Analysis of user Satisfaction Level in the Implementation of Ticket Digitalization at Merak Ferry Port, Banten Province

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Abstract : Merak Ferry Port is one of the main ports connecting Java and Sumatra. To improve service, PT ASDP Indonesia Ferry (Persero) implemented a digital ticketing system through the Ferizy application since May 1, 2020. This study aims to determine the level of satisfaction of service users with the digital ticketing system. The research method used was quantitative by distributing questionnaires to passengers. The collected data was analyzed using the Customer Satisfaction Index (CSI) method, and its validity and reliability were tested to ensure data accuracy. Based on the results of the research conducted, it was found that the level of user satisfaction with the digital ticketing service at Merak Port was categorized as satisfactory, with a CSI score of 77.08%. However, several problems were still found, such as signal interference, a lack of public understanding of technology, and the persistence of ticket scalpers. The results showed that the digital ticketing system has helped improve passenger service and comfort. To achieve better service in the future, it is recommended that the port improve public education, strengthen its technology system, and tighten supervision to prevent ticket scalping practices.

Keywords : Ticket Digitalization, User Satisfaction, Merak Port, Ferizy, Customer Satisfaction Index.

1. INTRODUCTION

The rapid development of digital technology has significantly transformed transportation services worldwide, particularly in ticketing and passenger management systems. Digital ticketing systems are increasingly implemented to improve operational efficiency, reduce transaction time, enhance service transparency, and minimize fraudulent practices in transportation services [1]. In the maritime transportation sector, digitalization has become an important strategy for improving passenger convenience and optimizing port operations in line with the concept of smart transportation systems [2].

In Indonesia, ferry transportation plays a strategic role in connecting islands and supporting national mobility. One of the busiest ferry crossings is operated through Merak Ferry Port, which connects Java and Sumatra via the Merak–Bakauheni route. The high volume of passengers and vehicles at this port often causes congestion, long queues, and inefficiencies in ticketing services, especially during holiday seasons and

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peak travel periods [3]. Before the implementation of digital ticketing, ticket purchases were conducted manually at port counters, resulting in long waiting times and creating opportunities for illegal ticket brokerage or ticket scalping practices [4].

To address these challenges, PT ASDP Indonesia Ferry (Persero) introduced the Ferizy digital ticketing application on May 1, 2020, as part of its transportation digitalization program. The Ferizy application enables passengers to purchase tickets online, schedule departures, and make cashless payments before arriving at the port [5]. The implementation of this system is expected to improve service effectiveness, reduce crowd density at ticket counters, and enhance passenger comfort and safety [6].

Digital ticketing systems have been widely recognized as an effective innovation for improving transportation service quality. Previous studies have shown that digitalization can increase operational efficiency and customer satisfaction while reducing administrative errors and transaction costs [7]. However, the successful implementation of digital systems also depends on several factors, including technological infrastructure, internet accessibility, user readiness, and public understanding of digital applications [8]. In developing countries, challenges such as limited digital literacy and unstable internet networks remain obstacles to the optimal adoption of digital transportation services [9].

Customer satisfaction is one of the most important indicators in evaluating the success of transportation services. Satisfaction reflects the extent to which user expectations are fulfilled by the provided services [10]. In the context of digital ticketing, passenger satisfaction is influenced by system reliability, ease of use, transaction speed, accessibility, and service security [11]. Therefore, measuring passenger satisfaction is essential for transportation operators to identify service strengths and weaknesses and formulate improvement strategies.

One method frequently used to measure customer satisfaction is the Customer Satisfaction Index (CSI). The CSI method quantitatively evaluates customer perceptions by comparing the importance and performance of service attributes [12]. This method provides an overall satisfaction index that is easy to interpret and useful for identifying priority areas for service improvement [13]. Compared to other methods, CSI offers a more comprehensive representation of customer satisfaction because it integrates multiple service dimensions into a single index value [14].

