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Intervening Role Quality Online System in Relationship Between Implementation Inaportnet and Effectiveness Ship Clearance In-Out

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Abstract: Recently trend of port management focus on fast and accurate services. Indonesian port applies Inaportnet system to accelerate ship clearance in-out. Obstacles in application are often encountered, such as lack of skill and difficulties data integration on systems. This study aims to test the mediating function quality online system in identifying variables affecting Inaportnet application. This study uses quantitative techniques and saturated sample of 110 respondents from all staff of Pertamina Trans Kontinental Company, a company with strategic role managing transportation and energy logistics in Indonesia. The analysis employed the SEM-PLS method using SmartPLS 4 application to determine how strong the role of quality online system as a mediating variable. The results showed that quality online system and inaportnet implementation significantly impact with p-values of 0.000 and 0.001, increasing process effectiveness ship clearance in-out by 62%. This confirms the importance of quality online systems and optimal Inaportnet implementation for effectiveness ship clearance.

Keyword: Inaportnet Implementation, Effectiveness of Ship Clearance In-Out, Obstacles of Inaportnet Implementation, Quality Online System of Inaportnet, Structural Equation Modeling

INTRODUCTION

Digitalization has become an integral part of industrial transformation around the world, including the maritime sector. Ports play a crucial role in driving economic growth as the main interface in the import and export industry (Yudika et al., 2024). The main role of ports is not limited to receiving ships loaded with thousands of passengers, cars, or goods. However, to realize substantial improvements in port management and administrative procedures related to logistics and shipping, the current state of port management requires the development of contemporary information and communication technologies. Such support is expected that the port can have effective and efficient performance (Puspitasari et al., 2021).

Although the port has experienced significant progress such as trend fast and accurate services, there are still various problems at port. Problems such as cumbersome bureaucracy and administrative in-efficiency especially in time-consuming ship clearance in-out procedures. Due to the so-called waiting period of up to 86% and sub-optimal use of docks, Indonesian ports are still considered inefficient (Andromeda, 2020). These problems not only hinder the smooth operation of port but also have an impact on increased operational costs and reduced competitiveness in the face of ports in other countries. The Indonesian government and port managers in overcoming this problem, make efforts to improve operational efficiency through the adoption information and communication technology (Haryani et al., 2023).

In line with these efforts, shipping agents or companies can optimize logistics and share real-time information on traffic and availability of trucks and operators through the "port community system (PCS)". Using PCS, port authorities may provide logistical solutions, save costs, expedite the import/export chain's delivery/pickup procedure, and increase customer satisfaction. The development of port-net, an evolution of this technology, has made possible more reliable, quicker, and more timely electronic communication. The Indonesian government has reaffirmed its intention to establish a system of one-door document services at ports, eliminating the need for face-to-face contact, in accordance with the ASEAN Concord II Declaration, which was held in Bali on October 7, 2003. Forming a team to handle the Indonesia National Single Window (INSW) is the next stage for the government. The port-net system is a key component of INSW, particularly when it comes to the port clearance procedure for ship services. Inaportnet is a cutting-edge platform that the Ministry of Transportation's Directorate General of Sea Transportation created. (Malisan et al., 2019).

Regulation No. 157 of 2015 which was amended by Regulation No. PM 192 of 2015 and officially promulgated on October 13, 2015 regulates the implementation Inaportnet for ship and goods services at ports territory of Republic Indonesia. Directorate General of Sea Transportation is responsible for administering Inaportnet system which can be accessed online at https://dephub.go.id/post/read/inaportnet. The system came into effect on January 13, 2016, three months after the regulation was officially passed. Inaportnet is a web-based service that facilitates ship arrival and departure services, processing of ship clearance in-out, loading and unloading, and other related tasks (Ridwan et al., 2021). The purpose of this system to facilitate the submission of service requests by service users, both shipping companies and stevedoring companies, to government agencies. These requests may relate to various activities such as vessel arrival, departure, transfer, mooring extension, service cancellation, and stevedoring planning (Krol et al., 2021). This system is expected to optimize port operations, reduce bureaucracy, and speed up process of managing ships. According to Zhang (2023), companies and organizations involved in Inaportnet include: shipping companies or agents, quarantine, stevedoring companies, transportation service companies, port authorities, syahbandar, port business entities.

