International Journal of Engineering Trends and Technology
ISSN: 2231–5381 / https://doi.org/10.14445/22315381/IJETT-V72I10P134

Volume 72 Issue 10, 352-356, October 2024

Original Article

Analysis of the Effectiveness of Inaportnet in Supporting Ship Document Services at Soekarno-Hatta Port

Senitriany Beatrix Nimot[1], Ganding Sitepu[2], Sitti Chaerunnisa Mappangara[3]

[1]*Magister of Transportation, Graduate School, Hasanuddin Universtiy, Makassar, Indonesia.*
[2,3]*Lecturer of Transportation Study Program, Graduate School, Hasanuddin University, Makassar, Indonesia*.

[1]*Corresponding Author : senitriany@gmai.com*

Received: 03 May 2024 Revised: 01 October 2024 Accepted: 15 October 2024 Published: 25 October 2024

Abstract *- Soekarno-Hatta Port uses the inaportnet system to provide fast service and minimize the operational costs of ships and goods. Even though it has used the inaportnet system, Soekarno-Hatta Port often handles shipping documents late. This increases ship operating costs and delayed loading and unloading schedules, increasing logistics costs. This research aims to analyze the effectiveness of inaportnet in supporting ship document services at Soekarno-Hatta port and develop strategies to improve service quality. The results of this study indicate that the use of inaportnet can provide benefits for PT Pelindo (Indonesian Port Company), namely: Creation of increased coordination and positive collaboration among various stakeholders at the Port, Fulfillment of open access to real-time information, simplification of administrative processes. The benefits for agents are operational efficiency in the loading and unloading system, easy, fast, transparent access, and simplified administrative processes. However, Pelindo and agents face disruptions and obstacles, namely, inaportnet operational disruptions, changes in work culture, and inefficient utilization of inaportnet features. The recommended solutions to these problems are adequate and effective training for PT. Pelindo staff, data integration, regularly carry out a monitoring and evaluation process for implementing inaportnet.*

Keywords *- Port, Inaportnet, Ship services, Documents, Supporting ship document.*

1. Introduction

Marine transportation is still the most important mode of transportation in international trade, with about 90% of international trade crossing the world's oceans and seas [1], [2]. In the era of the importance of sea transportation for international trade, ports play an important role in the structure of the global economy. They are essential facilities for the functioning of the global economy and the regions it supplies [3]. Ports face fierce competition to gain market share and provide a more effective and safe flow of goods worldwide. To meet these challenges, high-performing ports are applying innovative technologies to manage operations better and maintain safe, secure and energy-efficient facilities to mitigate environmental impacts. In this context, a new concept called smart port is emerging, and it is considered a solution that addresses the new challenges faced by the international trade and logistics system. Smart ports are key to improving overall port performance [4], [5], [6]. The maritime industry has long service cycles, complex structures, and heterogeneous information from a growing number of stakeholders, so Port operations are often inefficient such as delivery times, long transactions, delays, poor service, and unnecessary costs due to paperwork, information sharing between stakeholders, and lack of transparency and efficiency in Port operations, this requires the availability of reliable data [5]. The accelerating demand for services means that the entire port ecosystem - from ports to inland intermodal terminals - is under pressure to modernize [7]. By integrating digital technologies, ports can increase their capacity for smart operations and optimal resource allocation in port operations, enabling sustainable improvements in competitiveness [8].

Along with the start of the fourth industrial revolution globally, the internet and information and communication technology have been applied to the logistics field in ports [9]. Port digitization is inevitable and can improve port operations' efficiency, resulting in achievements [10]. Soekarno-Hatta Port has used the Inaportnet system since March 17, 2016, for the information system on ships and goods/cargo entry and exit from the port. Inaportnet is an open and neutral electronic portal to facilitate the exchange of data and port service information quickly, safely and easily integrated with relevant government agencies, port business entities and shipping industry players to provide fast service and minimize costs for freighter operations [11]. Port digitization is essential and contributes to increasing efficiency and competitiveness in the maritime industry, as

well as facilitating information exchange between the various agents involved in the supply chain [10], [8]. Ports have digitized systems for information exchange between various agents involved in the supply chain [12]. The Soekarno-Hatta Port's use of the Inaportnet system, a smart technology that simplifies information exchange between stakeholders, can improve operational efficiency at seaports [5]. However, despite using the Inaportnet system, Soekarno-Hatta Port often experiences delays in handling ship documents due to system or resource constraints.

