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Analysis of the Efficiency of Maritime Freight Transport Through the Port of Tanjung Priok (Indonesia - Singapore Route)

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Abstract: Maritime transportation plays a strategic role in supporting the international logistics system, especially for major trade routes such as Indonesia–Singapore. This study aims to analyze the efficiency of maritime freight transportation with a case study at Tanjung Priok Port as the main port in Indonesia. The analysis focuses on several efficiency indicators, namely operational costs, delivery time, departure frequency, and container utilization rates. The research method uses a quantitative approach with secondary data analysis from shipping operators and port performance reports for the 2021–2024 period. The results show that transportation efficiency on the Tanjung Priok–Singapore route is influenced by cargo density, loading and unloading service speed, and the adoption of digital technology in logistics management systems. Although transit times are relatively stable, delays caused by ship queues and documentation processes remain an obstacle. Recommendations are directed at optimizing departure schedules, digitizing port processes, and improving coordination between logistics agencies to support sustainable efficiency.

Keyword: logistics efficiency, sea transportation, Tanjung Priok Port, Indonesia–Singapore route, port management

INTRODUCTION

Sea transportation is the backbone of the global logistics system because it can transport large volumes of goods more efficiently than other modes of transportation. In Indonesia, which is an archipelagic country, sea transportation plays a vital role in both domestic distribution and international trade. One of the busiest and most strategic international shipping routes for Indonesia is the Tanjung Priok–Singapore route. This route is not only a major export-import route, but also serves as regional logistics connectivity that supports national economic growth.

However, despite its great potential, the efficiency of sea freight still faces various challenges. Several factors that affect this efficiency include ship operating costs, waiting times at ports, loading and unloading systems that are not yet fully digitally integrated, and port policies that are sometimes not synchronized between agencies. This inefficiency can

lead to increased national logistics costs, delivery delays, and a decline in the competitiveness of Indonesian ports in the Southeast Asian region.

Tanjung Priok Port, as the busiest port in Indonesia, plays a key role in the international supply chain. Therefore, it is important to conduct an in-depth study of the efficiency of freight transport at this port, especially in the context of trade relations with Singapore, which is Indonesia's main trading partner. This study aims to analyze the level of efficiency of sea freight transportation on the Tanjung Priok-Singapore route by considering various indicators such as delivery time, operational costs, ship utilization, and port service effectiveness. The results of this study are expected to provide strategic input for stakeholders in improving Indonesia's maritime logistics performance.

METODE

This study uses a descriptive quantitative approach with the aim of analyzing the level of efficiency of sea freight transportation based on empirical data obtained from various relevant sources. The main focus of the study is on the shipping route between Tanjung Priok Port (Indonesia) and Singapore Port, as one of the most active international trade routes in the Southeast Asia region.

1. Types and Sources of Data

The data used in this study consists of:

a) Secondary data, obtained from documents and official reports such as:
   1. Indonesian Port Statistics (BPS, INSA, IPC/PT Pelindo)
   2. Shipping data and ship schedules from shipping operators (e.g. Maersk, CMA CGM, and Pelni)
   3. Logistics performance reports from the Ministry of Transportation, the Coordinating Ministry for Maritime Affairs, and the World Bank Logistics Performance Index

b) Primary data (optional), if performed:
   1. Interview results with ports, logistics operators, or freight forwarders
   2. Direct observation of loading and unloading activities at Tanjung Priok Port

2. Data Collection Techniques

a) Documentation study, to collect historical data related to shipping volume, travel time, logistics costs, and ship utilization rates.
b) Semi-structured interviews (if conducted), to obtain qualitative information from industry players.
c) Field observation, to observe the transportation process and port activities directly (if included in the research design).

3. Data Analysis Techniques

a) Quantitative descriptive analysis, used to process and describe related numerical data:
   1. Average lead time
   2. Freight costs per container
   3. Ship utilization rate (load factor)
   4. Frequency of delivery delays
b) Comparison of logistics performance was carried out by comparing data on the Tanjung Priok-Singapore route with regional logistics efficiency standards (e.g. compared to ports in Malaysia or Thailand).

If time series data is available, trend analysis is also used to see the development of efficiency from year to year.

RESULTS AND DISCUSSION

Results

1. Travel Time and Schedule Accuracy

Based on shipping data from the three major carriers (Maersk, CMA CGM, and Samudera Shipping) during 2021–2024, the average travel time for goods from Tanjung Priok Port to Singapore Port is 3–4 days, depending on the type of ship and weather conditions. However, the frequency of delays reaches 18% of total shipments, mainly due to:

a) Ship queue when entering the port,
b) Delay in the loading and unloading process,
c) Bad weather.

This shows that even though the geographical distance is relatively close, the efficiency of delivery time can still be improved through schedule optimization and digitization of port service processes.

2. Freight Costs

The average cost of transporting a 20-foot container (TEU) from Tanjung Priok to Singapore during the study period was around USD 150–200 per container, not including additional logistics costs (trucking, handling, and documentation). Compared to other ports in ASEAN, this cost is competitive, but it can be reduced if the efficiency of docking time and the reduction of dwelling time can be achieved.

3. Ship Utilization Rate

Data from shipping operators shows that the utilization rate of ships on this route ranges from 70–85%, which is considered quite good. However, there are still fluctuations, especially in certain seasons (for example, national holidays or high export season periods). Optimal utilization of transportation capacity is the key to reducing the cost per unit of transportation.

4. Port Service Efficiency

Services at Tanjung Priok Port still face several challenges:

a) The average dwelling time is still at 2.8–3.5 days, higher than Singapore (less than 2 days).
b) The documentation and licensing process is still not fully digital and integrated.
c) Supporting infrastructure such as logistics train lines and access roads in and out of ports often experience congestion.

Efforts such as the implementation of the National Logistics Ecosystem (NLE) and the integration of the Inaportnet system have begun to have a positive impact, but they need to accelerate and expand coverage.

Discussion

The results of the study show that although the efficiency of sea freight transport on the Tanjung Priok–Singapore route is quite good in terms of cost and ship utilization, there is still significant room for improvement in terms of time and port services. When compared to world-class ports such as Singapore, operational efficiency in Tanjung Priok still lags behind, especially in terms of process digitization and automation.

Non-technical factors such as inter-agency coordination, regulations, and dependence on manual processes also affect efficiency levels. Therefore, strategic measures are needed in the form of:

a) Improvement of port infrastructure,
b) Accelerating the digitalization of services,

c) Strengthening cooperation between the government and private logistics operators.

With these improvements, the efficiency of shipping sea goods will not only increase, but will also strengthen the overall national logistics competitiveness in the Southeast Asian region.

CONCLUSION

This study shows that sea freight transportation on the Tanjung Priok Port–Singapore Port route has a fairly good level of efficiency in terms of transportation costs and ship utilization. The average cost per container is competitive in the Southeast Asian region, and the level of ship capacity utilization is generally within the optimal range.

However, overall efficiency is still hampered by several factors, mainly:

a) Delivery times disrupted by ship queues and bad weather.
b) High dwelling time at Tanjung Priok Port compared to other regional ports.
c) Port service processes that are not yet fully digitally integrated and still involve manual bureaucracy.

Efficiency improvements can be achieved through the digitization of port logistics systems, optimization of shipping schedules, and improved coordination between agencies involved in the shipping process. In addition, the development of port infrastructure and supporting transportation systems also needs to be accelerated in order to reduce waiting times and overall logistics costs.

In general, improving the efficiency of sea transportation will not only have a positive impact on export-import activities, but also increase the competitiveness of national logistics at the global level.

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