Some businesses have not been satisfied with the performance of tinternet-based port information and single service system known as Inaportnet. Challenges such as user resistance to technological change, infrastructure readiness, and limited human resources may impact the successful implementation this system. The success of implementing Inaportnet not only on the adoption of technology but also on the quality of the supporting online system (Panayides & Tsolakis, 2022). The quality online system includes aspects of reliability, ease of use, access speed, and data security, which are crucial for effective deployment of Inaportnet technology. However, there are often problems such as system instability that hinders access, complicated user interfaces, and data security risks that can lead to leakage of sensitive information. These problems can delay clearance process, increase ship waiting times, and reduce efficiency of port resource utilization. Addressing these issues involves enhancing technical infrastructure to ensure reliability and speed, simplifying user interfaces for better intuitiveness, and

strengthening security protocols to safeguard sensitive data. High-quality online systems that support the implementation Inaportnet are expected to significantly improve ship clearance effectiveness by speeding up the clearance process, reducing ship waiting times, optimizing port resource use, and providing a secure environment for users through the protection of sensitive information (Firnanda & Hati, 2021).

Ship clearance in-out is a critical process impacting port operations, involving document checks, physical inspections of ships, and coordination with various related agencies (Chen et al., 2022). Efficient clearance processes can boost port productivity, shorten vessel dwell times, and provide significant economic benefits. Conversely, inefficiencies can lead to delays, vessel backlogs, and higher operational costs (Paulauskas et al., 2023). These issues often stem from inadequate management systems, such as slow document processing and lack of coordination inter-agency. Therefore, the implementation Inaportnet with high quality online system acting as a mediator is expected to help improve port operational effectiveness in the ship clearance in-out process (Ricardianto et al., 2023).

The results of previous research conducted by Asta & Nugraha (2022), Puspitasari et al. (2021) and Andromeda (2020) generally only focus on the end results of Inaportnet implementation, such as time and cost efficiency, and administrative transparency. However, research on aspects of quality online systems a mediator is still limited, which includes reliability, speed, ease of use, and security has not received adequate attention, even though the quality online system is a determining factor in the success of Inaportnet implementation. Therefore, this research is important to fill the gap related mediating role quality online system in relationship between inaportnet implementation and effectiveness ship clearance in-out.

This research gap provides an opportunity to explore more deeply Pertamina Trans Kontinental Company, a company that has a strategic role in managing energy transportation and logistics in Indonesia. Pertamina Trans Kontinental Company faces unique challenges related to managing ship clearance in-out process with high volumes and great operational complexity. With the implementation Inaportnet system within the company, the quality online system is a key factor that can affect the overall effectiveness of system. This study aims to identify how dimensions of quality online system such as reliability, ease of use, and security act as significant mediators in relationship between implementation Inaportnet and increased operational efficiency at Pertamina Trans Kontinental Company. The focus of research on this company is expected to generate in-depth and relevant insights for system managers at Pertamina Trans Kontinental Company. This research also aims to provide practical recommendations in improving quality online systems, which can support the successful implementation of technology and operational efficiency in transportation and logistics sector.

METHOD

This research was conducted over a period of three months (June-August 2024), which began by determining the variables studied, namely the independent variable (X), the dependent variable (Y) and the mediating variable (Z), which was then used to develop a research framework (Figure 1). A quantitative approach was employed to test the relationships between "Inaportnet implementation" (X), "effectiveness of ship clearance in-out" (Y), and "quality online system" (Z) at Pertamina Trans Kontinental Company. The sampling technique used is saturated sampling, which is a non-probability technique in which the entire population involved in the ship clearance process at Pertamina Trans Kontinental Company is sampled (Sudarmanto et al., 2021). This study took a sample of 110 (one hundred and ten) respondents which included all employees who were directly involved with the Inaportnet system, so that no one was missed in data collection. The measuring instrument used was a questionnaire using a 5-point Likert Scale. Data analysis in this study was carried out using Structural Equation Modeling Partial Least Squares (SEM-PLS) with the contribution of SmartPLS version 4

software, which is designed to evaluate respondents perceptions of the variables under study (Becker et al., 2020).

