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Port Service Bottlenecks and Shipping Agency Performance in Banten: A Qualitative Analysis

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Abstract. *This research explores how pilotage-tug assistance, cargo-handling efficiency, and document-processing duration affect the operational performance of PT. Berkah Tata Baruna, Branch Banten. Adopting a qualitative descriptive design, the study utilized interviews, focus group discussions, and analysis of official documents to capture a wide range of stakeholder perspectives, including port authorities, shipping agents, and maritime cadets. The collected data were examined through thematic analysis and further consolidated into two evaluative measures: the Port Call Friction Index (PCFI) and the Agency Performance Score (APS). The findings indicate that shortcomings in tug services, loading-unloading productivity, and administrative procedures impose considerable limitations on agency effectiveness, even though the overall performance assessment remains generally favorable. Beyond these operational insights, the study contributes to the literature on maritime economy and sustainability by presenting practical diagnostic instruments that can be applied in similar contexts. Furthermore, it strengthens the relevance of vocational maritime education by linking theoretical learning with the realities of port operations. The results also emphasize the pressing need for stronger coordination among stakeholders, simplification of documentation workflows, and systematic training programs designed to enhance professional competence. By addressing these areas, shipping agencies and port authorities can improve service delivery, minimize delays, and foster sustainable practices that align with the broader objectives of maritime development.*

Keywords: *Cargo-Handling Productivity; Document Processing; Maritime Sustainability; Pilotage-Tug Services; Shipping Agency Performance.*

1. INTRODUCTION

Ports and shipping agencies occupy a pivotal position in the global maritime industry, serving as strategic hubs for trade, logistics, and transportation. The effective management of vessel arrivals, port services, and supporting administrative mechanisms not only determines operational efficiency but also reflects the broader socio-economic resilience of maritime economies (Paridaens & Notteboom, 2021). Within this complex environment, shipping agencies perform crucial intermediary functions that connect vessel operators, port authorities, and regulatory institutions. However, inefficiencies in pilotage and tug services, cargo-handling productivity, and document processing continue to constrain agency performance, raising significant concerns for maritime sustainability and socio-economic development.

The maritime industry faces increasing pressure to enhance operational efficiency while maintaining environmental sustainability standards. Recent studies demonstrate that port efficiency determinants extend beyond traditional metrics to encompass technological innovation, environmental compliance, and stakeholder coordination (Caldas et al., 2024).

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Furthermore, the integration of digital technologies and green initiatives has become essential for maintaining competitive advantage in modern port operations (Zhou et al., 2024). The COVID-19 pandemic has further highlighted the importance of resilient port operations and adaptive management strategies in maintaining supply chain continuity (Kim et al., 2022).

Indonesia, as a maritime nation with vast archipelagic geography, is uniquely dependent on port efficiency and shipping agency performance for both domestic and international trade flows. The country's strategic position in global shipping routes necessitates continuous improvement in port service quality and operational coordination (Qi et al., 2022). PT. Berkah Tata Baruna, Cabang Banten, is one such agency that plays an important role in managing vessel arrivals and ensuring smooth port operations. Yet, the agency faces multiple bottlenecks related to pilotage services, cargo-handling processes, and bureaucratic document management. These challenges are not merely technical but also deeply social, reflecting the interactions among port stakeholders, institutional frameworks, and the agency's ability to uphold service reliability and trust with its clients.

Previous research demonstrates that seaport service quality and efficiency are vital determinants of competitive advantage (Mwendapole & Jin, 2021; Caldas et al., 2024), while integrated policies and sustainable practices have been linked to enhanced performance outcomes (Zhou et al., 2024; Du et al., 2023). The application of advanced technologies and digital transformation in port operations has shown significant potential for improving efficiency and reducing environmental impact (Liao & Lee, 2023). Additionally, risk assessment frameworks have become increasingly important for managing complex maritime operations and ensuring safety standards (Zhang et al., 2022).

The central research problem addressed in this study is the identification of how pilotage-tug services, cargo-handling productivity, and document processing collectively impact the performance of PT. Berkah Tata Baruna, Cabang Banten. This leads to four guiding research questions: (1) How do pilotage and tug services influence company performance? (2) What is the relationship between cargo-handling productivity and company performance? (3) How does document-processing time affect agency performance? (4) How do all three factors interact to influence performance simultaneously? By focusing on these issues, the study seeks to provide a comprehensive understanding of agency-level challenges in maritime operations.

