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Accessibility, Facilities And Digitalization Impact On Port Performance

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Abstract: The aim of this research is to determine the impact of accessibility, facilities and digitalization on port performance in Patimban Subang. Some of the main problems include; There is no direct access to the port, inadequate port support facilities such as the absence of a logistics company that has a home base in the port area means that goods delivery is not optimal. Apart from that, the use of the Inaportnet system as a form of port digitalization has not been optimal. This research method uses SEM-PLS analysis. The results of the analysis and discussion show that the variables of accessibility, facilities and digitalization of freight ports have a significant positive influence on port performance variables. The statistical test results show that all independent variables are statistically significant at the 95% confidence level, with a P-value lower than .

Keyword: accessibility, facilities, digitalization, port performance.

INTRODUCTION

Indonesia is a very large archipelagic country so that shipping activities play an important role in the social and economic life of its population, so it is necessary to have water transportation infrastructure in the form of ports for effective and efficient transportation ((Özer et al., 2021). Infrastructure development in a region will have an impact on increasing community access, which will ultimately have an impact on improving the economy and community welfare (Kadio, 2023; Syam et al., 2022)(Putra & Djalante, 2016).

Patimban Port in Subang, West Java plays a strategic role as maritime transportation logistics. The port has been operating since the end of 2020, but the infrastructure at the port and to the port has not been fully integrated, there are still many road networks that have not been realized. Patimban Port has the potential to transport the flow of goods such as vehicles and heavy equipment which creates problems efficiently and effectively. If the increase in the

flow of goods is not balanced with an increase in the road network and optimal transportation engineering, it will result in the disruption of effective and efficient transportation flows (Eliasson & Segevall, 2022; Kotowska et al., 2018)(Fonataba, 2022).

Accessibility related to the distribution of goods from Patimban Port to the destination or vice versa, using the North Coast Road (Pantura). Researchers conducted pre-research by conducting a travel survey from Jakarta to Patimban Harbor where the route used was to use the Cipali toll access then exit the Cikopo toll road kilometer 72 and enter the Pantura Route, where the road conditions on the Pantura Route were not all smooth. Vehicles are dominated by trucks so the journey takes quite a long time, approximately 3.5 hours. This means that the logistics costs incurred are not cheap. Accessibility to Patimban Port, Subang, West Java needs to be improved so that it becomes a solution to reduce congestion at Tanjong Priok Port which is already very congested and becomes an alternative for users of transportation and logistics services as an effective and efficient logistics activity (Fahim et al., 2021; Handfield & Linton, 2017; Maemunah & Cuaca, 2021).

Accessibility is impacted by the increase in the number of vehicles which increases every year above 3% (Koh et al., 2020; Lourenço et al., 2020)while the development of road infrastructure is much lower, namely less than 1% per year, causing an imbalance between the number of vehicles and road infrastructure resulting in congestion points (Lee et al., 2018; Maemunah & Marta Anggoro, 2022; Philipp et al., 2021)(Benvenuti, 2018). Direct toll access to the port has been planned, but has not yet been realized. In fact, with this toll road, it is hoped that it can shorten logistics time and costs to make it cheaper. Apart from that, there is no infrastructure in the form of a railway network to the port. Integration with the railway network to Patimban Port is very important in supporting the effective and efficient flow of goods transport. Transportation by train will contain more goods than by truck, besides that, sending goods by train will be faster and save time (Lee et al., 2018; Maemunah et al., 2023).

(Humang, 2018) the facility problem that is often encountered in the distribution of goods from the port to the hinterland is that the road network service is not yet optimal, thus hampering the process of distributing goods. This has an impact on the operational performance of port services, such as delays in the supply of goods leaving the port. Patimban Subang Port began operating at the end of 2020, at the beginning of 2021 there was an increase in the flow of loading and unloading goods to 26,447 and in 2022 it will number 76,304 (Inaportnet, 2023). There was a very high spike. Facilities and infrastructure must be supported effectively and efficiently (Fahim et al., 2021).

