

Satisfied Yet Uneasy about Safety: Customer Satisfaction and Importance–Performance Gaps in Ferry Services on the Bajoe–Kolaka Route

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Abstract : Ferry services are the backbone of inter-island mobility in Indonesia, yet an overall satisfaction score may conceal weaknesses in the attributes passengers value most. This study evaluates the service performance of the ferry KM. Pulau Muna on the Bajoe–Kolaka route and identifies the factors perceived to hinder optimal service. Fifty service users rated ten service attributes for importance and performance on five-point scales. The data were analysed with the Customer Satisfaction Index (CSI), complemented by importance–performance gap analysis and a fishbone diagram. The CSI reached 79.77%, placing the service in the “satisfied” category. However, performance fell short of importance on every attribute, and the two safety-related attributes, safety and security procedures and emergency handling and safety equipment, were among the most important (4.74 and 4.84) but the lowest in performance (3.74 and 3.80), with gaps about twice those of the other attributes. Raising these two attributes to the level of the others would lift the CSI to about 81%, the threshold of the “very satisfied” category. The fishbone analysis points to training, safety equipment, procedures, and supervision as areas for improvement. Visible, well-communicated on-board safety is therefore the primary lever for improving passenger satisfaction.

Keywords : Ferry Service, Customer Satisfaction Index, Importance Performance Analysis, Passenger Safety, Fishbone Analysis, Indonesia.

Abstrak : Angkutan penyeberangan merupakan tulang punggung mobilitas antarpulau di Indonesia, namun skor kepuasan keseluruhan dapat menutupi kelemahan pada atribut yang paling dihargai penumpang. Penelitian ini mengevaluasi kinerja layanan kapal penyeberangan KM. Pulau Muna pada lintasan Bajoe–Kolaka dan mengidentifikasi faktor yang dianggap menghambat layanan optimal. Sebanyak 50 pengguna jasa menilai kepentingan dan kinerja sepuluh atribut layanan pada skala lima tingkat. Data dianalisis dengan Customer Satisfaction Index (CSI), dilengkapi analisis kesenjangan kepentingan–kinerja dan diagram fishbone. Nilai CSI mencapai 79,77% sehingga layanan berada pada kategori “puas”. Namun, kinerja berada di bawah kepentingan pada seluruh atribut, dan dua atribut keselamatan, yaitu prosedur keselamatan dan keamanan serta penanganan keadaan darurat dan peralatan keselamatan, termasuk

yang paling penting (4,74 dan 4,84) tetapi paling rendah kinerjanya (3,74 dan 3,80), dengan kesenjangan sekitar dua kali atribut lain. Peningkatan kedua atribut ini ke tingkat atribut lainnya akan menaikkan CSI menjadi sekitar 81%, yaitu ambang kategori “sangat puas”. Analisis fishbone menunjukkan pelatihan, peralatan keselamatan, prosedur, dan pengawasan sebagai area perbaikan. Keselamatan di atas kapal yang terlihat dan dikomunikasikan dengan baik menjadi pengungkit utama peningkatan kepuasan penumpang.

Kata Kunci : Angkutan Penyeberangan, Customer Satisfaction Index, Analisis Kepentingan Kinerja, Keselamatan Penumpang, Analisis Fishbone, Indonesia.

INTRODUCTION

For an archipelagic country, ferry transport is not an optional mode but an extension of the road network across water. In Indonesia, ferry crossings carry passengers and vehicles between islands that have no fixed link, and the quality of these services directly shapes regional mobility, trade, and access to public services. Because ferries are a public service, the government has set minimum passenger service standards through Minister of Transportation Regulation Number PM 39 of 2015, which covers safety, security, reliability, comfort, convenience, and equality. Meeting such standards on paper, however, does not guarantee that passengers experience the service as good. The Bajoe–Kolaka crossing illustrates the stakes. Operated from Bajoe Ferry Port in Bone Regency and managed by PT ASDP Indonesia Ferry (Persero) Bajoe Branch, the route is the node connecting South Sulawesi with Southeast Sulawesi. It spans 86 miles with a sailing time of about eight hours, is served by seven privately owned vessels with two trips per day, and recorded 75,876 passengers and 36,718 vehicles in 2019. A crossing of this length means that passengers spend a full working day or night on board, so their evaluation of the service depends less on the terminal and more on what happens at sea. Earlier work on the same route documented how severely ferry revenue fell during the pandemic and how it subsequently recovered (Usman, Alimah, et al., 2023), which makes retaining passengers through service quality a commercial as well as a public concern.

