.ijme.9100008.

[18] T. Notteboom and H. Haralambides, "Port management and governance in a post-COVID-19 era: Quo vadis?," *Maritime Economics & Logistics*, vol. 22, no. 3, pp. 329-352, 2020, doi: 10.1057/s41278-020-00162-7.

[19] Radar Kudus, "Polemik Pelabuhan Rembang, kerja sama dibahas lahan masih bermasalah," Jan. 28, 2022. [Online]. Available: https://radarkudus.jawapos.com/rembang/691643060/polemik-pelabuhan-rembang-kerja-sama-dibahas-lahan-masih-bermasalah

[20] Ministry of Transportation of the Republic of Indonesia, "Regulation of the Minister of Transportation No. PM 50 of 2021 on the administration of sea ports," State Gazette of the Republic of Indonesia 2021 No. 692, Jakarta, 2021. [Online]. Available: https://jdih.kemenhub.go.id