The disruption of services at the Soekarno-Hatta port increased ship operating costs and obstructed loading and unloading schedules. Uncertainty like this can have a negative impact on the transportation system, such as increasing operating costs, decreasing resource utility, and reducing customer satisfaction [13]. Effective port management is essential for the economic growth of a country [14]. The purpose of this research is to analyze ship document services through the inaportnet at Soekarno-Hatta port and evaluate implementation, as well as develop strategies to improve the quality of Soekarno-Hatta Port services.

2. Methodology

Problem identification relates to obstacles (problems) that may arise and the visible impact of using inaportnet. Additional data is specifically obtained by conducting field observations at the Soekarno Hatta Makassar port (PT. Pelindo IV), which has implemented inaportnet by emphasizing observations on operational processes involving the use of inaportnet.

The analysis technique used for document studies is analyzing several PT documents. Pelabuhan Indonesia Soekarno Hatta Makassar, especially in 2022, previous research documents, and regulations related to inaportnet. As for observations and interviews, the data obtained was then analyzed by transcribing the data, segmenting, coding and developing categories. The analysis technique used in this research is descriptive qualitative, which describes various disturbances in the application of inaportnet for ship documents.

3. Results and Discussion

3.1. Effectiveness of Using Inaportnet

Shipping agents use inaportnet to send loading and unloading notifications to port authorities and related parties. These notifications include information on the type of cargo, quantity, weight, and any special instructions required during the loading and unloading process. Port authorities and relevant parties use inaportnet to schedule and coordinate the loading and unloading process. During the loading and unloading process, inaportnet is used to monitor operational progress. Related parties can update the loading and unloading status in real-time through the system.

3.1.1. Effectiveness of Inaportnet on Pelindo IV Parties

The effectiveness of using inaportnet in PT. Pelindo IV can be seen from the efficiency of port operations, which is an important factor in increasing productivity, reducing costs, and improving services for stakeholders.

- Creating increased coordination and positive collaboration among various stakeholders at the port, inaportnet facilitates fast and accurate information exchange between various stakeholders at the port, such as shipping agents, logistics companies, port authorities, and other port service users. An integrated communication platform makes operational coordination more efficient, and stakeholder collaboration can be enhanced. This reduces waiting time, minimizes communication errors, and optimizes the use of Port resources.
- Fulfilments of open access to real-time information such as scheduling, ship status and destination, ship schedules, load lists, work lists, loading and unloading, mooring delays, and load changes and ship berthing locations in real-time. This information enables better planning, priority setting, and quick decision-making, improving port operational efficiency.
- Automation and Reduction of inaportnet Administration Costs are due to the shift from manual to technology-integrated processes. Inaportnet provides an online port service with booking and reservation features. With this system, manual administrative processes can be reduced and replaced with automated processes. This reduces human error, saves time, and reduces overall administrative costs. Users can also make payments electronically through the inaportnet platform, which increases efficiency in the payment process.

3.1.2. Effectiveness of Inaportnet on the Shipping Agent Party (Service User Party)

Inaportnet enables up-to-date monitoring and information exchange so that shipping agents can easily monitor the status of service requests, operational progress, and live reporting of results.

They can track loading and unloading progress, obtain information on delays or schedule changes, and access historical data related to vessels and cargo. With accurate monitoring and reporting, shipping agents can take necessary actions to optimize vessel operations. The effectiveness of inaportnet can be seen from the operational efficiency, easy, fast and transparent access, and simplification of administrative processes obtained.

- Inaportnet enables better collaboration between port authorities, shipping agents, and other relevant stakeholders. Using one integrated platform, these parties can communicate in real-time, share information, and coordinate loading and unloading activities more efficiently. This reduces communication errors, increases responsiveness, and speeds up the overall

workflow. To synchronize vessel operations with port schedules, reduce communication errors, and speed up the overall workflow.

