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Performance Evaluation of Merauke Archipelago Fisheries Port: GAP Analysis, Challenges, and Opportunities for Strengthening Port Services

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ABSTRAK

Tujuan Studi, studi ini bertujuan untuk menilai kinerja Pelabuhan Perikanan Kepulauan Merauke (PPN) menggunakan indikator standar nasional dan untuk mengidentifikasi kesenjangan (GAP) di seluruh komponen utama termasuk administrasi, fasilitas, layanan publik, investasi, dan industri. Penelitian ini berupaya memetakan area prioritas yang membutuhkan perbaikan strategis untuk memperkuat daya saing pelabuhan dan mendukung pembangunan perikanan berkelanjutan di Papua Selatan. Bahan dan Metode, Desain deskriptif-evaluatif digunakan dengan membandingkan kinerja pelabuhan aktual dengan standar nasional. Analisis melibatkan pemberian skor evaluatif, analisis GAP untuk mengidentifikasi perbedaan antara kondisi yang diharapkan dan aktual, dan interpretasi deskriptif untuk penjelasan yang lebih mendalam tentang kekuatan dan kelemahan kinerja. Hasil, evaluasi menunjukkan bahwa PPN Merauke mencapai tingkat kinerja yang baik dengan total skor 73,75 dari 100. Kinerja yang kuat tercatat pada fasilitas fisik dan operasional seperti kapasitas kolam, dimensi dermaga, volume produksi, dan frekuensi kunjungan kapal. Namun, kesenjangan kritis ditemukan pada digitalisasi (sistem SHTI dan SISKA), fasilitas teknis yang terbatas untuk penambatan dan perbaikan, efisiensi layanan logistik yang rendah, kehadiran industri pengolahan yang minimal, dan sumber daya manusia yang tidak mencukupi. Kesimpulannya, kekuatan pelabuhan tetap terkonsentrasi pada infrastruktur fisik, sementara komponen fungsional dan manajerial tertinggal. Empat strategi peningkatan utama direkomendasikan: modernisasi sistem informasi, penyediaan fasilitas dukungan teknis, pengembangan industri pengolahan, dan penguatan kapasitas sumber daya manusia untuk meningkatkan daya saing dan keberlanjutan.

Kata kunci: Kinerja Pelabuhan; Analisis Kesenjangan; Digitalisasi Perikanan; Fasilitas Operasional; Penguatan Layanan

ABSTRACT

Purpose of the Study, this study aims to assess the performance of the Merauke Archipelago Fisheries Port (PPN) using national standard indicators and to identify gaps (GAPs) across key components including administration, facilities, public services, investment, and industry. The research seeks to map priority areas that require strategic improvements to strengthen port competitiveness and support sustainable fisheries development in South Papua. Materials and Methods, A descriptive-evaluative design was employed by comparing actual port performance with national standards. The analysis involved evaluative scoring, GAP analysis to identify discrepancies between expected and actual conditions, and descriptive interpretation for deeper explanation of performance strengths and weaknesses. Results, the evaluation shows that Merauke PPN achieves a good performance level with a total score of 73.75 out of 100. Strong performance is recorded in physical and operational facilities such as pond capacity, pier dimensions, production volume, and vessel visit frequency. However, critical GAPs are found in digitalization (SHTI and SISKA systems), limited technical facilities for docking and repair, low logistics service efficiency, minimal processing industry presence, and insufficient human resources. Conclusions, the port's strengths remain concentrated in physical infrastructure, while functional and managerial components lag behind. Four key improvement strategies are recommended: modernizing information systems, providing technical support facilities, developing the processing industry, and strengthening human resource capacity to enhance competitiveness and sustainability.