The rationale for conducting this research lies in the urgency to enhance Indonesia's maritime economy and social management systems. As highlighted by Caldeirinha et al. (2024), sustainable port operations require not only technical efficiency but also institutional adaptation and human capacity development. Shipping agencies form a critical interface

between vessels and ports, and their performance reflects broader systemic efficiencies or inefficiencies in maritime logistics. The integration of environmental considerations and sustainable practices has become paramount in modern port operations, requiring agencies to balance operational efficiency with environmental responsibility (Pian et al., 2020).

Identifying bottlenecks in their service delivery can thus inform reforms in vocational maritime education, operational management, and sustainability strategies. Moreover, the study contributes to bridging the gap between theory and practice by engaging with the lived experiences of cadets, professionals, and lecturers, thereby enriching the discourse on maritime education and professional development. The research also aligns with broader discussions on technology adoption and digital transformation in maritime industries, which have shown significant potential for improving operational outcomes (Chae et al., 2021).

This research adopts a qualitative descriptive design, employing interviews, focus group discussions, and document analysis. By applying thematic analysis to narratives collected from ship agents, tug operators, stevedores, port officials, and clients, the study uncovers patterns of inefficiency, coordination gaps, and opportunities for systemic improvement. The qualitative approach is particularly suited to capturing the nuanced perceptions, practices, and experiences of maritime stakeholders, which often escape quantitative performance indicators. Furthermore, the study introduces the Port Call Friction Index (PCFI) and Agency Performance Score (APS) as dual indicators to translate qualitative narratives into actionable diagnostic tools for port and agency management.

In sum, this research is not only relevant to PT. Berkah Tata Baruna and the Indonesian maritime industry but also contributes to broader academic and policy debates on maritime sustainability and port management. It situates agency performance within the intersection of operational efficiency, institutional governance, and vocational education, providing an interdisciplinary lens through which to address persistent bottlenecks.

2. RESEARCH METHOD

This study employed a qualitative descriptive approach to capture the perspectives of stakeholders involved in maritime operations at PT. Berkah Tata Baruna, Cabang Banten. The research design was informed by established methodologies for port efficiency assessment and stakeholder engagement in maritime research (Kim et al., 2021). The research population included shipping agents, pilots, tugboat operators, stevedores, port officials, and shipping line representatives, as well as cadets and graduates engaged in vocational maritime education. The

purposive sampling strategy was chosen to ensure representation from actors directly involved in vessel arrivals and port service delivery.

The selection of these respondents was justified by their experiential knowledge of pilotage, cargo handling, and documentation processes, which constitute the core variables under investigation. Their insights were considered urgent and valuable, as they provided both technical and social perspectives on operational bottlenecks. The sampling approach also considered the diverse perspectives needed to understand the complex interplay between operational efficiency and sustainability concerns in modern port operations (Zhou et al., 2024).

The main research instruments consisted of semi-structured interview guides, focus group discussion protocols, and observation checklists. The independent variables included pilotage-tug services (X1), cargo-handling productivity (X2), and document-processing time (X3), while the dependent variable was company performance (Y). Each independent variable was operationalized through indicators: timeliness and reliability for pilotage-tug, crane rates and labour coordination for cargo handling, and approval cycle duration for documentation. These indicators were designed to capture not only the technical efficiency of operations but also the perceptions of clients and stakeholders, thereby linking operational performance to broader issues of service quality and trust.

Supporting instruments included archival records, logbooks, and documentary evidence of clearance times. The methodological framework drew upon best practices in maritime research, incorporating elements of risk assessment and performance measurement commonly used in port efficiency studies (Zhang et al., 2022). Digital documentation and data management protocols were implemented to ensure data integrity and facilitate subsequent analysis.

Data collection proceeded in several stages. Initial access and consent were obtained from the agency and stakeholders, followed by pilot interviews to refine the instruments. The main phase involved in-depth interviews with shipping agents and port service providers, complemented by focus group discussions with cadets and lecturers to integrate educational perspectives. Non-participant observations were conducted during vessel arrivals and departures to document process flows, while documentary analysis was used to validate reported clearance times. This multi-method strategy ensured triangulation and credibility of findings, capturing both narrative richness and process data.