Research on passenger transport service quality has grown steadily, and a recent systematic review of liner maritime passenger transport shows that combinations of quantitative and qualitative methods are the most frequently used approach (Žanić Mikuličić et al., 2024). In Indonesia, the Customer Satisfaction Index (CSI), often paired with importance–performance analysis (IPA), has become the standard tool for ferry ports. Reported results vary widely: a CSI of 0.680 at Bau-Bau Ferry Terminal, where the responsiveness of staff to complaints was the main issue (Almaliki et al., 2024); 55.51% at Rum speedboat harbour in Tidore, where toilets and waiting areas needed improvement (Sabaruddin et al., 2023); and 72.85 for fast-ship services on the Ulee Lheue–Balohan route, where on-board safety provisions were among the identified gaps (Sibarani et al., 2024). Outside Indonesia, terminal and route management emerged as the most critical service quality factor for passenger ferries in Bangladesh (Sourav et al., 2024). Within South Sulawesi, comparable user-based assessments have addressed cargo-handling services (Usman, Ibrahim, et al., 2023) and digital ship services (Shauqy et al., 2023), but not the passenger experience on board a ferry.

A parallel body of work establishes that safety is the defining attribute of ferry services. A review of the domestic ferry sector identified 28 key challenges and 90 opportunities for improving safety, particularly in developing countries (Baig et al., 2024). In Indonesia specifically, a quality function deployment study ranked safety equipment on board as the first priority for improvement, followed by safety training (Shang et al., 2023). Safety training has been shown to have a significant positive effect on the safety behaviour of ferry employees (Della et al., 2020), while the way safety is delivered to passengers raises their safety awareness and preventive behaviour (Lau et al., 2021). At the port side, an analysis of Indonesian roll-on/roll-off ferry operations found clusters of issues

in port functions that were continually neglected for non-technical reasons (Nurwahyudy et al., 2022).

These two strands have rarely been brought together. Satisfaction studies typically report a single index and a category label, and a favourable label can easily be taken as evidence that nothing needs fixing. Yet a composite index averages across attributes and may conceal a shortfall in precisely those attributes that passengers consider most important. Moreover, most Indonesian studies assess the port or terminal, whereas evidence on vessel-level service on long crossings is limited, and index results are seldom connected to a diagnosis of the operational causes behind weak attributes. This study addresses these gaps for the ferry KM. Pulau Muna on the Bajoe–Kolaka route. It aims (1) to measure overall passenger satisfaction using the CSI; (2) to identify which service attributes are considered important and are performing well, and which show the largest shortfall between importance and performance; and (3) to identify the factors that cause the service to be perceived as less than optimal. Its contribution is to read the composite index alongside attribute-level gaps, and to show how far the overall result depends on safety-related attributes.

RESEARCH METHOD

The study used a descriptive survey design that combined a quantitative assessment of passenger satisfaction with a qualitative cause-and-effect analysis. Fieldwork was carried out over six months in 2024 at Bajoe Ferry Port, Bone Regency, South Sulawesi, the home port of the Bajoe–Kolaka crossing. Data were collected through direct observation of ferry service activities, a review of relevant documents and literature, and a questionnaire distributed in person to users of KM. Pulau Muna over a two-week period. The sampling frame consisted of 58 users of the vessel. The sample size was determined with the Slovin formula in Equation (1), where n is the sample size, N the population size, and e the margin of error (5%), giving a sample of 50 respondents. Respondent identities were kept confidential; only gender, age, and education were recorded.