Keywords: Port Performance; GAP Analysis; Fisheries Digitalization; Operational Facilities; Service Strengthening

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INTRODUCTION

Fishing ports play a strategic role in supporting the national fisheries supply chain, particularly as hubs for loading and unloading catches, logistics distribution, fleet management, and supporting services for the fisheries industry(Yang et al., 2023). Effectively managed ports directly contribute to the stability of fish supplies, improved product quality, and the operational efficiency of fishermen and businesses alike(N'Souvi et al., 2025). In this context, the Indonesian Fisheries Port (PPN) serves as a crucial hub integrating production, processing, and marketing, ensuring the quality of PPN management significantly impacts the competitiveness of the fisheries sector at both the regional and national levels. This role is increasingly crucial given the growing demand for quality, safe, and certified fisheries products, requiring ports to perform their service functions optimally and to standards. National challenges in enhancing the competitiveness of the fisheries sector remain complex, particularly related to the efficiency of port services, accelerating digital transformation, and optimizing the utilization of physical facilities (Kusumawati & Punomo, 2024). The comprehensive implementation of information systems such as e-logbooks, PIPPs, online SPBs, and other monitoring applications remains uneven across ports, including PPNs in eastern Indonesia. Furthermore, the quality of port infrastructure, the availability of supporting facilities for the fisheries industry, and human resource capacity are crucial factors influencing operational performance (Mabinga & Mwalukasa, 2024). This condition shows that efforts to improve fishing port services not only require technical and managerial improvements, but also policy improvements and inter-system integration so that ports can function as centers for modern and sustainable fisheries economic growth.

As one of the strategic fishing ports in South Papua, the Merauke Port plays a crucial role in supporting capture fisheries activities, fishery product distribution, and logistics services for vessels operating in the Arafura waters. Its location in an area with abundant fishery resources makes the port play a significant role in maintaining the stability of the national fish supply and driving local economic development. However, as a key hub for fisheries activity in eastern Indonesia, the Merauke Port is required to have reliable, measurable service capacity that meets national standards. Performance evaluations indicate that although several indicators have achieved good standards, several critical issues remain obstacles to optimizing the port's functions (Fahim et al., 2022). Actual issues identified in the performance evaluation reveal significant limitations in human resources, particularly the insufficient number of management personnel to effectively carry out all port service functions. Furthermore, the utilization of digital facilities such as SHTI and SISKA has not been optimal, resulting in incomplete digitization of the recording, monitoring, and control of fisheries activities. Low absorption of clean water, ice, and fuel indicates obstacles in providing basic services to fishing vessels, which can hamper the operational activities of fishermen and the industry. The limited number of processing industries in the WKOPP and the low utilization of port land also contribute to structural challenges that reduce the

added value of fisheries in the region. Overall, the performance gap across these indicators directly impacts the effectiveness of port services and the capacity of the fishing industry (Mthembu & Chasomeris, 2023), necessitating a data-driven improvement strategy to comprehensively enhance the performance of the Merauke PPN.

Previous studies on fishing ports have generally focused on aspects of fisheries productivity, operational efficiency, and the dynamics of fishing activities and seafood marketing. Various studies tend to emphasize analysis of production volume, fishing fleet performance, and distribution chains, thus highlighting the macroeconomic dimensions of fisheries. While these findings provide an important contribution to understanding the role of ports in supporting fisheries activities, this approach does not fully encompass the complexity of port governance, which involves aspects of administration, public services, physical facilities, and the capacity of industries operating within the port area. Furthermore, very few studies explicitly link the gaps (GAPs) between standard port performance indicators, such as administration and information systems, port facilities, public services, and investment and industry. The lack of research integrating all these components results in a partial understanding of port performance, unable to comprehensively capture the relationships between these aspects. This research gap indicates that few studies have adopted a multi-indicator evaluation approach based on empirical data, such as that applied to the Merauke Port Management Unit. Therefore, research is needed that not only assesses performance achievements, but also analyzes the gaps that occur between service standards to produce a comprehensive picture of the condition of fishing ports and the direction of development needed.

Standardized indicator-based evaluation is crucial for improving fisheries port governance, as it provides an objective picture of aspects that meet standards and those that require improvement. In the context of the Merauke Port Authority (PPN), the urgency of research is heightened given the suboptimal use of digital systems, human resource availability, and the effectiveness of basic port services. These factors need to be systematically identified to formulate targeted performance improvement strategies. As a strategic port in eastern Indonesia, the Merauke Port Authority plays a crucial role in supporting the regional fisheries economy, and improving its management quality will directly impact the productivity and competitiveness of the fisheries sector. Therefore, research that produces empirically evidence-based recommendations is crucial to support more effective, adaptive, and sustainable port development planning. This study aims to analyze the performance of the Merauke Port Authority (PPN) based on national indicator standards and identify gaps (GAPs) in each key component, including administration, facilities, public services, and investment and industry. Furthermore, this study seeks to explain the factors causing low performance across several indicators and formulate strategic recommendations to comprehensively strengthen the performance of the Merauke Port Authority (PPN).