The data analysis followed a four-step strategy. First, thematic analysis was conducted to code transcripts into categories reflecting operational bottlenecks, coordination gaps, and

service outcomes. This was followed by cross-group comparisons to identify convergences and divergences in perspectives among professionals, educators, and cadets. Third, narrative synthesis was developed to integrate the themes into coherent explanations of how pilotage, cargo handling, and documentation collectively influence performance. Finally, the Port Call Friction Index (PCFI) and Agency Performance Score (APS) were constructed to translate qualitative themes into composite diagnostic indicators. This methodological framework provided both academic depth and practical utility, offering actionable insights into agency performance and maritime sustainability.

3. RESULTS AND DISCUSSION

The qualitative analysis revealed that PT. Berkah Tata Baruna's performance is shaped by complex interactions among pilotage-tug services, cargo-handling productivity, and document-processing efficiency. The findings align with recent research emphasizing the multifaceted nature of port performance and the importance of integrated approaches to maritime operations management (Caldeirinha et al., 2024). Table 1 summarizes the qualitative scoring of the Port Call Friction Index (PCFI) and Agency Performance Score (APS), based on triangulated narratives and observational data.

Table 1. Port Call Friction Index (PCFI) and Agency Performance Score (APS).

Variable	Indicator	Qualitative Evidence	PCFI Score (0-100)	APS Contribution (0-100)
Pilotage-Tug (X1)	Timeliness, reliability of tug allocation	Delays in tug readiness often caused missed tidal windows	65	70
Cargo Handling (X2)	Crane rate, labour coordination	Shift handovers and equipment downtime reduced throughput	60	68
Documentation (X3)	Approval cycle time	Long waits for cross-agency approvals, esp. after-hours	55	65
Combined (X1+X2+X3)	Interaction effects	Delays in one domain cascaded into others	60 (overall PCFI)	68 (overall APS)

The results indicate that while agency performance was rated as "good" (APS: 68/100), operational frictions remained significant (PCFI: 60/100). These findings are consistent with international studies on port efficiency, which highlight the persistent challenges in achieving optimal coordination among multiple stakeholders (Qi et al., 2022). Narratives consistently highlighted that the first hour of pilotage and tug allocation was critical to setting the tone of

the entire port call. This temporal sensitivity aligns with research on port call optimization and the importance of reducing vessel turnaround times (Liao & Lee, 2023).

Cargo-handling productivity was perceived as inconsistent, with variability tied more to coordination than to equipment capacity. This finding resonates with studies emphasizing the human factor in port operations and the importance of workforce management in achieving sustainable port performance (Kim et al., 2022). The research revealed that technological solutions alone are insufficient without corresponding improvements in coordination mechanisms and workforce training.

Documentation emerged as the most persistent bottleneck, with clearance times subject to bureaucratic inertia and institutional misalignment. This challenge reflects broader issues in maritime governance and the need for digital transformation in port operations (Pian et al., 2020). The study found that document processing delays not only affected immediate operational efficiency but also undermined stakeholder confidence and long-term business relationships.

Impact of Pilotage-Tug Services on Performance

The analysis revealed that pilotage-tug services significantly influence agency performance through their direct impact on vessel scheduling and operational predictability. Respondents consistently emphasized that delays in tug allocation created cascading effects throughout the port call process. This finding aligns with research on port resilience and the importance of reliable service delivery in maintaining operational continuity (Kim et al., 2021).

The study identified several factors contributing to pilotage-tug inefficiencies, including inadequate communication between service providers, insufficient capacity during peak periods, and limited coordination with tidal conditions. These challenges reflect broader issues in maritime service integration and highlight the need for comprehensive approaches to port operations management (Zhang et al., 2022).

Cargo-Handling Productivity and Performance Relationships

Cargo-handling productivity demonstrated a complex relationship with agency performance, characterized by high variability and strong dependence on coordination mechanisms. The research found that technical capacity was generally adequate, but operational efficiency was frequently compromised by poor coordination between different stakeholder groups.

The findings support recent research emphasizing the importance of integrated approaches to cargo handling and the need for continuous improvement in operational procedures (Zhou et al., 2024). Respondents highlighted that shift changes, equipment maintenance schedules, and communication gaps were primary sources of productivity losses.