$$n = N / (1 + N \times e^2)$$

The questionnaire contained ten service attributes covering crew service, boarding and documentation, punctuality, port and on-board facilities, and safety (Table 3). Each attribute was rated twice on a five-point scale: once for importance (1 = very unimportant to 5 = very important) and once for performance (1 = very poor to 5 = very good). Responses were tabulated in a spreadsheet for analysis. Overall satisfaction was calculated with the CSI in four steps. The mean importance score (MIS) and mean satisfaction score (MSS) were computed for each attribute. Each attribute's weight factor (WF) was obtained as its share of the total MIS, and its weight score (WS) as the product of WF and MSS. The CSI is the sum of the weight scores divided by the highest scale point, as in Equations (2) to (4), where i indexes the ten attributes. The resulting value was interpreted using the criteria in Table 1.

$$WF_i = MIS_i / \Sigma MIS \times 100\%$$

$$WS_i = WF_i \times MSS_i$$

$$CSI = \Sigma WS_i / 5$$

Table 1. Interpretation Criteria for the CSI

CSI value	Category
81%–100%	Very satisfied
66%–80.99%	Satisfied
51%–65.99%	Fairly satisfied
35%–50.99%	Less satisfied
0%–34.99%	Dissatisfied

Source: Criteria applied in this study

To answer the second objective, two attribute-level measures were derived from the same scores. The gap is the difference between mean performance and mean importance, and the conformity level is the ratio of the two expressed as a percentage, as in Equation (5). The attributes were then placed on an importance–performance grid whose axes cross at the grand means of the two scores, yielding four quadrants: concentrate here (high importance, low performance), keep up the good work (high importance, high performance), low priority (low importance, low performance), and maintain (lower importance, adequate performance).

$$\text{Conformity}_i = \text{MSSI} / \text{MISI} \times 100\%$$

For the third objective, a fishbone diagram was used to organise the factors that may cause the service to be perceived as less than optimal. Candidate causes identified from field observation and document review were grouped into six categories, namely people, process, equipment, materials, environment, and management, and a countermeasure was formulated for each. The fishbone technique has been used in the same way to trace the root causes of operational problems in roll-on/roll-off shipping (Rusnaedi *et al.*, 2024).

RESULT AND DISCUSSION

Respondent Characteristics

Table 2 shows that the 50 respondents were predominantly male (70%). Most were aged 20–40 years (70%), and nearly half held a three-year diploma (46%), followed by senior high school graduates (30%). The profile reflects a route used largely by working-age travellers, a group that typically travels with vehicles or goods and is therefore sensitive to both schedule reliability and conditions on board during an eight-hour crossing.

Table 2. Respondent Characteristics (n = 50)

Characteristic	Category	n	%
Gender	Male	35	70
	Female	15	30
Age	20–30 years	20	40
	31–40 years	15	30
	41–50 years	10	20
	Over 50 years	5	10
Education	Senior high school	15	30
	Diploma (D3)	23	46
	Bachelor's degree	10	20
	Master's degree	2	4

Source: Processed primary data (2024)

Importance and Performance of Service Attributes

Table 3 presents the mean importance and performance scores of the ten attributes. Two patterns stand out. First, passengers regard every attribute as important: mean importance ranges from 4.46 to 4.84, with a grand mean of 4.60. Second, performance is consistently lower, ranging from 3.74 to 4.16 with a grand mean of 3.99. The gap is negative for all ten attributes, which means that on no attribute does the service fully meet what passengers expect.

Table 3. Mean Importance and Performance Scores, Gap, and Conformity Level

No.	Service attribute	Importance	Performance	Gap	Conformity (%)
1	Quality of service provided by the crew during the voyage	4.50	4.02	−0.48	89.33
2	Speed of crew response to passenger complaints or requests	4.46	3.98	−0.48	89.24
3	Efficiency of the boarding process at the port	4.50	4.00	−0.50	88.89
4	Accuracy and completeness of travel document processing	4.48	4.08	−0.40	91.07
5	Punctuality of departure according to schedule	4.60	4.02	−0.58	87.39
6	Punctuality of arrival at the destination port	4.60	4.06	−0.54	88.26
7	Quality of port infrastructure (pier, public facilities)	4.52	4.04	−0.48	89.38
8	On-board facilities (toilets, passenger lounge, other areas)	4.78	4.16	−0.62	87.03
9	Safety and security procedures applied during the voyage	4.74	3.74	−1.00	78.90
10	Emergency handling and safety equipment on board	4.84	3.80	−1.04	78.51
	Mean	4.60	3.99	−0.61	86.70