Several previous studies have applied the CSI method in transportation research. Fitriyani and Syahputra reported that users of a digital intercity transportation system achieved a satisfaction level of 79.2%, indicating that digital services positively affected user experiences [15]. Similarly, Lestari and Prasetya found that the online ticket purchasing system at an integrated bus terminal produced a customer satisfaction index of 74.5%, categorized as satisfactory [16]. These studies demonstrate that the CSI method is effective in evaluating transportation service quality and identifying service attributes requiring improvement.

Despite the growing implementation of digital ticketing systems in Indonesia's transportation sector, studies focusing on passenger satisfaction with ferry transportation digitalization remain limited. Most previous studies have concentrated on land transportation systems, while maritime transportation services, particularly ferry ports, have received less academic attention. Therefore, this study aims to analyze the level of user satisfaction toward the implementation of ticket digitalization at Merak Ferry Port using the Customer Satisfaction Index (CSI) method. The findings of this

study are expected to provide insights for transportation operators and policymakers in improving the quality of digital ticketing services and enhancing passenger satisfaction in ferry transportation services.

2. METHODOLOGY

The research method used in this study is a quantitative descriptive method, which describes the results of the analysis conducted according to the conditions in the research field. The analysis results conducted using this research method generally involve random sampling, the use of research equipment to collect data, and quantitative or statistical data processing.

This study used a questionnaire guideline in the form of a Google Form distributed via QR code to service users. The sample was determined using the Slovin formula as follows.

Formula:

$$n=\frac{N}{1+N\ (e^2)} \quad (1)$$

Information:

n= sample size

N= population size

e= standard error/tolerable error (max. 10% = 0.1)

Based on this formula, the minimum sample size in this study is as follows.

$$n = \frac{10.970.462}{1 + 10.970.462(0{,}1^2)}$$

$n = 99.99 \approx 100$

Thus, the total sample size required for this study is 100 service users. The sample was randomly selected from a total population of 10,970,462 service users. The total population was obtained by adding 630,617 pedestrian passengers and 630,617 vehicle passengers.

10.339.845 person.

1. Gap Analysis

Gap Analysis Method is a methodto measure service quality by comparing customer expectations and the reality received, through five sevqual dimensions, namely tangibles, reliability, responsiveness, assurance, and empathy.

2. Validity Test, Reliability Test, and Customer Satisfaction Index Analysis

a. Validity Test

Validity testing is used to measure the level of validity of an instrument. Validity testing is carried out by correlating the scores on each item with the total score using the product moment correlation formula, the results will be obtained by comparing the value of r table with r count, if the value of r count is greater than r table then the instrument or question item can be said to be valid.

b. Reliability Test

An instrument is considered reliable if it can produce reliable data that is consistent with reality. To determine the reliability of an instrument, a Cronbach's alpha statistical test is performed. A variable is considered reliable if its alpha value is > 0.70, and the reliability test is considered satisfactory if its value is ≥ 0.361.

c. Customer Satisfaction Index

The Customer Satisfaction Index (CSI) is a method used to measure the overall level of user satisfaction by examining the performance and importance of the product or service attributes being measured. The CSI value can be determined using the following measurement method.

a. Calculate Mean Importance Scores, which is the average attribute importance level, using the equation:

$$MIS=\left[\frac{\sum_{i=1}^{n} Y_i}{n}\right] \quad (2)$$

Information:

Yi = importance value of attribute Y i

n = number of respondents

b. Count*Mean Satisfaction Scores,*namely the average attribute level of satisfaction, using the equation:

$$MSS=\left[\frac{\sum_{i=1}^{n} X_i}{n}\right] \quad (3)$$

Information:

Xi = satisfaction value of attribute X ith

n = number of respondents

Measuring the level of importance (expectation) using the Weighted Factor (WF), namely changing the average value of the level of importance into a percentage figure of the total average value of the level of importance for all attributes tested, so that a Weighted Factor of 100% is obtained.

$$WF = \frac{Yi}{\sum yi} \times 100\% \quad (4)$$

Information:

WF =*Weight Factor*

Yi = average level of importance (expectation) for attribute i

∑yi = average number of importance levels (expectations) for the i-th attribute

Measurement of the Weighted Score (WS) level, namely the multiplication value between the average value of the performance level (satisfaction) of each attribute with the Weighted Factor of each attribute.

$$WS = \sum \frac{WF \times xi}{100\%} \quad (5)$$

Information:

WS = Weight Score (WS)

Xi = level of satisfaction (reality) for the ith attribute

Count*Weighted Total*(WT), which is adding up*Weighted Factor*of all service quality attributes.

$$WT = \sum \frac{WF \times xi}{100\%} \quad (6)$$

Information:

WT = Weighted Total (WT)

WF = Weighted Factor (WF)

Xi = Level of satisfaction (reality) for the i-th attribute

Calculate overall customer satisfaction using the Satisfaction Index (SI), namely the Weighted Total divided by the maximum scale used in this study then multiplied by 100%.

$$SI=\frac{WT}{n} \times 100\% \quad (7)$$

Information:
SI = Satisfaction Index
WT = Total Weight (WF)
n = maximum number of scales in the study

3. DISCUSSION

The proposed Battery Management System (BMS)-based charging system is designed to utilize energy generated from a solar photovoltaic (PV) source for efficient and controlled battery charging. The overall system consists of a PV module, a DC–DC converter (charger controller), a lithium-ion battery pack, and a BMS unit.

Based on the data collection and analysis carried out in this study, the following research results were obtained.

a. Analysis of the Compliance of Ticket Digitalization Facilities at the Merak Ferry Port with the Minister of Transportation Regulation Number 19 of 2020 concerning the Implementation of Electronic Ferry Transportation Tickets.

To support the implementation of digital ticketing at Merak Ferry Port, several aspects must be prepared and comply with current regulations. Minister of Transportation Regulation No. 19 of 2020 concerning Electronic Ticketing includes several articles that serve as references or benchmarks for compliance.

Table 1. Ticketing includes several articles that serve as references or benchmarks for compliance

No	BenchmarkMinister of Transportation Regulation Number 19 of 2020 concerning the Implementation of Electronic Ferry Tickets	Information	Results
1.	Article 3 paragraph (3) regarding Electronic System Integration	Electronic System Integration	In accordance
2.	Article 4 paragraph (2) regarding Travel Information	Travel Information	In accordance
3.	Article 5 paragraph (1) regarding Electronic Tickets for Ferry Transportation	Electronic Ticket for Ferry Transportation	In accordance
4.	Article 5 paragraph (3) regarding Passenger Personal Data	Passenger Personal Data	In accordance
5.	Article 7 paragraph (1) regarding Ticket Payment	Ticket Payment	In accordance
6.	Article 8 paragraph (1) regarding the Issuance of Ferry Transportation Tickets	Issuance of Ferry Tickets	In accordance
7.	Article 8 paragraph (2) regarding Data on Passenger Tickets/Boarding Passes	Data on Passenger	In accordance

No	BenchmarkMinister of Transportation Regulation Number 19 of 2020 concerning the Implementation of Electronic Ferry Tickets	Information	Results
		Tickets/Boarding Passes	
8.	Article 9 paragraph (2) regarding Printing of Boarding Passes	Boarding Pass Printing	In accordance

b. Analysis of User Satisfaction Levels in the Implementation of Ticket Digitalization at Merak Ferry Port

Data processing to test validity is done using SPSS 29 software. Validity testing is done using Pearson Product Moment Correlation. The test results can be said to be valid if the r table value is less than the Pearson Correlation value (r count). Therefore, to obtain the r table value from df (degrees of freedom), the following formula is used.

$$df = N - 2 \quad (4.1)$$

N is the number of samples collected, which is 100 respondents. The R table shows that the value can be seen in Appendix 8. The r table value is 0.1966 with a significance level of 0.05. The instrument or statement can be declared valid if the calculated r value ≥ the r table value attached to Appendix 9. The test results are shown in table 2 as follows.$df = 100 - 2 = 98$