METHOD

This study uses a descriptive-evaluative design, an approach that focuses on assessing the level of performance achievement based on a set of nationally established standard indicators, followed by an evaluation process of the gap (GAP) between standards and actual performance. This design was chosen because it is able to provide a comprehensive empirical picture of the actual condition of the Merauke Nusantara Fisheries Port (PPN) by comparing each performance component, from administration and information systems, port facilities, public services, to investment and industrial aspects, against standardized benchmarks. Through this approach, the study can identify areas that have met standards, areas that still have performance deviations, and factors causing indicators not to be achieved. The results can then be used as a basis for developing strategic recommendations for sustainable port performance improvement.

The research location is at the Merauke Nusantara Fisheries Port (PPN), South Papua, which is one of the strategic ports in eastern Indonesia and serves as a center for fishing, landing, distribution, and processing of fishery products. The research subjects include various components that represent the port's overall performance, namely annual performance documents containing indicator achievement data, operational reports, and budget realization; physical port facilities such as docks, port basins, operational areas, marketing facilities, and ship repair facilities; and port information systems that include the implementation of digital applications such as PIPP, E-Logbook, SPB Online, SHTI, SISKA, and fish unloading inspection applications. In addition, the research also reviews public service data, including mooring services, distribution of clean water, ice, and fuel, as well as production achievements and frequency of ship visits. The final component is the industrial units operating in the port's working area, which includes the number and activity of fish processing industries and the use of port land for fisheries economic activities. Through this comprehensive subject coverage, the research is able to provide a complete picture of the operational performance of PPN Merauke.

The types and sources of data in this study consist of quantitative data and supporting qualitative data used in a complementary manner to provide a comprehensive evaluative picture of the performance of the Merauke PPN. Quantitative data includes all nationally established fishing port standard indicator values as benchmarks for performance achievement, including indicators for administration and information systems, port facilities, public services, and investment and industrial aspects. This quantitative data also includes the realization of each indicator's achievement, such as the level of digital application utilization (PIPP, E-Logbook, SPB Online, SHTI, SISKA), the capacity of port physical facilities, the frequency of ship visits, daily production volume, distribution of clean water, ice, and fuel, as well as labor absorption and port land utilization. In addition, the study collected performance scores and GAP values, namely the difference between the standard and the realization that indicates the level of performance deviation in each indicator. Meanwhile, supporting qualitative data was obtained to

provide an in-depth explanation of the factors influencing the quantitative achievement, especially for indicators that have not yet reached the standard. This data includes information on port operational conditions, obstacles to implementing digital information systems, human resource limitations, technical barriers to service facilities, and the condition of industrial units operating within the port's working area. This qualitative information is typically collected through brief interviews with port managers, direct field observations, and internal document reviews, helping to interpret the numerical data more contextually. The combination of these two types of data allows the research to produce accurate and relevant evaluative analyses for developing port performance.

The data collection techniques in this study were conducted through three main, complementary approaches. First, documentation was used to obtain secondary data in the form of the Merauke PPN annual performance report, port operational data, information on physical facilities, and data on human resources involved in port management. These documents served as the primary basis for assessing the performance of each indicator. Second, direct observations were conducted in the port area to verify the actual condition of facilities, such as docks, port basins, marketing facilities, port utilities, and other supporting services. These observations were crucial to ensure that the data recorded in the report corresponded to actual conditions on the ground. Third, brief interviews with managers or operational officers were conducted on a limited basis and only when necessary, primarily to obtain clarification on indicators that did not meet standards or encountered implementation challenges, such as the use of digital applications or the utilization of certain facilities. Next, data analysis techniques were carried out in three stages. First, evaluative analysis was used to compare the realized value of each indicator with established national standards, thus providing an initial overview of the level of achievement of the Merauke VAT performance. Second, GAP analysis was conducted by calculating the difference between the standard value and the realized value for each indicator, which was then interpreted as a measure of deviation or the level of performance non-achievement. This GAP served as the basis for identifying areas that needed improvement or enhancement. Third, descriptive interpretation was used to narratively explain the meaning of the findings, including the port's performance position, the factors causing the gap, and its implications for port operations. Through this combination of analytical techniques, the study was able to produce a comprehensive, in-depth evaluation that was relevant to the development of the Merauke VAT performance.