Source: Processed primary data (2024); gap and conformity calculated by the authors

The size of the gap, however, is far from uniform. For the eight non-safety attributes the gap lies between −0.40 and −0.62, averaging −0.51, and conformity stays within 87–91%. For the two safety attributes the picture changes sharply. Emergency handling and safety equipment (attribute 10) is the most important attribute of all (4.84) yet has the second-lowest performance (3.80), and safety and security procedures (attribute 9) has the third-highest importance (4.74) and the lowest performance of all (3.74). Their gaps, −1.04 and −1.00, are about twice the average of the other attributes, and their conformity falls below 79%. At the other end, travel document processing (attribute 4) shows the smallest gap and the highest conformity (91.07%), and on-board facilities (attribute 8) receive the highest performance score (4.16).

Customer Satisfaction Index

Table 4 reports the weight factors, weight scores, and the resulting index. The weighted total is 398.85, giving a CSI of 79.77%. According to the criteria in Table 1, passengers of KM. Pulau Muna fall in the “satisfied” category, a little over one percentage point below the threshold for “very satisfied”.

Table 4. Weight Factors, Weight Scores, and CSI

Attribute	MIS	MSS	WF (%)	WS
1	4.50	4.02	9.78	39.31
2	4.46	3.98	9.69	38.57
3	4.50	4.00	9.78	39.11
4	4.48	4.08	9.73	39.72
5	4.60	4.02	10.00	40.18

Attribute	MIS	MSS	WF (%)	WS
6	4.60	4.06	10.00	40.58
7	4.52	4.04	9.82	39.68
8	4.78	4.16	10.39	43.21
9	4.74	3.74	10.30	38.52
10	4.84	3.80	10.52	39.97
Total	46.02	39.90	100.00	398.85

Note: $CSI = 398.85 / 5 = 79.77\%$ (satisfied).

Source: Processed primary data (2024)

The highest weight factor belongs to emergency handling and safety equipment (10.52%), confirming that it is what passengers value most, and the lowest to the speed of crew response (9.69%). The highest weight score is contributed by on-board facilities (43.21), while the lowest comes from safety and security procedures (38.52), closely followed by the speed of crew response (38.57). In comparative terms the result is favourable. The index exceeds those reported for Bau-Bau Ferry Terminal (Almaliki *et al.*, 2024), the Ulee Lheue–Balohan fast-ship service (Sibarani *et al.*, 2024), and Rum harbour in Tidore (Sabaruddin *et al.*, 2023). Such comparisons should be treated as indicative only, because the studies differ in the attributes measured and in whether the port or the vessel is assessed. A more important observation concerns the structure of the index itself. Because all attributes were rated as highly important, the weight factors are almost equal, ranging only from 9.69% to 10.52%. The weighted CSI (79.77%) is therefore practically identical to the unweighted mean performance expressed as a percentage (79.80%). In this setting the weighting does little to emphasise what matters most, and the index behaves like a simple average in which strong attributes compensate for weak ones.

This has a direct practical implication. If the performance of the two safety attributes were raised only to the average level of the other eight (4.05), the CSI would rise to 80.91%; if they matched the best-performing attribute (4.16), it would reach 81.39% and cross into the “very satisfied” category. The distance between the present result and the top category is thus almost entirely accounted for by safety. An overall label of “satisfied” is accurate, but read alone it understates the one area in which passengers are clearly not reassured.

Importance–Performance Priorities

Plotting the attributes on the importance–performance grid makes the priorities explicit (Figure 1 and Table 5). Only two attributes fall in the quadrant that calls for concentrated effort, and both concern safety. On-board facilities is the single attribute that combines high importance with high performance. Six attributes sit in the lower-right quadrant, where performance is at or above the mean while importance is slightly below it, and one attribute, the speed of crew response, lies in the low-priority quadrant.

