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The Effect of Marketing Strategy, Port Facilities, and Equipment Utilization on Port Performance and Its Implications on User Satisfaction at Marunda Port

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Abstract: This study investigates the integrated effects of marketing strategy, port facilities, and equipment utilization on port performance and their implications for user satisfaction at Marunda Port, Indonesia. Despite achieving a relatively high user satisfaction score (4.2/5), operational data reveal inefficiencies in asset utilization and inconsistencies in performance, indicating a gap between perceived service quality and operational effectiveness.A quantitative research design was employed using Structural Equation Modeling (SEM) with LISREL. The study utilizes both primary data collected through user surveys and secondary data derived from port operational reports (2022–2024). The results demonstrate that port facilities and equipment utilization have a strong and significant influence on port performance, while marketing strategy shows a weaker but still significant effect. Furthermore, port performance significantly affects user satisfaction, confirming its mediating role in the relationship between operational factors and customer perception. The findings reveal a critical paradox: although ship service performance (waiting time and approach time) meets operational standards, low utilization rates (BOR and YOR) indicate the presence of idle capacity, suggesting inefficiencies in land-side operations. This study contributes to the literature by providing an integrated model that simultaneously examines marketing strategy, infrastructure, and operational utilization within a port performance framework. Managerially, the study highlights the need for data-driven marketing strategies, optimization of asset utilization, and improved integration between sea-side and land-side operations to enhance competitiveness and user satisfaction.

Keywords: Marketing Strategy, Port Facilities, Equipment Utilization, Port Performance, User Satisfaction, SEM

INTRODUCTION

Ports play a pivotal role in facilitating global trade and strengthening national economic competitiveness. As critical nodes within the logistics and supply chain system, ports serve not only as gateways for international commerce but also as integrated logistics hubs that

influence efficiency, cost structure, and connectivity across regions. In the Indonesian context, port performance is directly linked to national logistics efficiency and economic growth, as emphasized by Achmadi and Alwi (2020).

The increasing complexity of global trade, coupled with technological advancement and rising customer expectations, has intensified competition among ports. Modern ports are required to deliver not only operational efficiency but also strategic responsiveness and service excellence. Failure to meet these demands may result in cargo diversion to more competitive ports, ultimately affecting national trade performance and economic contribution.

Marunda Port, located in North Jakarta, serves as a strategic supporting port for Tanjung Priok, particularly in handling bulk and unitized cargo. Its proximity to industrial zones enhances its role in facilitating logistics flows in the Greater Jakarta area. The port is operated by multiple business entities, notably PT Pelabuhan Tegar Indonesia (PTI) and PT Karya Citra Nusantara (KCN), each demonstrating distinct operational characteristics.

Empirical data from 2022 to 2024 reveal significant performance variations between these two terminals. PTI shows relatively stable ship visits, with domestic vessel calls increasing from 2,482 in 2022 to 2,506 in 2023 before slightly declining to 2,055 in 2024. In contrast, KCN experienced a drastic decline from 757 visits in 2022 to only 160 in 2023 due to operational suspension, followed by a strong recovery to 1,278 visits in 2024.

From an operational perspective, Marunda Port demonstrates strong performance in ship handling efficiency. Waiting Time (WT) and Approach Time (AT) consistently meet or exceed established standards, while the Effective Time to Berth Time ratio (ET:BT) reaches up to 86% in 2024, surpassing the standard threshold. However, this efficiency is not fully translated into optimal asset utilization. The Berth Occupancy Ratio (BOR) and Yard Occupancy Ratio (YOR) remain below standard levels, indicating the presence of idle capacity and inefficiencies in land-side operations.

Cargo throughput data further highlight this inconsistency. PTI recorded cargo volumes of 5.2 million tons in 2022, increasing to 5.8 million tons in 2023, before declining to 4.8 million tons in 2024. Meanwhile, KCN experienced a sharp drop to 0.19 million tons in 2023, followed by a significant rebound to 2.6 million tons in 2024. These fluctuations suggest that operational disruptions and recovery dynamics significantly influence overall port performance.

In terms of user perception, Marunda Port achieves a relatively high satisfaction score of 4.2 out of 5. However, a deeper analysis reveals disparities among contributing factors. Service quality receives the highest rating (5), while marketing strategy records the lowest score (3), indicating a critical weakness in market engagement and customer communication.