FINDING AND DISCUSSION

Finding

Before presenting the research findings, it is important to emphasize that the performance evaluation of the Merauke Archipelago Fisheries Port (PPN) in this study is based on a direct comparison between national indicator standards and the port's actual performance during the assessment period. A

descriptive-evaluative approach was used to capture the objective conditions of each performance component, including those related to administration, physical facilities, public services, and the investment and industrial sectors. This analysis not only assesses the level of numerical achievement but also identifies emerging gaps (GAPs) and examines potential contributing factors. Therefore, the research findings presented below provide a comprehensive overview of the current performance of the Merauke PPN and aspects requiring strategic attention for future improvements in port services and governance.

Table 1. Achievements of Merauke VAT Administration and Information System Performance

Indicator	Standard	Realization	Mark	GAP
PIPP (Data Transmission Frequency)	Actively doing data entry	Actively filling in PIPP data	4	There isn't any
E-Logbook	Actively doing data entry	Actively fill in the E-logbook	2	There isn't any
SPB-Online	Already implemented online SPB	Online SPB has been implemented	2	There isn't any
SHTI (Fish Catch System)	Actively conducting SHTI	Not active	0.5	Merauke VAT has not implemented SHTI
SISKA (Fish Traceability System)	Actively doing data entry	Not active	0.5	Merauke VAT has not implemented SISKA

The performance of administration and information systems at the Merauke PPN shows that most digital services have been running according to standards, especially in the PIPP, E-logbook, and SPB-online indicators, which are recorded as active and consistent in data entry. However, two main systems, SHTI and SISKA, are still not optimal with an achievement score of only 0.5 because they have not been implemented effectively in the field. This condition indicates a significant gap in the digitalization aspect of the port, especially in systems related to traceability and recording of fish catches. The main factors causing the low performance of these two systems are limited human resources in managing digital applications, minimal training, and uneven technical skills to operate data-based systems within the Merauke PPN environment.

Table 2. Achievements of PPN Merauke Fisheries Port Facilities

Port Facility Indicators	Standard	Realization	Mark	GAP	Description of Findings
Pool Capacity	> 2,250 GT	2,500 GT	4	There isn't any	Facilities meet standards and support ship operations
Length of Pier	> 150 m	287 m	4	There isn't any	The pier is very adequate for loading and unloading activities.
Pool Depth	> 300 cm	950 cm	4	There isn't any	Ideal depth for large vessels and safe for navigation
Repair Facilities (Docking/Workshop)	There is	There isn't any	0.5	Critical gap	The lack of facilities means that ships have to be repaired outside the port.
Availability of Port Land	> 10 ha	28 ha	4	There isn't any	Sufficient land for development of facilities and industry

Table 2 shows that the physical facilities at the Merauke Nusantara Fisheries Port (PPN) are generally in excellent condition and meet national standards. The pond's capacity reaches 2,500 GT, the pier's length reaches 287 meters, and the pond's depth reaches 950 cm, all far exceeding minimum

standards, enabling it to support large-sized vessels with high loading and unloading volumes. The port's land availability is also very adequate, totaling 28 hectares, providing significant opportunities for the development of supporting facilities and industries. However, the study identified one critical deficiency: the lack of repair facilities in the form of docking or workshops. This indicator scored the lowest and created a significant gap because the port is unable to provide independent ship repair services. This condition results in low technical service effectiveness and increases ship reliance on repair facilities outside the port, making it a top priority for follow-up in the port's performance improvement strategy.