The data obtained from the questionnaire will be analyzed using the path analysis method to test the mediating role of quality online system on the relationship between Inaportnet implementation and the effectiveness of in-out ship clearance. Validity and reliability tests will ensure the questionnaires are of high quality. The analysis aims to offer practical recommendations for Pertamina Trans Kontinental Company to enhance their online system and improve port process efficiency.

Table 1. Variable Measurement

Variable	Operational definition	Items	Source
Implementation of Inaportnet (X)	The implementation of Inaportnet is an information technology-based web system designed to simplify administrative and operational processes at Indonesian ports. This system integrates data from various parties, such as port authorities and customs, to improve efficiency, transparency, and accountability.	1. Ship in service; 2. Extension of the ship's mooring or anchoring period; 3. Changing the mooring or anchoring of the ship; 4. Ship out service; 5. Ship cancellation; 6. Success of ship clearance in-out service;	(Wang & Song, 2020) (PM NOMOR 8, 2022)
Quality online system (Z)	Quality online system measures how well web-based systems perform, including factors like response time, access speed, availability, reliability, functionality, data security, and user satisfaction. It evaluates how well the system meets user needs, operates reliably, and maintains data integrity.	1. Easy of use; 2. Integration data and system; 3. Flexibility online system; 4. Fast respon time; 5. Data security; 6. Reliable system;	(Chen & Liu, 2021) (Firnanda & Hati, 2021)
Ship Clearance In-Out Effectiveness (Y)	Ship clearance in-out effectiveness measures how efficient and regulatory the ship administration process is at the port. It involves document turnaround time, inter-agency coordination, and information accuracy, with a focus on speed, compliance, and reduction of delays or costs. rta additional costs.	1. Speed of document processing; 2. Quality of human resources; 3. Document accuracy; 4. Adequate facilities 5. National regulations and clearance in-out guidelines; 6. Involvement of related goverment institution to ship agencies;	(Li et al., 2022) (Zainudin et al., 2023)

Source: Research Analysis Results (2024)

Based on the description of variable measurements previously described in Table 1, the hypothesis model of this study is to examine the mediating role of the quality online system on the relationship between the application of inaportnet and the effectiveness of ship clearance in-out, as shown in Figure 1 as a research model.

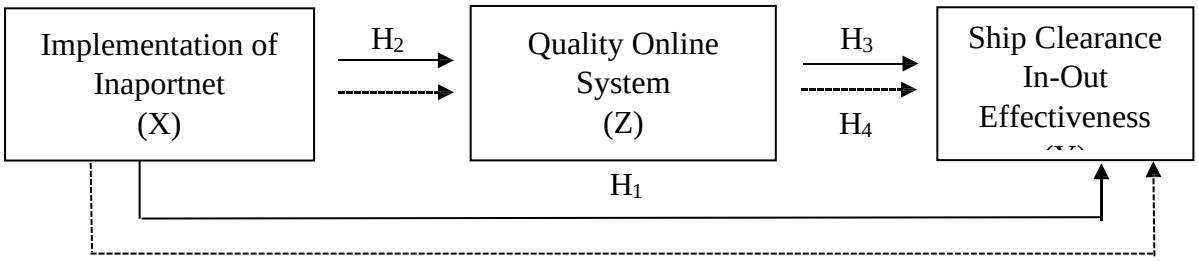

Figure 1. Research Model
Source: Research Analysis Results (2024)

The research topic is stated in the form of a hypothesis, which is a short-term solution. The hypothesis is considered provisional because it is based only on prevailing ideas and has not been supported by facts gathered from actual observations.