- Easy, fast and transparent access, available in real-time. Inaportnet provides relevant information to shipping agents regarding vessel arrival and departure schedules, vessel status, vessel service data, Port capacity, administrative requirements, etc. This will allow shipping agents to make better decisions based on accurate and up-to-date information and reduce uncertainty in planning vessel operations. Port authorities can optimize docks, equipment, and manpower according to the loading and unloading requests in inaportnet. This helps reduce congestion, improve efficiency, and minimize vessel waiting time at the Port.
- Simplification of administrative processes. With inaportnet, administrative processes and communications that were previously done manually can be automated and simplified. inaportnet provides an integrated platform that allows shipping agents to efficiently access and manage information related to vessel operations. They can send notifications, submit service requests, and communicate with port authorities through a single system. This reduces reliance on manual processes that are often time-consuming and prone to errors. It thus reduces administrative costs and saves time required in various activities, such as service request submission, document completion, and service payment. This reduction in operational costs and time provides significant economic benefits to shipping agents and other stakeholders.

3.2. Constraints on the Operation of Inaportnet

Although inaportnet can streamline the administrative and supervisory processes in loading and unloading activities, its implementation has not been fully implemented.

The ministry's decision to carry out digitalization at the port is considered to be insufficiently fulfilled until now. This is due to the obstacles faced by the agent and the Port (Soekarno-Hatta Indonesian Port Company) and inaportnet operational disruptions.

3.2.1. Inaportnet Operational Disruption

During 2021-2023, data were obtained regarding disruptions in the operation of inaportnet, which were one of the causes of inaportnet not being fully implemented properly. The following is data on disruptions to inaportnet operations from 2021 to 2023.

These various disturbances have caused the transition of services from digital to manual systems, so the implementation of digital services through inaportnet has not been fully implemented.

Table 2. Inaportnet operation interruption

No.	Year	Disorder		Description
1	2021	1	Operator error	4 times
		2	Electricity outages	2 times
		3	Inaportnet system error	4 times
		4	Internet network disruption	3 times
2	2022	1	Operator error	6 times
		2	Electricity outages	3 times
		3	Inaportnet system error	6 times
		4	Internet network disruption	6 times
		5	Document capacity is too large	12 times
3	2023	1	Operator error	4 times
		2	Electricity outages	12 times
		3	Inaportnet system error	6 times
		4	Internet network disruption	7 times
		5	Document capacity is too large	10 Times

Source: PT. Soekarno-Hatta Port Makassar; 2021-2023

3.2.2. Changes in Work Culture

Digitalization refers to using and integrating new technologies, particularly digital ones, into employees' tasks. It has transformed the nature of work, reducing the demand for workers who perform routine tasks and possess low qualifications [15]. This is a complaint from PT. Pelindo itself. The existence of a pattern of resistance or discomfort from the parties involved in adopting new technology and changing the way of working that has been accustomed, such as changing the work culture from all manual to automatic and integrated, creates problems for PT staff. Pelindo.

This is because the staff's knowledge of the use of technology and information is inadequate, so they are not yet fluent in the operation of inaportnet. Although PT. Pelindo provides a special room for training staff authorized to perform services on ships, and IT staff are always open to being asked about the technical use of Inaportnet. This shows that human resources are not yet a strategic factor in increasing the role of employees in the digital economy [16].

3.2.3. Inaportnet's Inefficient Utilization of Features

The operation of inaportnet is considered not fully effective by service users, in this case, shipping agents. The number of applications that must be used makes shipping agents feel inefficient. Shipping agents' use of inaportnet is limited to ship service and administration features. Lack of knowledge of technology and information related to the many applications for shipping purposes makes shipping agents unable to explore the benefits of inaportnet further.

The effectiveness of inaportnet for shipping agents depends on their ability to utilize the features provided by the system, proper training, and good collaboration with authorities and other relevant stakeholders.

3.3. Improving the Effectiveness of Inaportnet: A Solution to Improve Service Quality and Port Effectiveness

The success of port digitization is highly dependent on digital readiness, which includes an organization's ability to adapt to and effectively utilize digital technologies, encompassing its infrastructure, processes, workforce skills, and cultural mindset [17], [18].