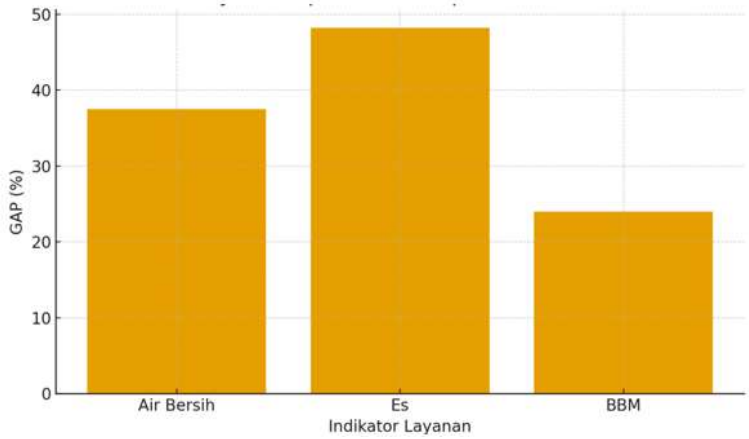


Chart 1. GAP of Ship Operational Services at PPN Merauke

Graph 1 shows the deviation between service standards and actual performance for three key logistics components: clean water, ice, and fuel distribution. Ice distribution exhibited the largest gap (GAP) of 48.23%, indicating limited production and distribution capacity, which directly impacts cold chain support for fishing vessels. Clean water distribution recorded a GAP of 37.50%, indicating the low effectiveness of water supply infrastructure management in meeting daily vessel operational needs. Meanwhile, the GAP for fuel distribution, at 24.01%, although smaller than other indicators, still indicates a mismatch between demand and supply capacity. Overall, these findings reflect structural weaknesses in port logistics service management that require policy intervention and system capacity enhancement to achieve nationally established service standards.

Table 3. Results of the Evaluation of the Performance of Merauke's VAT Investment and Industry

Indicator	**Standard**	**Merauke VAT Realization**	**GAP**	**Information**
Number of Processing Industry Units	15 units	2 units	13 units (-86.7%)	Very low performance; processing industry is not yet developed.
Port Land Utilization Level	100%	46.42%	53.58%	More than half of the land has not been utilized for industrial activities.
Availability of PSP (Revenue Source Management)	Must be available	Not yet available	Not fulfilled	Inhibiting business development and investment in the port area.

Industrial Supporting Infrastructure	Adequate	Limited	Does not meet standards	It is a major obstacle for industry players to operate or invest.

Evaluation results on the investment and industrial aspects indicate that the performance of the Merauke VAT is still far from the established standards. Of the target of 15 processing industry units, only two units are operational, resulting in a gap of 13 units, or a deficit of 86.7%. The land utilization rate is also still low, reaching only 46.42%, while the remaining 53.58% has not been maximized for productive activities. Furthermore, the lack of PSP (Revenue Source Management) and limited supporting infrastructure have hampered investor interest and reduced the attractiveness of the port area. These findings confirm that although the port has adequate physical potential, its industrial sector has not yet developed optimally and requires stronger policy intervention.

Table 4. Summary of Total Evaluation of Merauke VAT Performance Score

Main Pillars of Performance	**Achievement Value**	**Standard**	**GAP**	**Category**	**Key Findings**
Industry & Investment	4.25	15	10.75	Low	Minimal industrial units (2/15), low land utilization (46.42%)
Ship Repair Infrastructure	0.5	2	1.5	Very Low	No docking/workshop facilities
Utilization of Digital Systems	5.0	8	3.0	Low	SHTI and SISKA have not been running optimally
Total Port Performance Score	73.75	100	26.25	Good	Need improvement on three critical pillars

Table 4 shows that although Merauke's total VAT performance score reached 73.75 and is in the "good" category, three main pillars significantly contributed to the overall GAP of 26.25. The industry and investment pillar has the largest GAP because the number of processing industries is far below standard and land utilization is still low. In terms of ship repair infrastructure, the score is very low due to the lack of docking facilities or workshops, which hampers technical services for ships. Meanwhile, the utilization of digital systems is also not optimal, as evidenced by the non-functioning SHTI and SISKA. These three pillars are priority areas for improvement to improve overall port performance.