This research is based on the following hypotheses:

H1: There is a relationship between inaportnet implementation and ship clearance in-out.
H2: There is a relationship between the application of inaportnet and the quality of the online system.
H3: There is a relationship between the quality of the online system and ship clearance in-out.
H4: The implementation of inaportnet and the quality of the online system simultaneously affect ship clearance in-out.

RESULT AND DISCUSSION

Implementation of Inaportnet

The Inaportnet system is a strategic initiative by Indonesian Ministry of Transportation aimed to enhancing port efficiency and transparency through digital modernization. Inaportnet combines various port services into a single platform, streamlining administrative processes like vessel berthing permits, monitoring, and reporting. This system designed to cut ship clearance times, reduce logistics costs, and boost the global competitiveness of Indonesian ports. Implementation inaportnet significantly has notably improved major Indonesian ports, such as Tanjung Priok and Belawan Port, by shortening ship and cargo clearance times from several days to just hours (Wicaksono et al., 2020).

Inaportnet is an online port service system developed by the Indonesian government to enhance the efficiency of ship administration, covering arrivals and departures. It aims to provide fast, transparent, and accurate services by reducing physical contact and integrating stakeholders like port authorities, government agencies, operators, and shipping companies. The system is expected to streamline port administration and support smoother maritime logistics operations (Oosthuizen et al., 2021).

Implementation Inaportnet in Indonesia is governed by Regulation Minister Transportation Number PM 192 of 2015, requiring all ports to adopt the system for ship and goods services. This regulation aims to improve port competitiveness and streamline service procedures by integrating customs, immigration, quarantine, and port management systems. Sutomo et al. (2021) highlight the importance of adhering this regulation to ensure consistent and reliable system performance across all Indonesian ports.

Quality Online System

In modern era, the efficiency and effectiveness port operations depends greatly on high-quality online systems. These systems improve cargo handling, logistics, and stakeholders communication. Xie et al. (2020) found that a reliable, user-friendly, and secure online system significantly enhances performance by minimizing delays and aiding decision-making. Integrating real-time data analytics and automation can streamline operations, reduce human error, and ensure timely service delivery.

Quality online system refers to effectiveness and efficiency a web-based system in providing services or information to users (Jung & Kim, 2022). To stay competitive globally, ports need strong online systems. These advanced systems can enhance service quality, attract more business, and boost revenue. Wang & He (2021) found that ports with high-quality online systems saw improved throughput and higher customer satisfaction. These systems help with cargo tracking, reduce congestion, and ensure transparent information flow, all essential for international trade. As the maritime industry continues to digitize, the importance of high-quality online systems will only grow, becoming a key factor in operational success.

The significance of high-quality online systems highlighted by their role in security and compliance. Ports as critical infrastructure, need robust security measures to defend against cyberattacks and unauthorized access. These systems use advanced security protocols to protect sensitive data and meet international regulations. Liu et al. (2019) emphasize that secure online systems are vital for preventing cyber incidents and maintaining operational integrity. By implementing robust online solutions, ports can improve resilience to cyber threats, safeguard assets, and ensure smooth operations.

Ship Clearance In-Out Effectiveness

Ship clearance effectiveness is crucial for port operations, as it directly affects the efficiency of the global supply chain. With growing maritime trade, ports must expedite ship administration while maintaining accuracy and regulatory compliance. Effective clearance depends on fast, precise documentation and smooth collaboration between stakeholders such as port authorities, customs, and shipping agents in a modern port setting (Haralambides et al., 2021).

The effectiveness of in-out ship clearance is vital for port and logistics management, impacting speed, accuracy, and costs. This process, measured by completion speed, documentation accuracy, and stakeholder collaboration, can significantly reduce logistics costs and attract vessel operators seeking efficiency. The modern port ecosystem's effectiveness in ship clearance is crucial for operational efficiency and global competitiveness, involving not just document checks and inspections but also complex cross-agency coordination (Hayashida et al., 2021).