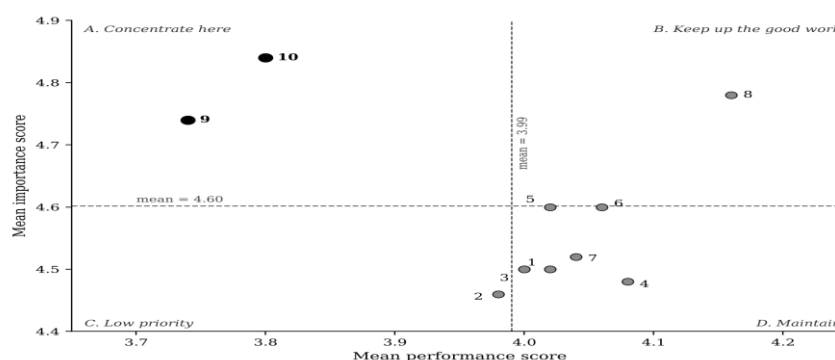


Figure 1. Importance–Performance Grid of the Ten Service Attributes (numbers refer to Table 3)
Source: Processed primary data (2024); grid constructed by the authors

Table 5. Classification of Attributes by Importance–Performance Quadrant

Quadrant	Attributes	Implication
A. Concentrate here	9. Safety and security procedures; 10. Emergency handling and safety equipment	Top priority for improvement
B. Keep up the good work	8. On-board facilities	Sustain the current standard
C. Low priority	2. Speed of crew response	Improve after quadrant A
D. Maintain	1. Crew service; 3. Boarding; 4. Document processing; 5. Departure punctuality; 6. Arrival punctuality; 7. Port infrastructure	Maintain; avoid letting performance slip

Source: Processed primary data (2024). Axes cross at the grand means (importance 4.60; performance 3.99)

Two qualifications apply to this reading. The quadrants are relative: every attribute has an importance score above 4.4, so “lower importance” means lower than the others, not unimportant. Departure and arrival punctuality (attributes 5 and 6), for example, lie almost exactly on the importance mean and carry gaps of -0.58 and -0.54 , larger than those of crew service or documentation. They should be regarded as the next priority once safety has been addressed. In addition, IPA assumes that each attribute affects satisfaction linearly and symmetrically. Evidence from public transport shows that the three-factor theory, which distinguishes basic, performance, and excitement factors, provides a more robust basis for prioritisation than IPA (Tuan et al., 2022). Safety is a typical basic factor: passengers may not reward it when it is present, but they penalise its absence heavily. If so, the grid is more likely to understate than to overstate the urgency of the safety attributes.

The prominence of safety is consistent with the wider evidence on Indonesian ferries. Shang et al. (2023) found that safety equipment on board was the first priority for improving ferry service safety in Indonesia, followed by safety training, which mirrors the two attributes isolated here. The Ulee Lheue–Balohan study likewise listed on-board safety provisions among the gaps despite a satisfactory overall index (Sibarani et al., 2024). The present results extend that pattern to a long crossing and show that it is visible even in a small sample using a ten-item instrument. It is important to be precise about what the safety scores represent. They measure what passengers perceive, not the vessel’s technical compliance, which is certified through a separate regulatory process. A low perceived score can arise because equipment or procedures are deficient, but also because they are not visible or not explained to passengers. Lau et al. (2021) showed that safety delivery, meaning the way safety information and demonstrations are provided, positively influences passengers’ safety awareness and their preventive behaviour. On an eight-hour crossing, clear briefings, visible and accessible life-saving appliances, and crew who are evidently prepared for emergencies are therefore part of the service, not merely a matter of compliance.

Factors Behind Less-Than-Optimal Service

The fishbone analysis organises the candidate causes of less-than-optimal service into six categories (Table 6 and Figure 2). The causes were identified from field observation and document review and should be read as a structured set of working hypotheses for management, not as measured effects.

