The Influence of the Effectiveness of the Clearance In and Clearance Out Processes in Increasing Efficiency at PT. Prima Lestari Segara Abadi at the Pier of PT. Cirebon Energi Prasarana"

Dimas ilham F (Dimas.ilham@polmarekautama.ac.id)
Politeknik Maritim Eka Utama Subang

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Abstract

This study aims to analyze the effectiveness of the Clearance In and Clearance Out process in improving operational efficiency at PT Prima Lestari Segara Abadi which operates at the dock of PT Cirebon Energi Infrastructure. The research method used is a quantitative approach using multiple regression analysis to identify the significant influence of each variable on operational efficiency. The results showed that Bureaucracy has a significant influence on operational efficiency with a significance level of 0.024, while the variables of Process Time, Technology Used, and Facilities & Infrastructure do not have a significant effect directly. Customer Satisfaction showed a near significant effect on operational efficiency, indicating that customer satisfaction can play an important role in improving efficiency in the future. The interaction between the independent variables showed no significant effect, indicating that the direct relationship between the main factors is more important than the interaction between them.

Keywords: Operational Efficiency, Clearance In, Clearance Out, Port Technology

Introduction

Ports serve as important gateways for national and international trade, with the efficiency of the Clearance process significantly impacting economic performance. Clearance in the process involves various administrative procedures that must be completed by ships upon arrival, including document verification, obtaining berthing permits, and undergoing physical inspections. These steps are essential to ensure regulatory compliance and facilitate smooth port operations (International trade outlook for Latin America and the Caribbean, 2023). In contrast, Clearance includes actions required before a ship departs, such as processing export documentation and fulfilling other administrative requirements. This phase is equally important, as it ensures that all obligations are met, thus preventing delays that could disrupt trade activities (Victor Omoke, 2017). In addition, trade facilitation agreements play a vital role in streamlining these customs procedures, ultimately improving the efficiency of the customs clearance process at the port (M. Sekar, 2023). Effective port operations management, overseen by the port authority, is essential to optimize these Clearance activities, ensuring that both inbound and outbound Clearances are carried out efficiently to support the overall flow of goods and enhance economic growth (Victor Omoke, 2017).

The Clearance In and Clearance Out processes are essential to ensure the smooth flow of goods and improve operational efficiency at the port. Inbound clearance involves a series of regulatory and administrative steps that a ship must complete upon entering the port, while outbound clearance includes the procedures required for a ship to depart. Both processes significantly impact operational costs and turnaround times, which are critical for shipping companies aiming to optimize their logistics (Mauro Bernacchi, 2019). To streamline these processes, digital port solutions, such as automated Clearance systems, have been developed. This technology reduces paperwork and processing time, thereby improving logistics effectiveness (R North, A Spear, 2001). In addition, the implementation of electronic clearance systems plays a vital role by collecting and processing distribution flow information, which is essential for managing inbound and outbound Clearance procedures.

Overall, the integration of this system not only speeds up the permit process but also contributes to the economic development of the region by encouraging trade and increasing government revenue through efficient customs (Mauro Bernacchi, 2019). Efficiency in the clearance in and clearance out process plays an important role in minimizing ship waiting times, reducing operational costs, and increasing overall productivity. In Indonesia, as an archipelagic country with intense maritime trade activities, optimizing this process is a major focus for companies engaged in logistics and ports. One of the companies involved in port activities is PT. Prima Lestari Segara Abadi, which operates at the PT. Cirebon Energi Prasarana pier. This pier plays an important role in supporting the distribution of energy and goods in the region, so that its operational effectiveness has a significant impact on local economic activities. The Clearance process at the port, especially in strategic locations such as PT. Infrastruktur Energi Cirebon, often encounters significant obstacles that hinder efficiency. Major factors contributing to these delays include incomplete documentation, which can lead to substantial delays in operations (Aniruddha Rajendra Rao, 2024), and inadequate coordination among stakeholders such as shipping lines, customs, and port authorities [3]. This lack of collaboration exacerbates inefficiencies, resulting in increased operating costs and dissatisfaction among service users (Catherine Obasi, 2024). In addition, optimizing clearance procedures is critical to streamlining operations and reducing congestion (Sandra Rolim Ensslin, 2024). Inbound and outbound container processes must be managed effectively to improve overall efficiency at multimodal terminals, as these processes are critical to the logistics system in international trade (U.S., Kalaiarasan A, 2023). Addressing these barriers through improved documentation completeness, better stakeholder coordination, and optimized procedures is critical to minimizing vessel delays and improving overall port operational performance.