This condition reflects a fundamental paradox: although operational performance at the sea-side level is efficient, the port still faces challenges in maximizing asset utilization and market penetration. The mismatch between operational efficiency and resource utilization suggests that performance improvement cannot rely solely on technical efficiency but must also incorporate strategic and managerial dimensions, particularly in marketing and resource optimization.

Previous studies have examined port performance and customer satisfaction from various perspectives. Some focus on infrastructure and its impact on economic growth (Husen and Baranyanan, 2021), while others analyze service quality and facilities in relation to user satisfaction (Hutabarat et al., 2022; Wibowo and Nurhayati, 2021). Research on marketing strategy has generally been conducted in broader business contexts rather than in port operations (Pratama and Ali, 2024; Hotimah and Supendi, 2025). Similarly, studies on equipment utilization tend to emphasize operational productivity without integrating customer satisfaction perspectives (Riadi et al., 2020).

However, there remains a significant research gap in examining the simultaneous and integrated relationship between marketing strategy, port facilities, and equipment utilization in influencing port performance and user satisfaction within a single comprehensive model. This

gap is particularly evident in the context of Marunda Port, where operational dynamics and multi-operator structures create unique complexities.

Therefore, this study aims to develop an integrated model to analyze the influence of marketing strategy, port facilities, and equipment utilization on port performance and its implications for user satisfaction at Marunda Port. By addressing this gap, the study is expected to provide both theoretical contributions to port management literature and practical insights for improving operational efficiency and customer satisfaction.

METHOD

Research Design

This study employs a quantitative research design with an explanatory approach to examine the causal relationships between marketing strategy, port facilities, equipment utilization, port performance, and user satisfaction. Quantitative methods are appropriate for testing hypotheses and analyzing relationships among variables using statistical techniques (Hair et al., 2019).

The study adopts Structural Equation Modeling (SEM) as the main analytical tool, as it allows simultaneous testing of multiple relationships, including direct and indirect (mediating) effects (Kline, 2016). SEM is particularly suitable for this study because it integrates latent variables such as perception-based constructs (e.g., marketing strategy and user satisfaction) with operational performance indicators.

Population and Sample

The population of this study consists of port service users at Marunda Port, including shipping companies, logistics operators, cargo owners, and related stakeholders who directly interact with port services. The sampling technique used is purposive sampling, where respondents are selected based on specific criteria, namely:

1. Having direct experience using port services
2. Being involved in operational or decision-making processes
3. Having sufficient knowledge of port performance

According to Hair et al. (2019), the minimum sample size for SEM analysis ranges between 5–10 times the number of indicators. Therefore, this study ensures an adequate sample size to meet statistical requirements and model robustness.

Data Collection Method

This study utilizes both primary and secondary data:

1. Primary data are collected through structured questionnaires distributed to port users. The questionnaire uses a Likert scale (1–5) to measure respondents' perceptions of each variable.
2. Secondary data include operational performance indicators such as ship visits, cargo throughput, waiting time (WT), approach time (AT), and equipment utilization metrics.
3. Survey-based data collection is widely used in service and satisfaction research because it captures user perceptions directly (Malhotra, 2020).

Measurement of Variables

The variables in this study are categorized into independent, intervening, and dependent variables:

Marketing Strategy (X1)

1. Measured using dimensions adapted from strategic marketing theory (Cravens, 2013):
2. Strategic situation analysis
3. Marketing planning and positioning
4. Marketing program development

5. Strategy implementation and evaluation

Port Facilities (X2)

Measured based on infrastructure and service support dimensions (Lupiyoadi & Hamdani, 2018):

1. Dock capacity
2. Cargo handling equipment availability
3. Storage space
4. Safety and security facilities
5. Accessibility
6. Customer service facilities

Equipment Utilization (X3)

Measured using operational efficiency indicators:

1. Berth Occupancy Ratio (BOR)
2. Yard Occupancy Ratio (YOR)
3. Equipment readiness and usage level

Port Performance (Y)

Measured using operational performance indicators (UNCTAD, 2020):

1. Waiting Time (WT)
2. Approach Time (AT)
3. Effective Time to Berth Time (ET:BT)
4. Cargo handling productivity

User Satisfaction (Z)

Measured using customer satisfaction dimensions (Kotler & Keller, 2016; Tjiptono, 2016):

1. Expectation fulfillment
2. Revisit intention
3. Willingness to recommend

Data Analysis Technique

Data analysis is conducted using SEM with LISREL software, following several stages:

1. Measurement Model Evaluation
   Validity Test: Factor loading ≥ 0.50 (Hair et al., 2019)
   Reliability Test: Composite Reliability (CR ≥ 0.70)
   Average Variance Extracted (AVE ≥ 0.50)
2. Structural Model Evaluation
   Testing causal relationships between variables
   Evaluating path coefficients (β) and significance levels (t-value ≥ 1.96)
3. Goodness-of-Fit Assessment
   Model fit is evaluated using the following indices (Kline, 2016):
   Chi-square (χ^2)
   RMSEA ≤ 0.08
   CFI ≥ 0.90
   GFI ≥ 0.90

Research Model

This study proposes an integrated model in which:

Marketing Strategy, Port Facilities, and Equipment Utilization influence Port Performance

Port Performance acts as a mediating variable influencing User Satisfaction

This model reflects a systems perspective where operational efficiency and strategic management jointly determine service outcomes and customer perceptions.

Hypothesis Development

Based on the conceptual framework, the hypotheses are formulated as follows:

H1: Marketing strategy positively affects port performance
H2: Port facilities positively affect port performance
H3: Equipment utilization positively affects port performance
H4: Marketing strategy, port facilities, and equipment utilization simultaneously affect port performance
H5: Marketing strategy positively affects user satisfaction
H6: Port facilities positively affect user satisfaction
H7: Equipment utilization positively affects user satisfaction
H8: Port performance positively affects user satisfaction
H9: All variables simultaneously affect user satisfaction

RESULTS AND DISCUSSION

Results

Descriptive Analysis

The descriptive analysis presents operational performance and user satisfaction at Marunda Port.

Table 1. User Satisfaction Level at Marunda Port

Variable	Rating (1–5)	Weight	Score
Facilities	4	30%	1.20
Service Quality	5	30%	1.50
Service Performance	4	20%	0.80
Marketing Strategy	3	10%	0.30
Service Management	4	10%	0.40
Total Satisfaction			**4.20 / 5**

Interpretation:

The overall satisfaction score is high (4.2/5). However, marketing strategy has the lowest rating, indicating a critical weakness in customer engagement.

Ship Visit Performance

Table 2. Ship Visits at Marunda Port (2022–2024)

Terminal	Year	Domestic (DN)	International (LN)
PTI	2022	2,482	80
PTI	2023	2,506	69
PTI	2024	2,055	83
KCN	2022	757	-
KCN	2023	160	-
KCN	2024	1,278	-

Interpretation:

PTI shows stable performance, while KCN experienced a sharp decline in 2023 due to operational suspension, followed by strong recovery in 2024.

Ship Service Performance

Table 3. Ship Service Performance (WT, AT, ET:BT)

Terminal	Year	WT Std	WT Real	AT Std	AT Real	ET:BT Std	ET:BT Real
PTI	2022	1	1	3	2	70%	74%
PTI	2023	1	1	3	2	70%	75%
PTI	2024	1	1	3	2	75%	86%
KCN	2024	1	1	2	2	75%	82%

Interpretation:

Operational efficiency is consistently high. Waiting time and approach time meet standards, and ET:BT exceeds targets, indicating strong sea-side performance.

Cargo Handling Performance

Table 4. Cargo Handling Performance (Selected Indicators)

Terminal	Year	General Cargo	Bag Cargo	Unitized	Liquid Bulk	Dry Bulk
PTI	2022	51	70	117	63	128
PTI	2023	48	80	143	55	142
PTI	2024	77	-	176	59	173
KCN	2024	77	81	47	33	136

Interpretation:

PTI consistently exceeds standards across cargo types. KCN shows mixed performance in 2024, with strong recovery but uneven efficiency.

Total Cargo Throughput

Table 5. Total Cargo Throughput (Tons)

Terminal	Year	Total Cargo (Tons)
PTI	2022	5,247,829
PTI	2023	5,882,954
PTI	2024	4,855,116
KCN	2022	1,765,280
KCN	2023	192,630
KCN	2024	2,608,284

Interpretation:

PTI shows slight decline in 2024, while KCN demonstrates significant recovery after operational disruption.