Table 6. Candidate Causes of Less-Than-Optimal Service and Proposed Countermeasures

Category	Candidate causes	Proposed countermeasures
People	Insufficient training in operating procedures and passenger handling; shortage of personnel; low motivation and job satisfaction	Regular training on procedures, technology, and customer service; review of staffing needs; incentives and career development

Category	Candidate causes	Proposed countermeasures
Process	Inefficient boarding, documentation, and loading procedures; weak coordination between units; inaccurate scheduling	Review and simplify operating procedures; routine coordination meetings and integrated information; scheduling based on demand patterns and peak periods
Equipment	Port and vessel infrastructure inadequate or damaged; outdated port management and ticketing systems; inadequate safety and security equipment	Scheduled maintenance and repair; upgrading of electronic ticketing and vessel management systems; investment in modern safety and security equipment
Materials	Supplies and equipment of inadequate quality; shortage of required documents and consumables	Quality checks and reliable suppliers; an inventory management system for essential materials
Environment	Extreme weather disrupting operations; regulatory changes not followed up	Contingency plans for adverse weather, including rescheduling; monitoring of and compliance with applicable regulations
Management	Policies and planning that do not support operational efficiency; limited supervision and periodic evaluation of service performance	Policies responsive to operational needs and user feedback; a periodic performance monitoring and evaluation system

Source: Field observation and document review (2024)

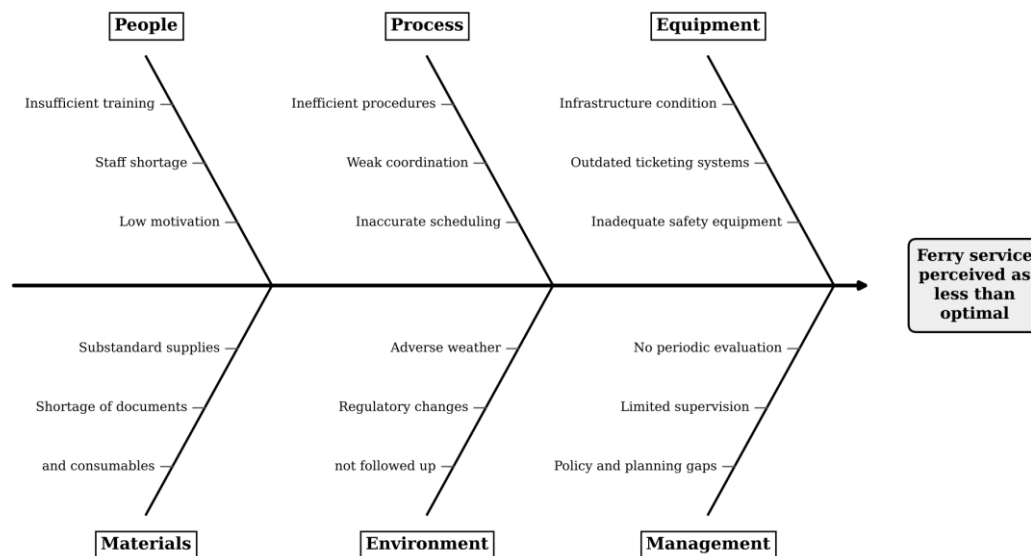


Figure 2. Fishbone Diagram of Factors Behind Less-Than-Optimal Ferry Service
Source: Field observation and document review (2024)

When the diagram is read against the attribute scores, three branches bear most directly on the safety gap. The first is people. If crew members are not trained regularly in operating procedures and emergency handling, passengers are unlikely to perceive competent preparedness. This corresponds to the finding that safety training has a significant positive effect on the safety behaviour of ferry employees, with safety management and safety knowledge acting as mediators (Della et al., 2020). Related evidence from a port operator in the same province indicates that occupational safety and work discipline jointly raise employee productivity (Usman et al., 2024),

which suggests that investment in crew safety competence is unlikely to come at the expense of service output. The second branch is equipment. Inadequate safety equipment appears in the diagram alongside infrastructure condition and outdated ticketing technology. Its presence is consistent with the priority given to on-board safety equipment in Indonesian ferry services (Shang *et al.*, 2023) and with risk assessments that place hardware next to crew, ship management, and company management as the principal dimensions of ferry navigation risk (Hsu *et al.*, 2022). The technology constraint also deserves attention in its own right: experience with digital ship services in the region shows that electronic systems improve service delivery only when they are reliable and supported by clear fallback procedures (Shauqy *et al.*, 2023).