Based on the problems faced in the implementation of inaportnet in improving port operational efficiency, here are some implications and recommendations that can be considered:

- Training and Education: The Port needs to provide adequate and effective training to staff on using inaportnet and applying related technologies. Although this has been done before, it is still considered ineffective. Ports and agents should conduct regular education and training. This training will help improve staff understanding and skills in effectively utilizing the features of inaportnet, as well as the benefits that can be obtained from the system while maximizing the implementation of the new work culture system (from manual to digital). All employees involved in modern processes must be trained to work with software and hardware for digital transformation readiness [19].
- Data Integration: Ports should ensure good integration between the inaportnet and other port information systems. This is because many other applications are often complained about by staff from both service providers and service users. Integrating data will enable smooth and real-time data exchange between various related parties, including shipping agents, logistics entrepreneurs, port authorities, and customers. Good data integration will help reduce human error, speed up document processing, and improve overall coordination.
- Monitoring and evaluation: Ports should carry out a regular monitoring and evaluation process of the inaportnet implementation. This will help identify areas requiring maintenance, training/education, and measuring the impact of inaportnet on port operational efficiency. The data and feedback obtained through this monitoring and evaluation can be used to continuously take corrective actions and improve operational performance.

By following these implications and recommendations, ports can improve their operational efficiency through the effective and optimized implementation of inaportnet. This will help optimize operational processes, improve stakeholder collaboration, and significantly benefit ports and the maritime industry.

4. Conclusion and Recommendation

4.1. Conclusion

Implementing the Inaportnet system at Soekarno-Hatta Port has provided various benefits, particularly in accelerating administrative processes, optimizing the use of port resources, and delivering real-time information that enhances operational efficiency. This system helps reduce operational costs, increases transparency, and facilitates coordination between stakeholders, such as shipping agents and port authorities. However, several challenges hinder its implementation, including operational disruptions related to the system, internet network issues, and large document capacity. Additionally, resistance to changes in work culture and the limited ability of human resources to effectively use this technology are also significant obstacles. The incomplete utilization of Inaportnet's features further reduces the system's optimization.

4.2. Recommendations

There needs to be an ongoing training program for port staff and users of the Inaportnet system to improve their understanding and ability to utilize all its features. This training should focus on utilizing digital technology and simplifying work processes. Soekarno-Hatta Port must ensure the Inaportnet system is well integrated with other supporting technologies. This can be done by improving network infrastructure and system capacity to handle large document loads and prevent operational disruptions.

The port needs to regularly monitor and evaluate the use of Inaportnet to ensure the system is running optimally. This evaluation can also identify areas that require improvement and provide feedback for further system development. Changing the work culture in the port environment from manual to digital is necessary. This requires support from port management as well as education to staff on the importance of digitization in improving work efficiency.

Author Contributions

Conceptualization: Senitriany Beatrix Nimot
Data curation: Senitriany Beatrix Nimot
Formal analysis: Senitriany Beatrix Nimot, Ganding Sitepu
Funding acquisition: Senitriany Beatrix Nimot
Research: Senitriany Beatrix Nimot
Methodology: Senitriany Beatrix Nimot, Ganding Sitepu, and A. Sitti Chaerunnisa M.
Project administration: Senitriany Beatrix Nimot
Resource: Senitriany Beatrix Nimot
Supervision: Senitriany Beatrix Nimot, Ganding Sitepu, and A. Sitti Chaerunnisa M
Validation: Senitriany Beatrix Nimot
Writing–original draft: Senitriany Beatrix Nimot
Writing–reviewing & editing: Senitriany Beatrix Nimot, Ganding Sitepu, and A. Sitti Chaerunnisa M.

Funding

The authors acknowledge personal expenses during the course of this research.

Data and Materials Availability

All data associated with this study are present in the paper.