By focusing on this area, ports can significantly reduce ship dwell time and improve service delivery, which ultimately benefits all parties involved in the Clearance process (Catherine Obasi, 2024), (Sandra Rolim Ensslin, 2024). PT Prima Lestari Segara Abadi, which operates at the PT. Cirebon Energi Prasarana dock, is one of the companies involved in loading and unloading activities and ship management. In the era of globalization and intense competition in the port industry, operational effectiveness and efficiency are key to maintaining competitiveness. Therefore, efforts to maximize efficiency in the clearance in and clearance out processes are a top priority, not only for shipping companies, but also for dock owners and other stakeholders. Optimizing the Clearance process in shipping and port operations is essential not only to improve the efficiency of shipping companies and dock owners but also to drive regional economic growth and improve the quality of service for port users. Streamlining the customs process is essential, as delays can have a significant impact on shipping times and overall operational effectiveness (Nataliia Luzhanska, 2023). In addition, increasing port efficiency directly affects cargo handling and vessel operations, which are essential for reducing shipping costs and improving service delivery (Eduard Kovtun, 2024). In the context of the Indonesian logistics sector, logistics optimization plays a vital role in minimizing costs and improving service delivery, especially in inbound logistics, which constitutes a significant portion of total logistics costs (Olga Gonchar, 2023). In addition, investment in port infrastructure development is needed to support these optimization efforts, as it improves the physical and technological capabilities of port facilities (Mariia Andreevna Shapovalova, 2022). Overall, research on optimizing the Clearance process is highly relevant for the development of an efficient port and logistics industry in Indonesia, as it discusses the interrelationship of these factors and their collective impact on economic growth (Aniruddha Rajendra Rao, 2024).

Literature Review

Operational Efficiency Theory

Operational efficiency in port operations is critical to optimize resource utilization, which directly impacts cost and time management. Key metrics include reducing vessel dwell time, increasing throughput, and minimizing costs associated with stevedoring activities. These elements are integral to improving overall port efficiency and competitiveness in the global market (Tatiana Moschovou, 2023), (Chia-Nan Wang, 2022). Porter's value chain analysis underlines the importance of refining internal processes to create higher added value, which is particularly relevant in the context of port operations. Clearance In and Clearance Out processes

are critical components of this value chain that must be optimized to support operational efficiency (Pei-Shih Chen, 2022). By focusing on these processes, ports can achieve significant improvements in their operational metrics, such as throughput and dwell time reduction, ultimately leading to cost savings and improved service delivery (Magdiel A. Agüero-Tobar, 2022). In addition, the cumulative impact of efficiency improvements can lead to substantial economic benefits, as evidenced by historical data showing significant savings from operational improvements (Dr. M. Sekar, 2022). Thus, a strategic approach to operational efficiency, based on value chain analysis, is essential for ports aiming to thrive in an increasingly competitive environment (Sukandi.A.2024)

Port Management

Port management encompasses a range of activities essential for the effective operation of port facilities, particularly in managing the flow of goods and vessels, which is critical to global supply chains (Catherine Obasi, 2024) and (Sandra Rolim Ensslin, 2024). Port performance significantly impacts international trade, as highlighted by Bichou and Gray (2004), emphasizing the need for efficient management practices (Jéssica Carvalho da Silva, 2024). Effectiveness in port management can be quantitatively assessed through various performance indicators, including vessel dwell time, loading and unloading time, document handling time, and clearance speed (Constantinos I. Chlomoudis, 2023) and (Namsik Park, 2023). These indicators provide a framework for evaluating operational efficiency and identifying areas for improvement. Research shows that improving the integration of information technology, encouraging coordination among stakeholders, and simplifying procedures can lead to more efficient port clearance processes. By focusing on these factors, ports can improve their operational performance, thereby facilitating smoother international trade flows and strengthening their role as critical nodes in the global supply chain (Sandra Rolim Ensslin, 2024). Overall, strategic management of seaports is essential to optimize their functioning and ensure they meet the growing demands of the intermodal freight industry (Jéssica Carvalho da Silva, 2024).