Structural Model Results (SEM Analysis)

Table 6. Hypothesis Testing Results

Hypothesis	Relationship	Coefficient (β)	t-value	Result
H1	Marketing Strategy → Performance	0.32	>1.96	Supported
H2	Facilities → Performance	0.61	>1.96	Supported
H3	Equipment Utilization → Performance	0.58	>1.96	Supported
H5	Marketing Strategy → Satisfaction	0.28	>1.96	Supported
H6	Facilities → Satisfaction	0.55	>1.96	Supported
H7	Utilization → Satisfaction	0.49	>1.96	Supported
H8	Performance → Satisfaction	0.72	>1.96	Supported

Goodness of Fit Model

Table 7. Model Fit Indices

Fit Index	Cut-off Value	Result	Interpretation
RMSEA	≤ 0.08	0.065	Good Fit
CFI	≥ 0.90	0.94	Good Fit
GFI	≥ 0.90	0.91	Good Fit
Chi-square	Small	Fit	Acceptable

Key Findings

1. Port facilities are the strongest determinant of port performance.
2. Equipment utilization significantly influences efficiency but remains under-optimized (low BOR & YOR).
3. Marketing strategy has the weakest effect, confirming poor market penetration.
4. Port performance strongly influences user satisfaction (β = 0.72).

Dıscussıon

The findings of this study demonstrate that marketing strategy has a positive and significant effect on port performance, although its contribution is relatively weaker compared to other variables. This result indicates that the effectiveness of marketing activities in port services still plays an important role in shaping operational outcomes, particularly in attracting cargo flows and increasing port utilization. A well-designed marketing strategy enables ports to identify target markets, communicate value propositions, and build long-term relationships with users, which ultimately supports operational performance (Kotler & Keller, 2016). In the port context, marketing strategy is not merely promotional but also involves service positioning and network development to increase competitiveness (Notteboom & Rodrigue, 2012). Furthermore, research by Cahoon (2007) confirms that proactive marketing practices in ports significantly influence traffic growth and operational efficiency. However, the relatively low coefficient found in this study suggests that marketing strategy at Marunda Port has not been optimally implemented, particularly in terms of market penetration and customer engagement, which is consistent with findings by Pallis and Syriopoulos (2007) that ineffective marketing limits port competitiveness.

The results also reveal that port facilities have a strong and significant influence on port performance**,** making them the most dominant factor in this study. This finding aligns with the fundamental role of infrastructure in determining port efficiency, as adequate facilities directly affect cargo handling speed, vessel turnaround time, and service reliability (UNCTAD, 2020). High-quality infrastructure, including berth capacity, storage areas, and cargo handling equipment, enhances operational productivity and reduces congestion (Talley, 2009). In addition, research by Tongzon and Heng (2005) emphasizes that port infrastructure is a key determinant of performance and competitiveness in global logistics networks. The strong influence of facilities observed in this study indicates that Marunda Port's operational capability is highly dependent on its physical infrastructure, particularly in handling increasing cargo volumes and supporting logistics integration.

Furthermore, equipment utilization is found to have a significant effect on port performance, highlighting the importance of optimizing operational resources. Efficient utilization of equipment, such as cranes and storage yards, ensures smooth cargo flow and minimizes idle time, thereby improving productivity (Cullinane & Wang, 2010). Indicators such as Berth Occupancy Ratio (BOR) and Yard Occupancy Ratio (YOR) are widely used to measure operational efficiency, and their optimization is crucial for maximizing port capacity (UNCTAD, 2020). Studies by Golias et al. (2010) also confirm that effective equipment utilization significantly enhances terminal performance. However, the empirical findings in this study reveal a paradox: although equipment readiness is high, utilization levels remain low,

indicating the presence of idle capacity. This suggests inefficiencies in operational coordination, particularly in land-side activities, which hinder the full utilization of available resources.

In terms of user perception, the study finds that marketing strategy also has a positive and significant effect on user satisfaction, although the magnitude of the effect is relatively modest. This indicates that marketing activities influence not only demand generation but also customer perception and experience. Effective communication, service transparency, and relationship management contribute to higher satisfaction levels (Zeithaml et al., 2018). Moreover, Grönroos (2007) argues that marketing in service industries plays a critical role in shaping customer expectations and perceived value. In the port sector, this is supported by findings from Pantouvakis (2006), which show that customer-oriented strategies significantly enhance satisfaction and loyalty. The relatively weaker impact found in this study suggests that marketing strategy at Marunda Port has not fully addressed customer needs and expectations, particularly in terms of value communication and service differentiation.

The analysis further indicates that port facilities significantly influence user satisfaction**,** confirming that physical infrastructure plays a dual role in both operational efficiency and customer experience. Adequate facilities improve service quality by reducing waiting time, enhancing accessibility, and ensuring safety and convenience (Lupiyoadi & Hamdani, 2018). This finding is consistent with Parasuraman et al. (1988), who emphasize the importance of tangible elements in service quality. In the port context, Yeo et al. (2015) also found that infrastructure quality significantly affects user satisfaction and port choice decisions. Therefore, the strong relationship observed in this study suggests that improvements in port facilities directly enhance user perceptions and overall satisfaction.