The effectiveness of ship clearance depends on both operational efficiency and adherence to national and international regulations, such as documentation, safety inspections, customs, and health controls. Research by Feng et al. (2021) highlight that regulatory compliance is crucial for maritime security and accelerating the clearance process. Ports with effective systems for ensuring compliance can reduce waiting times and enhance overall operational efficiency.

Partial Least Squares (PLS) Approach Structural Equation Test Results

a. Research Graphic

The following are the results of research that has been carried out using the SEM approach and using SmartPLS tools shown in Figure 2:

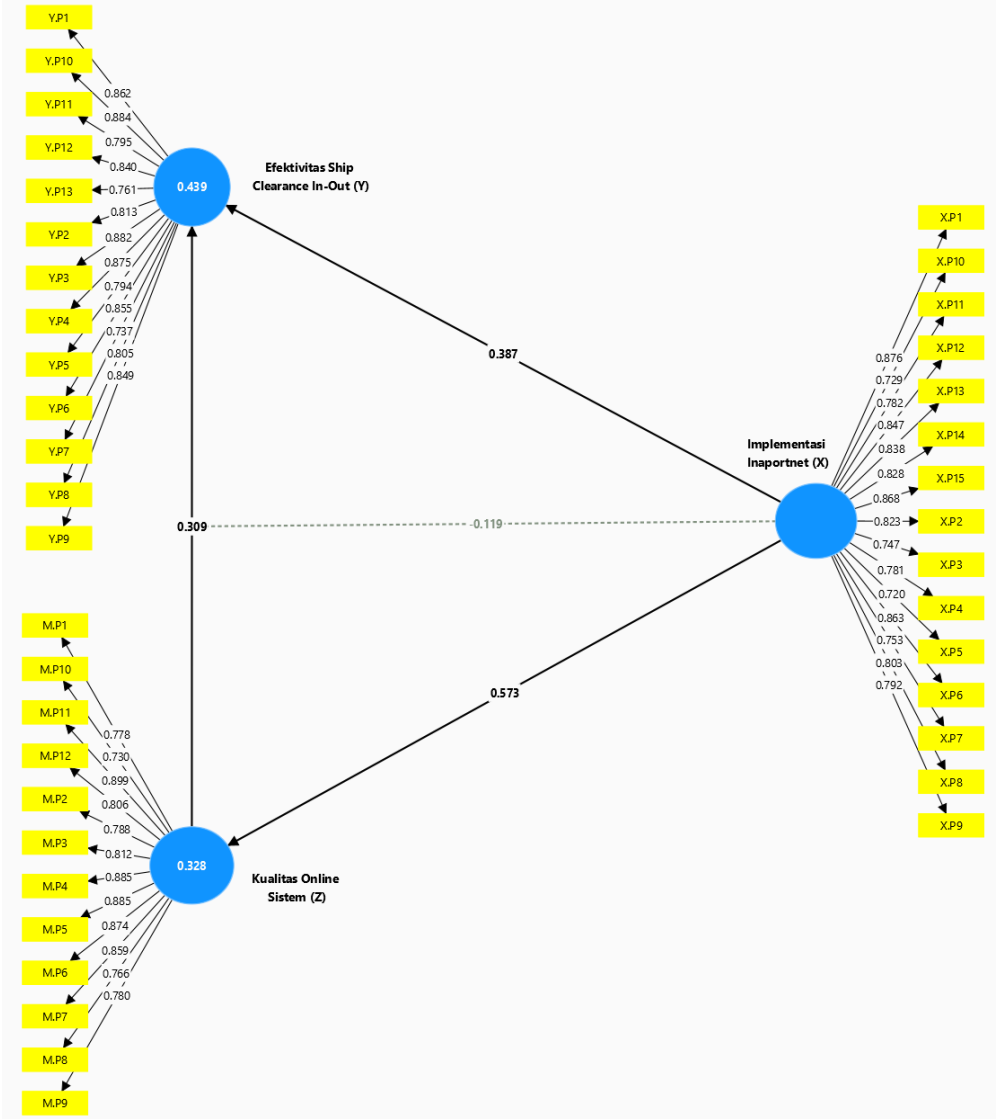

Figure 2. research Graphic
Source: Research Analysis Results (2024)