Discussion

Most of the administrative and information system indicators at the Merauke Port Authority (PPN), such as PIPP, E-Logbook, and SPB-Online, have been operating according to standards, reflecting the port's ability to adopt basic technology to support electronic vessel reporting and licensing processes. This achievement demonstrates the institution's understanding of the importance of digitalization as part of improving service efficiency. However, success in these indicators does not fully reflect the port's overall digital readiness, as significant gaps remain in systems that require more complex operational capacity(Daniel et al., 2025). The gaps observed in the SHTI and SISKA indicators indicate that the port's digitalization process has not been evenly distributed across all core functions. Unlike

PIPP and E-Logbook, which have relatively simple work patterns and are integrated into routine port activities, SHTI and SISKA require analytical skills, accuracy, and consistent data input continuity. The failure to achieve these two indicators indicates that the port has not yet fully operationalized its digital catch recording and vessel information system, resulting in limited use of real-time data to support fishery resource management and operational decision-making (Zhu et al., 2021).

Further analysis revealed that the root of the problem lies in limited human resource capacity and low digital literacy within the port environment. The limited number of human resources, consisting of three civil servants and eleven contract workers, directly impacts the high workload of system operators(Luran et al., 2025). Furthermore, coordination with the central unit is suboptimal, resulting in ineffective technical assistance, system updates, and operational problem resolution (Jia et al., 2024). This finding is consistent with the literature on the digitalization of fishing ports in Indonesia, which emphasizes that technological readiness is often not matched by institutional readiness and human resource capabilities as determining factors for successful implementation. This situation emphasizes that the sustainability of port digitalization depends not only on the provision of applications but also on strengthening governance and organizational capacity. Therefore, a more systematic capacity-building strategy is needed, including intensive training for operators, improving the digital literacy of all staff, and providing ongoing technical assistance mechanisms from central agencies (Ganapathy et al., 2022). Strengthening digital system integration is a crucial prerequisite for modernizing port services, given the strategic role of accurate and standardized data in production planning, fish resource monitoring, and increasing public accountability. More effective integration will ultimately strengthen the foundation for the overall digital transformation of the Merauke PPN.

The physical facilities at the Merauke Nusantara Fisheries Port (NPP) have demonstrated excellent performance, meeting technical operational standards, including pond depth, fleet capacity, pier length, and land availability. This reflects the success of investments in basic infrastructure, which has been the primary foundation of fishing port operations (Ayhan, 2023). Adequate physical capacity allows the port to accommodate vessels of various sizes and high loading and unloading frequencies, thus structurally offering the port the potential to support increased productivity and service efficiency. These superior physical facilities are not fully linked to service quality due to the lack of ship repair facilities, such as docks or technical workshops (Prasetiawan, 2023). This limitation leads to fishermen and ship owners relying on repair facilities in other areas, increasing waiting times and operational costs. The gap between robust basic infrastructure and the lack of supporting facilities creates significant operational constraints, particularly for vessels requiring routine maintenance and emergency repairs to maintain operational viability.

These findings align with previous studies that emphasized that port technical infrastructure is determined not only by physical capacity but also by the functionality of supporting infrastructure that

ensures the continued operation of the fleet. Research at various fishing ports in Indonesia shows that the absence of ship repair facilities directly impacts the low efficiency of the fisheries production chain, particularly in areas remote from logistics centers and maritime industry facilities. Therefore, even with adequate physical facilities, port efficiency still depends on the completeness of the technical services attached to the infrastructure(Sadiq et al., 2021). This situation highlights the need for a strategy to strengthen technical facilities as a complementary measure to existing physical infrastructure. Integrating basic infrastructure and supporting ship repair facilities will create a more productive port operational ecosystem. This effort also has implications for increasing port competitiveness regionally, given that the presence of ship maintenance facilities is a key indicator of fishing port modernization(Krile et al., 2021). Providing adequate supporting infrastructure can accelerate operational processes, reduce logistics costs for fisheries businesses, and encourage optimization of overall service performance.

The performance of public vessel services at the Merauke Nusantara Fisheries Port demonstrates a high level of effectiveness, reflected in the large volume of fish production and the high frequency of vessel visits. This indicates that the port has strong operational appeal and is an important fishing hub in southern Papua. The stable flow of vessels demonstrates the port's ability to provide basic services needed by fishermen and its strategic position within the fishing network in the Arafura waters. Despite high production activity and vessel visits, logistical distribution, such as the provision of clean water, ice, and fuel, has shown low performance(Alavi-Borazjani et al., 2025). Limited clean water installations mean the water supply cannot consistently meet vessel needs, especially during peak fishing periods. Limited ice storage capacity also reduces the port's ability to support post-harvest fish quality management. Furthermore, suboptimal fuel management results in inefficient fuel distribution, requiring vessels to wait longer or seek supplies from outside the port.