Table 2. Validity Test Results

Question	r count	r table	Decision
1	0.875	0.1966	Valid
2	0.827	0.1966	Valid
3	0.835	0.1966	Valid
4	0.866	0.1966	Valid
5	0.856	0.1966	Valid
6	0.882	0.1966	Valid
7	0.877	0.1966	Valid
8	0.882	0.1966	Valid
9	0.808	0.1966	Valid
10	0.870	0.1966	Valid

Based on the correlation calculation results of the validity test for the performance measurement tool, it ranges from 0.827 to 0.882 (calculated r). The figure used for comparison is 0.1966 (table r). Based on the validity test results table above, it can be seen that all instruments or statements contained in the questionnaire are declared valid.

The reliability test in this study uses the Cronbach's Alpha formula found in the SPSS 29 software. The Cronbach's Alpha value can be said to be reliable if the Cronbach's Alpha value is ≥ 0.7.

The results of this reliability test show that the Croncbach's Alpha value is 0.959, which is listed in Appendix 10. The results of the variables are said to be reliable and have a relationship at a very strong level, based on the questionnaire consistency table, such as table 3 as follows.

Table 3. Reliability Test Results

Cronbach's Alpha	**Number of Instruments**	**Criteria**
0.959	10	Very strong

On the first page of the questionnaire form that has been distributed to service users, there are several questions related to personal data that must be filled in by each service user, namely gender, age, travel intensity, and travel purpose as shown in table 4 below.

Table 4. Respondent Characteristics Table

Information	Number of people)	Percentage (%)
1. Gender		
a. Man	35	35
b. Woman	65	65
2. Age		
a. <20 years	59	59
b. 20-35 years	38	38
c. 36-45 years old	3	3
d. >45 years		
3. Travel Intensity		
a. 1-3 times	61	61
b. 4-6 times	22	17
c. 7-9 times	10	10
d. >10 times	7	7
4. Travel Destination	71	71
a. Tour	27	27
b. Work	2	2
c. Other		

The questionnaire that has been distributed with several question indicators regarding service user satisfaction with the implementation of ticket digitalization at Merak Ferry Port will be calculated using the Customer Satisfaction Index (CSI) requiring 100 respondents.

The CSI calculation is expected to measure the level of user satisfaction with the implementation of ticket digitization. The steps for calculating the Customer Satisfaction Index (CSI) are as follows.

Table 5. CSI

Question Items	MIS	MSS	WF	WS
1	3.82	3.82	9.91	37.87
2	3.88	3.88	10.07	39.07

3	3.83	3.76	9.94	37.38
4	3.94	3.85	10.23	39.37
5	3.86	3.72	10.02	37.27
6	3.86	3.80	10.02	38.07
7	3.91	3.84	10.15	38.97
8	3.80	3.76	9.86	37.08
9	3.72	3.67	9.65	35.43
10	3.91	3.90	10.15	39.58
Total		Total (WT)		**385.39**

Based on the table, the results of the Customer Satisfaction Index calculation were obtained, namely 385.39, then the results were processed again using the CSI formula as follows.

$$SI = \frac{WT}{n} \times 100\%$$

$$SI = \frac{385{,}39}{5} \times 100\%$$

$$SI = 77{,}08\%$$

Based on the final calculation using the Customer Satisfaction Index (CSI) method, the User Satisfaction Index (CSI) was 77.08%. It can be concluded that users are satisfied with the implementation of ticket digitization at Merak Ferry Port based on the satisfaction level criteria (Table 5), which shows a CSI value ranging from 66 to 80.99 indicating satisfaction.

c. Analysis of Service User Obstacles in the Implementation of Ticket Digitalization at Merak Ferry Port

In the questionnaire that has been distributed, researchers also included questions related to what obstacles are still faced by service users in implementing ticket digitalization which can also be used as input for port management so that they can provide even better services.