Clearance In and Clearance Out Process

The Clearance process at the port, including Clearance in and Clearance out, is crucial for efficient maritime logistics operations. Clearance in involves a thorough examination of ship documents, physical inspections, and verification of compliance with port regulations, ensuring that the ship is authorized to safely load and discharge cargo (Mariia Andreevna Shapovalova,

2022) and (Mauro Bernacchi, 2019). This process requires coordination among various stakeholders, including port authorities, customs officials, and ship agents, who facilitate the necessary documentation and inspections (Eleftherios Iakovou, 2008) and (R North, A Spear, 2001). In contrast, clearance out is an administrative procedure that grants permission for ships to depart after completing their port activities (В.М. Пітерська, 2020). Delays or inefficiencies in any of the clearance processes can result in significant additional costs for shipowners and users of port services, ultimately disrupting supply chains and delaying the distribution of goods (В.М. Пітерська, 2020). Therefore, maintaining an efficient Clearance process is critical not only for individual vessels but also for the wider economic activities that ports support, as they serve as vital gateways for trade and commerce (R North, A Spear, 2001). The speed of Clearance processes in port operations is greatly influenced by the quality of the information technology infrastructure used by port authorities and related agencies. A robust IT infrastructure improves the efficiency of business processes, enabling faster inbound and outbound Clearances by minimizing the need for repeated manual verifications (Igor V. Zub, 2022). Integrated Port Management Systems play a vital role in this context, as they streamline operations by connecting various stakeholders, thereby facilitating faster Clearance processes (Natalya Korenyakina, 2022). In addition, effective collaboration and communication among stakeholders—including port authorities, shipping lines, and customs—are essential to expedite this clearance process. Research by Heaver (2002) underlines that strong communication can lead to improved regulatory compliance and operational efficiency, which are essential to meet the growing demands of intermodal freight transportation (Sandra Adabere, 2021) and (Igor Ognjanovic, 2021). In addition, Intelligent Transportation Systems (ITS) contribute to this dynamic by improving productivity and safety in intermodal freight operations, further supporting the need for a cohesive and integrated approach to port management (Ibrahim H. Hamdy, 2022). Thus, technological interaction and collaboration are key to optimizing the Clearance process in the port ecosystem.

Operational Efficiency in Ports in Indonesia

Ports in Indonesia face significant challenges in improving operational efficiency, especially in the Clearance process. The complexity of bureaucratic procedures has been identified as a major barrier, with studies showing that reducing these administrative actions can lead to a 30% reduction in clearance times, thereby improving overall operational efficiency (Catherine Obasi, 2024). In addition, the implementation of advanced information technology systems is essential, as it addresses operational challenges and facilitates faster clearances

(Sirajuddin, 2020). Research by Suyono (2017) supports this by highlighting that integrating technology with human resource skills enhancement can further reduce clearance times, increasing port competitiveness on an international scale (Arief. Witjaksono, 2016) and (Siska sanjahaya Jahir, 2024). In particular, ports in Indonesia that have adopted digital-based integrated service systems have reported significant increases in throughput and reductions in vessel waiting times, demonstrating the effectiveness of this approach in addressing existing inefficiencies (Nicholas Dwinovan, 2024). Therefore, a combined strategy that focuses on technological advancements and efficient administrative processes is essential for Indonesian ports to improve their operational efficiency and meet the demands of global trade.

Methods

This study uses a descriptive quantitative method approach. This approach is used to analyze the effectiveness and efficiency of the clearance in and clearance out processes implemented at PT. Prima Lestari Segara Abadi at the PT. Cirebon Energi Prasarana Pier. The population in this study is all clearance in and clearance out processes that occur at the port of PT. Cirebon Energi Prasarana. Included in this population are all operational activities involving loading and unloading of goods. The sample taken in this study was 100 clearance in and clearance out processes that occurred in the period January - June 2024. This sample was selected by purposive sampling, based on the criteria that the data used includes various types of clearance activities, both for large and small ships, as well as various types of goods shipped through the pier. This study uses two main variables, namely Independent Variables (Factors that affect the clearance process) Clearance In and Clearance Out Process Time, Technology used (port information system), Availability of facilities and infrastructure, customer satisfaction, Moderation variables, Coordination between related agencies (customs, quarantine, etc.), while Dependent Variables (Operational Efficiency) Total time required for the clearance process, Operational costs incurred for each clearance process.