The third branch is management. Limited supervision and the absence of periodic evaluation mean that weaknesses persist unnoticed. This echoes the observation that issues in Indonesian roll-on/roll-off ferry port functions tend to be continually neglected for non-technical reasons (Nurwahyudy *et al.*, 2022) and the broader conclusion that human factors, policy, and economics, as much as technology, shape safety in the domestic ferry sector of developing countries (Baig *et al.*, 2024). The process branch, in turn, relates to the punctuality attributes: inefficient procedures, weak coordination, and inaccurate scheduling are plausible sources of the departure and arrival gaps noted above, and terminal and route management has been identified as the most critical service factor for passenger ferries elsewhere (Sourav *et al.*, 2024).

Implications

For the operator and the port manager, the results point to a clear sequence. The first priority is on-board safety as passengers experience it: a routine and audible safety briefing at departure, life jackets and other appliances that are visibly sufficient and accessible, clear evacuation signage, and periodic emergency drills that involve the crew on duty. These measures are modest in cost compared with infrastructure works and address the two largest gaps. The second priority is schedule reliability, through better coordination between port units and the vessel and through scheduling that reflects demand patterns. The third is to preserve what already works, particularly on-board facilities and document processing. For regulators, the findings suggest that monitoring against the minimum service standards would benefit from attribute-level reporting, since a composite index in the “satisfied” range may coexist with a pronounced shortfall in safety perception. For research, the study demonstrates the value of reporting gaps and importance–performance positions alongside the CSI. When importance ratings are uniformly high, as is common in public transport surveys, the CSI weights converge and the index loses its ability to discriminate. Reporting the index alone in such cases risks giving a reassuring picture of a service whose most valued attribute is its weakest.

Limitations

The findings should be interpreted with several limitations in mind. The sample comprised 50 users of a single vessel drawn from a frame of 58, so the results describe this service and cannot be generalised to the route or to other operators. The instrument consisted of ten single-item attributes, and its validity and reliability were not formally tested. Importance and performance were rated by the same respondents in the same questionnaire, which may inflate the consistency of the answers (Jordan & Troth, 2020). The individual response data were not available for inferential testing, so differences between attributes are described but not tested statistically. Finally, the fishbone analysis rests on observation and document review and was not validated through structured interviews with crew or management. Future studies should use a larger sample across vessels, a validated multi-item instrument, objective indicators such as on-time performance and safety inspection records, and analytical approaches that distinguish basic from performance factors.

CONCLUSIONS AND RECOMMENDATIONS

Passengers of KM. Pulau Muna on the Bajoe–Kolaka route are, overall, satisfied with the service, with a CSI of 79.77%. On-board facilities are both highly valued and well rated, and travel document processing comes closest to meeting expectations. Nevertheless, performance falls below importance on all ten attributes, and the shortfall is concentrated in safety. Emergency handling and safety equipment, and safety and security procedures, are among the attributes passengers

consider most important but are the two rated lowest in performance, with gaps about twice those of the other attributes. They are the only attributes requiring concentrated improvement, and closing their gap alone would bring the index to the threshold of the “very satisfied” category. The factors that may explain less-than-optimal service span people, process, equipment, materials, environment, and management, with training, safety equipment, and supervision most closely linked to the safety gap. It is therefore suggested that the operator prioritise visible and well-communicated on-board safety, supported by regular crew training and periodic drills; that the port manager and operator improve coordination and scheduling to strengthen punctuality; and that service performance be monitored periodically at the attribute level, not only through a composite index. Future researchers are encouraged to extend the assessment to other vessels on the route with a larger sample and a validated instrument, and to combine passenger perceptions with objective operational and safety data.

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