The graphical model of this study shows the relationship between Inaportnet Implementation (X), Quality of online system (Z), and the effectiveness of ship clearance in-out (Y). Inaportnet implementation is measured by various indicators and has a direct effect on the effectiveness of ship clearance in-out (path coefficient 0.387) as well as through the quality of the online system (path coefficient 0.573). the quality of the online system, which is also measured by related indicators, affects the effectiveness of ship clearance in-out (path coefficient 0.309). Overall, the quality of the online system acts as a mediating variable, strengthening the effect of Inaportnet Implementation on the effectiveness of in-out ship clearance.

b. Convergent Validity

One way to check whether a measurement model using reflecting indicators is legitimate is to look at the external loading output value, which shows how each indicator's value relates to the measured construct. The estimate method employs the Partial Least Squares (PLS) algorithm in SmartPLS 4 software to provide this external loading number.

Table 2. Output Outer Loading Construct

No.	*Variables*	*Indicator*	*Outer Loading*
1	Inaportnet Implementation	X 1	0.876
		X 2	0.823
		X 3	0.747
		X 4	0.781
		X 5	0.720
		X 6	0.863
		X 7	0.753
		X 8	0.803
		X 9	0.792
		X 10	0.729
		X 11	0.782
		X 12	0.847
		X 13	0.838
		X 14	0.828
		X 15	0.868
2	Quality Online System	Z 1	0.778
		Z 2	0.788
		Z 3	0.812
		Z 4	0.885
		Z 5	0.885
		Z 6	0.874
		Z 7	0.859
		Z 8	0.766
		Z 9	0.780
		Z 10	0.730
		Z 11	0.899
		Z 12	0.806
3	Ship Clearance In-Out Effectiveness	Y 1	0.862
		Y 2	0.813
		Y 3	0.882
		Y 4	0.875
		Y 5	0.794
		Y 6	0.855
		Y 7	0.737
		Y 8	0.805
		Y 9	0.849
		Y 10	0.884
		Y 11	0.795
		Y 12	0.840
		Y 13	0.761

Source: Research Analysis Results (2024)

Based on Table 2, it can be concluded that the research involving 3 variables, namely "implementation of inaportnet" (X), "effectiveness of ship clearance in-out" (Y), and "quality of online system" (Z), the three variables show significant results with a loading factor value above 0.7, which means that the three variables are significant and valid.

c. Construct Reliability and Validity Test

The reliability and construct validity tests aim to evaluate the extent to which research instruments are reliable or have high reliability in collecting data. The instrument is considered reliable if the Cronbach alpha (α) coefficient value for each variable exceeds 0.6, while if the value is below 0.6, the instrument is considered unreliable. Construct validity is also important to ensure that the instrument actually measures the intended aspect appropriately. This evaluation helps ensure the quality and accuracy of the data collected in the study.

Table 3 demonstrates that all variables have composite reliability values more than 0.60 and Cronbach's Alpha values greater than 0.60, which are deemed sufficient for the dependability of study data. Because their composite reliability value is higher than Cronbach's Alpha, these study variables are reliable enough to be used in Structural Equation Model (SEM) analyses conducted using SmartPLS software. The data collecting instruments used in this investigation were found to be highly solid, according to the validity and reliability assessments of the measurement model.

Table 3. Processing Value Composite Reliability

No.	Variables	*Cronbach's Alpha*	rho_A	*Composite Reliability*	*Average Variance Extracted (AVE)*
1	Inaportnet Implementation	0.961	0.962	0.965	0.648
2	Quality Online System	0.957	0.959	0.962	0.678
3	Ship Clearance In-Out Effectiveness	0.962	0.962	0.966	0.686

Source: Research Analysis Results (2024)

d. Test Determination

The model feasibility test is evaluated using the R-square value for each independent latent variable on the dependent variable. Table 4 shows the results of the R-square calculation performed with SmartPLS.