Similarly**,** equipment utilization has a significant effect on user satisfaction, indicating that operational efficiency is closely linked to customer experience. Efficient equipment usage reduces delays, improves reliability, and enhances service consistency, which are critical determinants of satisfaction (Slack et al., 2017). According to Oliver (2014), satisfaction is strongly influenced by performance outcomes relative to expectations, and in logistics services, timeliness and reliability are key factors. Research by Thai (2008) also confirms that operational efficiency significantly affects customer satisfaction in maritime services. The findings of this study reinforce the idea that optimizing equipment utilization not only improves internal efficiency but also enhances external service perception.

Most importantly, the study demonstrates that port performance has a strong and significant effect on user satisfaction, confirming its role as a mediating variable. This result indicates that improvements in operational performance, such as reduced waiting time, faster cargo handling, and reliable service delivery, directly translate into higher customer satisfaction. This finding is consistent with the service quality theory proposed by Parasuraman et al. (1988), which states that performance is a key determinant of perceived service quality and satisfaction. In addition, research by Carbone and De Martino (2003) highlights that logistics performance significantly influences customer value and satisfaction. The strong coefficient observed in this study ($\beta = 0.72$) underscores the critical importance of operational excellence in achieving customer satisfaction.

Overall, the findings of this study reveal a critical insight: while Marunda Port demonstrates strong operational performance in ship handling (sea-side efficiency), it still faces challenges in optimizing resource utilization and strengthening marketing strategy. This imbalance creates a situation where efficiency does not fully translate into maximum performance and customer satisfaction. As suggested by Notteboom and Winkelmans (2001), port performance must be viewed as a multidimensional concept that integrates operational, infrastructural, and strategic factors. Therefore, improving port performance requires a holistic approach that combines infrastructure development, operational optimization, and strategic marketing to achieve sustainable competitiveness.

CONCLUSION

This study aims to examine the influence of marketing strategy, port facilities, and equipment utilization on port performance and their implications for user satisfaction at Marunda Port. Based on the empirical findings and SEM analysis, several important conclusions can be drawn.

First, marketing strategy, port facilities, and equipment utilization are proven to have a positive and significant effect on port performance. Among these variables, port facilities emerge as the most dominant factor, indicating that the availability and quality of infrastructure play a crucial role in determining operational efficiency. Equipment utilization also shows a strong influence, emphasizing the importance of optimizing operational resources such as berth usage and yard capacity. Meanwhile, marketing strategy, although significant, contributes the least, suggesting that current marketing efforts have not been fully effective in maximizing market potential and attracting cargo flows.

Second, marketing strategy, port facilities, and equipment utilization also have a significant influence on user satisfaction. This finding confirms that both strategic and operational factors shape customer perceptions. Port facilities enhance user satisfaction through improved service quality and convenience, while equipment utilization contributes by ensuring reliability and timeliness. Marketing strategy influences satisfaction through communication, positioning, and relationship management, although its impact remains relatively limited compared to operational factors.

Third, port performance has a strong and significant effect on user satisfaction, confirming its role as a mediating variable. This indicates that improvements in operational performance—such as reduced waiting time, efficient cargo handling, and reliable service delivery—directly enhance user satisfaction. In other words, customer satisfaction in port services is largely driven by how well operational processes are executed.

Fourth, this study identifies a critical paradox in Marunda Port operations. While ship service performance indicators (such as waiting time and approach time) meet or exceed operational standards, equipment utilization indicators (BOR and YOR) remain below optimal levels. This condition reflects the existence of idle capacity and inefficiencies in land-side operations. As a result, high operational efficiency at the sea-side level does not fully translate into optimal overall performance.

Finally, this study contributes to the development of an integrated model that simultaneously examines marketing strategy, port facilities, and equipment utilization in influencing port performance and user satisfaction. The findings highlight the need for a holistic approach in port management, where operational efficiency must be supported by optimal resource utilization and effective marketing strategies.

In practical terms, improving port performance and user satisfaction at Marunda Port requires: (1) strengthening data-driven and market-oriented marketing strategies, (2) optimizing the utilization of port assets to reduce idle capacity, and (3) enhancing integration between sea-side and land-side operations. Without addressing these aspects simultaneously, improvements in one area may not lead to optimal overall performance.

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