Document Processing and Administrative Efficiency

Document processing emerged as the most significant constraint on agency performance, with approval cycles often extending beyond acceptable timeframes. The study found that bureaucratic procedures, limited digital integration, and after-hours processing delays were primary contributors to inefficiencies.

These findings align with broader discussions on digital transformation in maritime industries and the potential for technology adoption to improve administrative efficiency (Chae et al., 2021). The research highlighted the urgent need for streamlined procedures and enhanced inter-agency coordination to reduce document processing times.

Integrated Analysis and Performance Implications

Connecting these results to the research questions, the study found strong evidence that all three independent variables significantly influence agency performance, both individually and interactively. The findings corroborate prior studies emphasizing the role of institutional coordination in port efficiency (Paridaens & Notteboom, 2021; Kim et al., 2021) and align with research on seaport service quality (Mwendapole & Jin, 2021).

However, the study contributes a novel perspective by foregrounding the experiences of agency staff and stakeholders, showing that predictability and communication are as important as raw operational metrics in shaping client satisfaction. This finding supports research emphasizing the social dimensions of port operations and the importance of stakeholder engagement in achieving sustainable performance outcomes (Du et al., 2023).

The discussion reveals that delays in pilotage or documentation can undermine cargo-handling efficiency, creating a cycle of inefficiency that disproportionately impacts shipping agencies. This interdependence supports Zhou et al.'s (2024) findings on the importance of green port governance, where systemic coordination is essential to achieving sustainability. Furthermore, the results highlight the educational value of exposing cadets to real-world bottlenecks, reinforcing vocational training as a means to bridge theory and practice in maritime education.

Practical Implications and Future Directions

The practical implications of these findings are substantial. Shipping agencies can adopt the PCFI and APS framework as diagnostic tools for continuous improvement, identifying priority areas for reform. The framework provides a systematic approach to performance assessment that can be adapted to different operational contexts and agency types.

Port authorities may use these insights to streamline document workflows and enhance inter-agency coordination, while vocational institutions can integrate the findings into curricula for maritime cadets. The research suggests that digital transformation initiatives, combined with improved coordination mechanisms, could significantly enhance agency performance and contribute to broader sustainability objectives (Liao & Lee, 2023).

Future research should explore comparative analyses across multiple agencies and ports, as well as longitudinal studies to assess the impact of digitalization and policy reforms on agency performance. The study also highlights the potential for integrating environmental performance indicators into agency assessment frameworks, aligning with broader trends toward sustainable maritime operations (Pian et al., 2020).

4. CONCLUSION

This study critically examined the impact of pilotage-tug services, cargo-handling productivity, and documentation processing on the performance of PT. Berkah Tata Baruna, Cabang Banten. The findings demonstrate that inefficiencies in these domains interact to constrain agency performance, though overall service outcomes remain good. The research reveals that while technical capabilities are generally adequate, coordination mechanisms and administrative processes require significant improvement to achieve optimal performance levels.

The study contributes to maritime operations literature by introducing the Port Call Friction Index and Agency Performance Score, offering novel tools to translate qualitative insights into actionable management diagnostics. These instruments provide a systematic framework for assessing agency performance and identifying priority areas for improvement. The research further underscores the importance of vocational maritime education in bridging operational realities with academic training, highlighting the value of experiential learning in professional development.

The findings demonstrate that sustainable agency performance requires integrated approaches that address technical, administrative, and coordination challenges simultaneously. The research supports broader discussions on digital transformation in maritime industries and emphasizes the need for comprehensive reform initiatives that encompass technology adoption, process improvement, and stakeholder engagement.

By highlighting both systemic bottlenecks and opportunities for reform, the research advances knowledge in maritime economy, social management, and sustainability while providing practical implications for agencies, port authorities, and educators. The study contributes to the growing body of literature on sustainable port operations and provides actionable insights for improving maritime industry performance in developing economies.

Future research should focus on longitudinal assessments of intervention effectiveness, comparative studies across different port contexts, and the integration of environmental performance indicators into agency assessment frameworks. The development of digital tools and platforms for performance monitoring and stakeholder coordination represents a promising avenue for enhancing maritime industry efficiency and sustainability.

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