Table 4. Value R Square

	R Square	*R Square Adjusted*
Ship Clearance In-Out Effectiveness	0.439	0.423
Quality Online System	0.328	0.322

Source: Research Analysis Results (2024)

Based on Table 4, it can be concluded that the R-Square value for the variable "effectiveness of ship clearance in-out" (Y) is 0.439 and the R-Square value for the variable "quality online system" (Z) is 0.328.

e. Test Predictive Relevance / Q-Square

In order to assess whether the model has predictive ability, the Q-Square (Q2) measure is used. The value of Q2 > 0 indicates the predictive relevance of the model. The results of the calculation of Q2 in this study are as follows.

Q^2 = 62,3%

The predictive relevance value, which is 0.623 or 62.3%, is shown by the Q test2 . It can be said that 62.3% of the data can be explained by the model. However, the remaining 37.7 percent may be due to factors not discussed in this study.

f. Test Goodness of Fit

Goodness of fit evaluates the extent to which a model or equation can explain variation in the data accurately.

Table 5. Output Model Fit

	Saturated model	Estimated model
SRMR	0.076	0.078
d_ULS	9.073	9.019
d_G	0.951	0.952
Chi-square	4279.766	4279.459
NFI	0.463	0.463

Source: Research Analysis Results (2024)

From Table 5, it can be seen that the SRMR value has met the criteria with a number below 0.080. Furthermore, the d_ULS value is 9.073, and the d_ULS value of 9.019 should be greater than 2.000, which indicates that the model fits the data. For the d_G values, the numbers 0.950 and 0.951 were obtained, where the d_G criterion must be greater than 0.900. This indicates that the descriptive fit of the model is acceptable and fit, and the model alignment or relationship between constructs can be tested.

g. Hypothesis Testing

One way to help researchers understand the connection between their variables is to employ structural model testing. The suggested hypothesis is tested for accuracy by examining statistical significance using the t-statistic and p-value. The hypothesis is deemed accepted if the p-value is lower than 0.05. In this kind of hypothesis testing, the values or outcomes of the output, such as path coefficients and indirect effects, serve as the foundation.

Table 6. Path Coefficients (Mean, STDEV, T-Statistic)

Research Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
X -> Y	0.387	0.397	0.109	3.537	0.000
X -> Z	0.573	0.576	0.087	6.559	0.000
Z -> Y	0.309	0.304	0.101	3.058	0.001
X x Z -> Y	0.119	0.115	0.060	1.968	0.025

Source: Research Analysis Results (2024)

Based on Table 6, hypothesis assessment testing can be done as follows:

H1 : The results showed a significant relationship between Inaportnet Implementation (X) and Ship Clearance In-Out Effectiveness (Y). The direction of the relationship can be seen from the resulting research p value of 0.000 which also exceeds the specified standard (<0.05). The interpretation of this finding is that the higher the implementation of inaportnet at Pertamina Trans Kontinental Company, it will be followed by an increase in the effectiveness of ship clearance in-out.

H2 : The results of this study indicate a significant relationship between Inaportnet Implementation (X) and Quality Online System (Z). The direction of the relationship can be seen from the resulting research p value of 0.000 which also exceeds the predetermined standard (<0.05). The interpretation of this finding is that the higher the implementation of inaportnet at Pertamina Trans Kontinental Company, the more regular the quality of the online system.

H3 : The results of this study indicate a significant relationship between the Quality of Online Systems (Z) and the Effectiveness of Ship Clearance In-Out (Y). The direction of the relationship can be seen from the resulting research p value of 0.001 which also exceeds the specified standard (<0.05). The interpretation of this finding is that the higher the quality of the online system at Pertamina Trans Kontinental Company, it will be followed by an increase in the effectiveness of ship clearance in-out.