The gap between high vessel activity and low logistics performance can be understood through the approach of fisheries port supply chain management theory, which emphasizes the importance of smooth material and resource flows as a prerequisite for operational performance. In the context of fisheries ports, the supply chain encompasses not only vessel operational inputs but also the integration of supporting equipment, storage capacity, and distribution systems. The imbalance between demand and logistics capacity indicates a structural bottleneck that hinders service efficiency and reduces the port's added value to service users(Ojadi & Maiyaki, 2025). The implications of this finding highlight the need to improve logistics capacity and management to strengthen the port's role in supporting sustainable fishing operations. Optimizing clean water installations, expanding ice storage facilities, and improving fuel service systems are strategic steps to increase the reliability of vessel services. Strengthening logistics aspects not only improves service quality but also increases the productivity of fisheries activities, accelerates vessel circulation, and overall contributes to increasing port competitiveness at the national level.

The investment and industrial segments are the weakest points in the performance of the Merauke Nusantara Fisheries Port, as evidenced by the small number of operational processing plants, only two of the fifteen planned units. The imbalance between the port's physical capacity and the development of the industrial sector indicates that available facilities are not yet capable of attracting downstream activities on a broader scale. Low land utilization also reflects the suboptimal utilization of port assets as a catalyst for economic growth, thus preventing the full realization of the potential for developing the fisheries industry(Xu et al., 2025). The low growth of the processing industry is influenced by various structural factors, including the non-functioning Revenue Source Management (PSP) mechanism, which could provide a transparent and competitive asset utilization scheme for investors. The absence of this mechanism leaves investors with uncertainties regarding land management and supporting facilities. Furthermore, low investor interest is also caused by limited downstream facilities such as cold storage, fisheries markets, and logistics services, which are prerequisites for the processing industry to operate efficiently and sustainably. This condition results in the port functioning only as an unloading point without providing any added value.

This phenomenon is consistent with previous studies that emphasize that the competitiveness of fishing ports is largely determined by the presence of a processing industry as a driving force of economic activity. Literature on fishing port development in Indonesia shows that ports with a strong processing industry tend to have higher service levels, more stable supply chains, and are able to create added value for fishermen and business actors. Without the support of a processing industry, ports become mere physical infrastructure unable to strengthen local economic integration or increase the fisheries sector's contribution to regional development (Ma et al., 2021). The policy implications of this situation require a targeted investment strengthening strategy, including promoting business opportunities, providing adequate downstream facilities, and restructuring port land use through an effective PSP scheme. The development of supporting industrial infrastructure such as cold storage facilities, integrated logistics centers, and market areas is a strategic step to increase investor interest. Integration between upstream and downstream industries also needs to be encouraged to create a complementary business ecosystem. This approach not only strengthens the structure of the fishing industry but also improves the overall performance of ports as centers of regional economic growth.

Human resource limitations are one of the most prominent structural factors weakening the operational capacity of the Merauke Port Authority (PPN). With only three civil servants and eleven contract workers, the administrative, technical, and digital workload is not commensurate with the demands of implementing various port applications and services. This situation hinders the speed and accuracy of data management, coordination of vessel services, and compliance with operational standards set at the national level. This gap in the number and quality of human resources indicates that the organization's capacity is not yet ready to support the level of digitalization and complexity of modern

port services. This human resource limitation is directly correlated with the poor implementation of SHTI and SISKA, two digital systems critical for fisheries monitoring and governance. The lack of trained operators and low digital literacy result in these applications not functioning optimally, impacting the accuracy of fisheries data, service transparency, and business process efficiency. Human resource limitations also impact logistics services such as the distribution of clean water, ice, and fuel, which require consistent and coordinated operational management(Judijanto et al., 2024). These findings indicate the need for HR management reform, increased digital competency, and the addition of new staff with technical and managerial expertise tailored to port operational needs.