References

[1] H. Haralambides, "Globalization, Public Sector Reform, and the Role of Ports in International Supply Chains," *Maritime Economics & Logistics*, vol. 19, pp. 1-51, 2017. [CrossRef] [Google Scholar] [Publisher Link]

[2] Wayne K. Talley, and ManWo Ng, "Cargo Port Choice Equilibrium: The Case of Shipping Lines and Cargo Port Service Providers," *Transportation Research Part E: Logistics and Transportation Review*, vol. 164, 2022. [CrossRef] [Google Scholar] [Publisher Link]

[3] Clément Iphar et al., "Port Call Extraction from Vessel Location Data for Characterising Harbour Traffic," *Ocean Engineering*, vol. 293, pp. 1-11, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[4] Anahita Molavi, Gino J. Lim, and Bruce Race "A Framework for Building a Smart Port and Smart Port Index," *International Journal of Sustainable Transportation*, vol. 14, no. 9, pp. 686-700, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[5] Kunpeng Li, Amir Gharehgozli, and Jun-Yeon Lee, "Smart Technologies and Port Operations: Optimal Adoption Strategy with Network Externality Consideration," *Computers & Industrial Engineering*, vol. 184, pp. 1-14, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[6] Barbara T.H. Yen et al., "How Smart Port Design Influences Port Efficiency–A DEA-Tobit Approach," *Research in Transportation Business & Management*, vol. 46, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[7] Behzad Behdani, "Port 4.0: A Conceptual Model for Smart Port Digitalization," *Transportation Research Procedia*, vol. 74, pp. 346-353, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[8] Kevin X. Li et al., "Smart Port: A Bibliometric Review and Future Research Directions. Transportation Research Part E: Logistics and Transportation Review, vol. 174, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[9] Wang Ki Jun, Min-Kyu Lee, and Jae Young Choi, "Impact of the Smart Port Industry on the Korean National Economy Using Input-Output Analysis," *Transportation Research Part A: Policy and Practice*, vol. 118, pp. 480-493, 2018. [CrossRef] [Google Scholar] [Publisher Link]

[10] Monika Klein, and Monika Spychalska-Wojtkiewicz, "Digitalization of Small Ports as a Step in Achieving Sustainable Goals," *Procedia Computer Science*, vol. 225, pp. 3381-3387, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[11] Vidya Selasdini, Jasief Soetopo Putrahardja, and Muhammad Kemal Passya, "The Influence of Inaportnet Skills and Employee Performance on the Smoothness of Ship Services at PT Benua Indah Gemaca Banten Branch," *Journal of Accounting and Finance Management*, vol. 3, no. 4, pp. 186-199, 2022. [CrossRef] [Google Scholar] [Publisher Link]

[12] Natalia Kapkaeva et al., "Digital Platform for Maritime Port Ecosystem: Port of Hamburg Case," *Transportation Research Procedia*, vol. 54, pp. 909-917, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[13] Wei Wang, and Yiwei Wu, "Is Uncertainty Always Bad for the Performance of Transportation Systems?," *Communications in Transportation Research*, pp. 1-6, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[14] Dani Rusli Utama et al., "The Effect of Digital Adoption and Service Quality on Business Sustainability Through Strategic Alliances at Port Terminals in Indonesia," *The Asian Journal of Shipping and Logistics*, vol. 40, no. 1, pp. 11-21, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[15] Katarzyna Piwowar-Sulej et al., "The Impact of Digitalization on Employees' Future Competencies: Has Human Resource Development a Conditional Role Here?," *Journal of Organizational Change Management*, vol. 37, no. 8, pp. 36-52, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[16] Galiya Berdykulova et al., "Digitalization of Human Resource Department: The Experience of Kazakhstani Enterprise," *Procedia Computer Science*, vol. 231, pp. 359-364, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[17] Yashar Salamzadeh et al., *Digital Readiness*, International Encyclopedia of Business Management, Elsevier, 2024. [Google Scholar] [Publisher Link]

[18] Jean Baptiste Bernard Pea-Assounga, and Jesna Lafortune Bindel Sibassaha, "Impact of Technological Change, Employee Competency, and Law Compliance on Digital Human Resource Practices: Evidence from Congo Telecom," *Sustainable Futures*, vol. 7, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[19] Vladimir Kryukov et al., "Assessment of Transport Enterprise Readiness for Digital Transformation," *Transportation Research Procedia*, vol. 63, pp. 2710-2718, 2022. [CrossRef] [Google Scholar] [Publisher Link]