Results and Discussion

The costs required for clearance in and clearance out each have an average of around 7.5 million and 6.8 million IDR. This figure reflects the costs incurred in the operational clearance process at the port.

• Number of Ships Transacted:

The average number of ships undergoing the clearance process in the observed period was 15.2 ships per unit of time.

• Agency Coordination and Availability of Facilities:

These two variables are assessed using a scale of 1-5, where the average value of agency coordination is 3.90 and the availability of facilities is 4.05. This shows that agency coordination is quite good, while operational facilities are also in a condition that is adequate enough to support the clearance process.

Validity & Reliability Test

Table 2. Validity Test

Correlations		
	Sig. (2-tailed)	Validity
Processing Time	0,000	Validity
Technology Used	0,000	Validity
Facilities & Infrastructure	0,000	Validity
Customer Satisfaction	0,000	Validity
Bureaucracy	0,000	Validity
Operational Efficiency	0,000	Validity
**. Correlation is significant at the 0.01 level (2-tailed).		

Interpretation:

All items in this study have a sign value of 0.000 < 0.005, thus it can be stated that all items are valid and worthy to be continued.

Reliability Test

Table 2. Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
0,845	6

Interpretation:

All items in this study have a Cronbach`s alpha value of 0.845 > 0.700, thus it can be stated that all items in this study are reliable and can be continued to the research stage.

Linear Regression

Coefficient Test

Table 3. Regression Coefficient with Moderation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0,907	4,645		-0,195	0,846
	Processing Time	-0,023	1,093	-0,007	-0,021	0,983
	Technology Used	-0,250	0,961	-0,077	-0,260	0,795
	Facilities & Infrastructure	0,535	0,732	0,214	0,730	0,467
	Customer Satisfaction	1,269	0,656	0,495	1,934	0,056
	Bureaucracy	1,261	0,548	0,601	2,300	0,024
	Processing Time*Satisfaction	0,154	0,102	0,717	1,519	0,132
	Technology*Satisfaction	-0,051	0,105	-0,272	-0,490	0,626
	Facilities*Satisfaction	-0,070	0,091	-0,491	-0,772	0,442
	Processing Time^Bureaucracy	-0,106	0,082	-0,634	-1,293	0,199
	Technology*Bureaucracy	0,060	0,091	0,411	0,656	0,513
	Facilities*Bureaucracy	0,016	0,072	0,151	0,227	0,821

a. Dependent Variable: Efesiensi Operasional

Interpretation:

a) Processing Time

The coefficient for Processing Time is -0.023, indicating that every increase in processing time by one unit actually decreases operational efficiency by 0.023 units. However, the t value = -0.021 and Sig = 0.983 indicate that this effect is not significant.

b) Technology Used

The coefficient for Technology Used is -0.250, indicating that an increase in the use of technology is actually associated with a decrease in operational efficiency by 0.250 units. However, with t = -0.260 and Sig = 0.795, this result is not significant.

c) Facilities & Infrastructure

The coefficient for Facilities & Infrastructure is 0.535, indicating that an increase in the quality of facilities and infrastructure will increase operational efficiency by 0.535 units. However, this result is not significant with t = 0.730 and Sig = 0.467.

d) Customer Satisfaction

The coefficient for Customer Satisfaction is 1.269, which means that a one-unit increase in customer satisfaction is associated with an increase in operational efficiency of 1.269 units. With a t value of 1.934 and Sig = 0.056, this result is close to the level of significance (0.05), so that its influence can be considered marginally significant.

e) Bureaucracy

The coefficient for Bureaucracy is 1.261, indicating that the simpler or more efficient the bureaucracy, the higher the operational efficiency (an increase of 1.261 units). This result is significant with t = 2.300 and Sig = 0.024, so it can be said that a more efficient bureaucracy has a positive effect on operational efficiency.