The GAP analysis revealed a consistent pattern across performance dimensions. Small gaps were found in physical facilities and ship traffic, reflecting the port's strength in its relatively stable, physical structural capacity. Moderate gaps were observed in logistics services, indicating that despite high ship volumes, operational capacity is insufficient to meet increasing distribution needs(Wang et al., 2022). Large gaps emerged in the dimensions of digitalization, processing industry, and technical facilities such as docking, indicating that the port's functional capacity lags far behind its structural capacity. This pattern illustrates that the Merauke Port Authority (PPN) has strong infrastructure but has not been able to convert this physical strength into efficient and value-added services. The integration of GAP patterns across dimensions led to the identification of systemic root causes, namely the imbalance between physical infrastructure development and operational readiness. The evaluative-descriptive approach in this study allows for a clear mapping between achievement indicators and causes of failure, such as a lack of human resources, weak digital system integration, minimal supporting industries, and the absence of a PSP mechanism. These findings imply that port success is determined not only by physical size and capacity, but more so by the port's ability to carry out integrated administrative, technical, and business functions.

The research findings meet the objectives of identifying achievements, assessing gaps (GAPs), analyzing causal factors, and developing a direction for strengthening port performance. The findings are consistent with performance evaluation theory, which emphasizes the importance of the relationship between structural inputs and functional outputs in public organizations. The resulting GAP analysis also aligns with the performance gap model in the maritime sector, which indicates that weaknesses often occur in digital systems, supply chains, and downstream industrial capacity. Compared with previous fishing port literature, this study contributes by confirming that ports with adequate infrastructure do not automatically achieve optimal service performance without strong support from industry, human resources, and digitalization. The practical implications of these findings emphasize the need for a holistic performance improvement strategy. Strengthening digital human resources through technical training and staffing are fundamental steps to support the implementation of applications such as SHTI and SISKA. The construction of docking facilities is necessary to improve the completeness of ship technical

services, which have previously been an operational obstacle. Increasing the logistics distribution capacity for clean water, ice, and fuel will strengthen ship services and encourage high port utilization rates. The development of processing industries and optimization of land use are key to increasing the economic added value and competitiveness of ports as centers of regional growth. This findings-based approach is expected to produce significant and sustainable performance improvements for PPN Merauke.

CONCLUSIONS

This study conducted a comprehensive evaluation of the performance of the Merauke Archipelago Fisheries Port (PPN) using national-level standard indicators through a descriptive-evaluative approach. The analysis results indicate that the port's performance is in the good category, with an aggregate score of 73.75 out of 100. The highest achievement was demonstrated by the physical facilities and port operational activities components, including pond capacity, pier length, pond depth, fishery production volume, and vessel visit frequency. These findings indicate that the structural capacity of the Merauke PPN has met the basic requirements to support fishing activities and vessel services in the South Papua fisheries area. However, this study also identified several critical gaps that have a significant impact on the decline in overall performance. The largest gaps occurred in the aspect of port digitalization, specifically the implementation of the Daily Fish Catch System (SHTI) and the Vessel Information System (SISKA), which are not yet functioning optimally. Similar shortcomings were also found in the industrial and investment aspects, including the minimal number of processing industry units in the port's working area and the low level of land utilization. Furthermore, limited technical facilities, such as the lack of ship repair facilities (docking and workshops) and low efficiency of logistics services (distribution of clean water, ice, and fuel), also worsen performance. Human resources, with only 3 civil servants and 11 contract workers, pose an additional obstacle affecting the effectiveness of managing these indicators. The GAP pattern indicates that the Merauke Port Authority's primary strength still lies in physical infrastructure, while the functional, technological, and management dimensions have not developed proportionally. Therefore, improving port performance requires strategic interventions in four priority areas: modernizing information systems and strengthening digital capabilities; providing supporting technical facilities, particularly docking and ship repair shops; developing the processing industry and optimizing land use; and increasing human resource capacity through strengthening formation and competency training. Implementing these recommendations has the potential to significantly close the performance gap, strengthen port competitiveness, and encourage more effective integration of the fisheries value chain in supporting sustainable fisheries economic development in South Papua.

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