4. CONCLUSION

After conducting the research, the research results were obtained as described in the previous chapter, so from these problems the following conclusions were obtained.

The ticket digitalization facility at the Merak Ferry Port is in accordance with the Regulation of the Minister of Transportation of the Republic of Indonesia Number 19 of 2020 concerning the Implementation of Electronic Ferry Transportation Tickets, such as the availability of the ferizy application, the availability of travel information, the availability of passenger personal data, payment methods, the availability of ticket issuance barcodes, and the availability of ticket issuance tools in the port area.

The level of user satisfaction in the implementation of ticket digitalization at the Merak Ferry Port is 77.08% which is included in the satisfied criteria (66-80.99) and another 22.02% are stated as dissatisfied. Ticket digitalization has been implemented since May 1, 2020 at the Merak Ferry Port in accordance with the Regulation of the Minister of Transportation of the Republic of Indonesia Number 19 of 2020 concerning the Implementation of Electronic Ferry Transportation Tickets.

From the results of the questionnaire that has been distributed, there are several obstacles regarding the implementation of ticket digitalization at the Merak ferry port, such as technical system disruptions, lack of socialization and technological limitations, not having digital payment tools, inconsistencies in departure data, and the distance between ticket orders.

References

[1] M. A. Camilleri, "The digitization of travel and tourism services," Tourism Planning & Development, vol. 17, no. 3, pp. 223–234, 2020.

[2] S. Banerjee and A. Yadav, "Smart transportation systems and digital transformation," International Journal of Transportation Science and Technology, vol. 10, no. 2, pp. 125–136, 2021.

[3] Ministry of Transportation of Indonesia, "Annual Transportation Statistics Report," Jakarta, Indonesia, 2023.

[4] A. Ramadhan, D. Pratama, and Y. Saputra, "Analysis of ticket scalping practices at ferry ports in Indonesia," Journal of Maritime Transportation, vol. 8, no. 1, pp. 45–53, 2024.

[5] PT ASDP Indonesia Ferry (Persero), "Ferizy Online Ticketing System," accessed May 2026.

[6] R. Nugroho and T. Hidayat, "Implementation of digital ticketing systems in Indonesian ferry transportation," Journal of Marine Policy and Management, vol. 6, no. 2, pp. 88–96, 2022.

[7] J. Wang, H. Lee, and P. Kim, "Digital transformation in public transportation services," Transportation Research Procedia, vol. 48, pp. 1942–1951, 2020.

[8] M. A. Rahman and S. K. Hasan, "Factors affecting adoption of e-ticketing systems," International Journal of Information Systems, vol. 14, no. 4, pp. 201–210, 2021.

[9] N. Putri and F. Kurniawan, "Digital literacy challenges in transportation services," Journal of Information Technology and Society, vol. 5, no. 1, pp. 15–23, 2022.

[10] P. Kotler and K. L. Keller, Marketing Management, 15th ed. London, U.K.: Pearson Education, 2016.

[11] T. Parasuraman, V. Zeithaml, and 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] A. Bhote, Beyond Customer Satisfaction to Customer Loyalty, New York, NY, USA: AMA Publications, 1996.

[13] D. Supranto, Measuring Customer Satisfaction Level, Jakarta, Indonesia: Rineka Cipta, 2018.

[14] R. Wijaya and N. Sari, "Application of Customer Satisfaction Index in transportation services," International Journal of Industrial Engineering Research, vol. 11, no. 3, pp. 144–152, 2021.

[15] N. Fitriyani and M. Syahputra, "Customer satisfaction analysis of digital intercity transportation systems using CSI method," Journal of Transportation Technology, vol. 9, no. 2, pp. 77–85, 2023.

[16] Y. Lestari and H. Prasetya, "Evaluation of online ticket purchasing systems at integrated bus terminals," Journal of Public Transportation Research, vol. 7, no. 1, pp. 55–64, 2022.