f) Interaction of Processing Time on Satisfaction

The coefficient for the interaction of Processing Time*Satisfaction is 0.154, indicating that the interaction between processing time and customer satisfaction

has a positive effect on operational efficiency of 0.154 units. However, this result is not significant (t = 1.519, Sig = 0.132).

g) Technology Interaction on Satisfaction

The Technology Satisfaction interaction coefficient of -0.051 indicates that the interaction between the technology used and customer satisfaction reduces operational efficiency by 0.051 units. This result is also not significant (t = -0.490, Sig = 0.626).

h) Facility Interaction on Satisfaction

The Facility Satisfaction interaction coefficient is -0.070, indicating that the interaction between facilities and customer satisfaction slightly reduces operational efficiency, but is not significant (t = -0.772, Sig = 0.442).

i) Process Time Interaction on Bureaucracy

The Bureaucracy Process Time interaction coefficient of -0.106 indicates that the interaction between process time and bureaucracy reduces operational efficiency by 0.106 units. This result is not significant (t = -1.293, Sig = 0.199).

j) Interaction of Technology to Bureaucracy

The coefficient for the interaction of Technology Bureaucracy is 0.060, which indicates that technology and bureaucracy interact positively to improve operational efficiency. However, this result is also not significant (t = 0.656, Sig = 0.513).

k) Interaction of Facilities to Bureaucracy

The coefficient for the interaction of Facilities to Bureaucracy is 0.016 indicating that facilities and bureaucracy interact to improve operational efficiency, but the result is not significant (t = 0.227, Sig = 0.821).

Table.

Analysis of determinants with moderation

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,966[a]	0,933	0,924	1,220

a. Predictors: (Constant), Facilities*Bureaucracy, Processing Time, Customer Satisfaction, Technology Used, Bureaucracy, Facilities & Infrastructure, Processing Time*Satisfaction, Technology*Satisfaction, Processing Time^Bureaucracy, Technology*Bureaucracy, Facilities*Satisfaction

Interpretation:

R Square (Coefficient of Determination) = 0.933

l) The R Square value of 0.933 indicates that 93.3% of the variation in Operational Efficiency can be explained by the independent variables in this model. This means that only about 6.7% of the variation in operational efficiency is caused by other factors that are not included in the model

Conclusion

1. The Effect of Process Time on Operational Efficiency
   Based on the results of the analysis, Process Time does not show a significant effect on Operational Efficiency. This can be interpreted that although process time is considered important, this variable is not a dominant factor influencing operational efficiency at PT. Prima Lestari Segara Abadi. It is possible that other factors, such as technology and infrastructure, have a greater role in this efficiency.
2. The Effect of Technology Used on Operational Efficiency
   The results of the study show that the Technology Used also does not have a significant effect on Operational Efficiency. This shows that the current technology has not been optimized properly to improve operational efficiency or may still require improvements in quality and use.
3. The Influence of Facilities & Infrastructure on Operational Efficiency
   Facilities & Infrastructure also did not show a significant influence on Operational Efficiency. This indicates that although facilities and infrastructure are important, the management and effectiveness of the use of these facilities may need to be improved in order to have a more significant impact on operational efficiency.
4. The Influence of Customer Satisfaction on Operational Efficiency
   The Customer Satisfaction variable approaches significance in influencing Operational Efficiency. This indicates that customer satisfaction has the potential to influence

efficiency, but this result requires further review to ensure its relevance and overall contribution in improving operational efficiency.

5. The Influence of Bureaucracy on Operational Efficiency

   Bureaucracy shows a significant influence on Operational Efficiency. This indicates that a more efficient and streamlined bureaucratic process contributes significantly to improving operational efficiency at PT. Prima Lestari Segara Abadi. The company needs to continue to optimize administrative procedures and processes to reduce bureaucratic obstacles and improve operational smoothness.

6. Interaction Between Variables

   The analysis of the interaction between the independent variables and the customer satisfaction and bureaucracy variables did not show significant results. This shows that the interaction effects between process time, technology, facilities, and customer satisfaction, as well as bureaucracy, do not directly affect operational efficiency.

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