H4 : The results of this study indicate a significant relationship between the Quality of the Online System (Z) and the Application of Inaportnet (X) with the Effectiveness of Ship Clearance In-Out (Y). The direction of the relationship is seen from the resulting research p value of 0.025 which also exceeds the specified standard (<0.05). The interpretation of this finding is that the higher and more complete the quality of the online system and its application at Pertamina Trans Kontinental Company, it will be followed by an increase in the effectiveness of ship clearance in-out.

CONCLUSION

This study aims to evaluate the effectiveness of Inaportnet system implementation at Pertamina Trans Kontinental Company, focusing on its impact on the ship clearance in-out process, a key aspect of port operations. The findings indicate that Inaportnet significantly enhances operational efficiency by simplifying and automating previously complex and time-consuming administrative procedures. This automation reduces vessel waiting time, speeds up the clearance process, and boosts port throughput, thereby improving overall operational performance.

Quantitatively, this study shows that the implementation of Inaportnet has a significant influence on the effectiveness of in-out ship clearance, with a path coefficient value of 0.387 and a T-Statistic of 3.537 with a p-value of 0.000. In addition, the quality of the implemented online system also plays an important role, with a coefficient value of 0.573 and a T-Statistic of 6.559 with a p-value of 0.000. The relationship between the quality of the online system and the effectiveness of ship clearance in-out also proved significant, with a coefficient of 0.309 and a T-Statistic of 3.058 with a p-value of 0.001. Simultaneously, the implementation of Inaportnet and the quality of the online system affect the effectiveness of ship clearance in-out with a coefficient of 0.119 and a T-Statistic of 1.968 with a p-value of 0.025, and increase the effectiveness of the ship entry-exit licensing process by 62%.

This study found that the quality of the online system in Inaportnet is crucial to its overall effectiveness. Key factors include system reliability to prevent technical disruptions, ease of use for operators, and fast, responsive access to streamline processes. Additionally, data security is vital, as the system manages sensitive information related to port operations.

It is important to note that while Inaportnet has demonstrated the ability to improve efficiency, its success depends largely on how good the quality of the online system is. If the quality of the system is less than optimal, for example if there are problems with system stability or if the user interface is difficult to use, the benefits of implementing Inaportnet may be significantly reduced. Therefore, to maximize the benefits of this system, Pertamina Trans Kontinental Company needs to continuously monitor and improve the quality of the online system they use. Overall, this study confirms that Inaportnet is a key innovation for enhancing port operations' efficiency and effectiveness. However, to achieve optimal results, companies must maintain and continuously improve the quality of both the online system and its underlying technology. Additionally, prioritizing training and development of human resources is essential to ensure optimal use of the system. This approach will provide not only short-term benefits but also help sustain and enhance the company’s competitive advantage in the future.

Implications

The implications of these findings for Pertamina Trans Kontinental Company are considerable. The company needs to pay more attention to managing and improving the quality of the online system implemented in Inaportnet. Investment in the development of better technology infrastructure, such as a more stable network and more intuitive software, is a necessary step. In addition, the company also needs to ensure that staff using the system receive adequate training so that they are able to utilize the features to their full potential. Then the

company can improve operational efficiency, reduce costs, and at the same time increase competitiveness in an increasingly competitive market.

Research limitations

This study has several limitations that need to be considered. First, it focuses solely on Pertamina Trans Kontinental Company, so the results may not reflect other Indonesian ports. Second, the limited time frame and sample size may restrict its ability to capture broader dynamics or long-term changes in ship clearance systems. The findings should be interpreted cautiously due to potential issues with data validity and reliability. Additionally, while the study emphasizes the online system's quality as a mediator in Inaportnet implementation, other factors like infrastructure, technology adoption, quality of human resourches and organizational culture may also influence success but were not the study's focus.

Nonetheless, this study has provided a strong basis for understanding the important role of quality online systemin Inaportnet implementation. Future research is recommended to continue using quantitative methods, but with a broader scope, covering several ports in Indonesia or even involving international ports for comparison. In addition, future research may also consider exploring additional variables that may affect the effectiveness of technology implementation in port operations, so as to provide more holistic and applicable insights for efficiency improvement in this sector.

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