The absence of a logistics company that has a home base at Patimban Port has created problems regarding requests for transportation or delivery of goods from or to the port (Maemunah & Nekrasov, 2023; Nur, 2022). Service users have to search from outside the area or order in advance, which takes longer, resulting in additional costs and delivery times. Apart from that, the lack of supporting facilities such as banks around the port makes the transaction or payment process slow which ultimately slows down the process of transporting goods. Even though transactions can now be carried out digitally, in reality problems often occur when transactions are carried out digitally so that the existence of bank facilities around the port is still very necessary to support the smooth process of effective and efficient logistics activities (He & Haasis, 2019; Lee et al., 2018; Maemunah et al., 2021; Tanasale et al., 2023).

The existence of facilities both within the port and around the port is very important to support the distribution of goods to various destination areas effectively and efficiently. Currently, the existing facilities at Patimban Port are still very lacking, thus hampering the port's performance (Fan et al., 2021; Maemunah et al., 2022).

The role of the port will be achieved if the port is supported by adequate facilities (Asadi et al., 2021). Port development must be carried out based on careful, comprehensive and integrated planning and looking at existing aspects. If it is not managed well, it will result

in the intended target not being achieved, making it ineffective and inefficient (Kadio, 2023; Nur, 2022).

Patimban Port is not yet 100% complete and construction is still ongoing. However, since it opened at the end of 2020 to date the port has experienced improved services with an increase in the flow of goods entering the port. The problem is that the use of digitalization in ports is not yet optimal (Fahim et al., 2021; Maemunah et al., 2021; Marthalina et al., 2024). The use of the Inaportnet system as a form of implementing digitalization at Patimban Port has not been fully integrated. Service users who use the Inaportnet application can only know about ship movements, not the goods being loaded. To find out in detail the goods being loaded, the goods owner must use another system owned by each ship operator which is not integrated with Inaportnet. According to (Philipp et al., 2019; Poulsen & Lema, 2017) limited access to information systems will slow down the documentation process and slow down port performance. Good implementation of port digitalization will encourage transparent, effective and efficient services (Josefsson & Berg, 2019; Siti Maemunah, 2020).

METHOD

In the planning, Patimban will become a port that prioritizes the data population in this research are business actors and service users in the transportation and logistics sector related to logistics activities in the Patimban Port area, Subang, West Java.

The number of respondents in this study was 138 people. Respondents in this research are providers and users of transportation and logistics services in the Patimban Port area, Subang, West Java. Meanwhile, the collection of secondary data or supporting data for this research was obtained through interviews by conducting questions and answers with data sources directly or indirectly via telephone calls with leaders/decision makers to obtain the information needed for this research. Researchers conducted interviews with office holders at the Patimban Subang Subang Class II Port Authority Harbormaster's Office, West Java. Second, observations are carried out by carefully observing the object under study, listening to and reading news regarding all transportation and logistics activities at Subang Patimban Port. The method approach used in this research is SEM-PLS (Hair et al., 2019; Sarstedt et al., 2017). This approach model was chosen because the sample size in this study was not large so it was able to test indicator variables and latent variables as well as measure variables indirectly through predetermined indicators.

RESULTS AND DISCUSSION

The survey, which was carried out by distributing questionnaires via Google Form, obtained 138 respondents who provided answers and were suitable to be used as samples in this research.

Variables related to accessibility, digitalization, facilities, and performance are evaluated by considering outer loading, Cronbach Alpha, and Average Variance Extracted (AVE) as important indicators for measuring the quality of measuring instruments and reliability. The following is an interpretation of the data based on the indicators provided:

The Accessibility variable has an outer loading of 0.948, which shows that indicators related to accessibility (A1, A3, A4, A5, A6, A7, A8) have a high contribution in describing this variable. A Cronbach Alpha value of 0.767 indicates a level of consistency The good results between these indicators indicate that these indicators are reliable in measuring accessibility. The AVE value of 0.767 also indicates that most of the variation in the data can be explained by the construct being measured, which indicates good construct validity.

Digitalization: The Digitalization variable has an outer loading of 0.932, indicating that indicators related to digitalization (D1, D2, D4, D5, D6, D7, D8, D9, D11) have a high contribution in describing this variable. The Cronbach Alpha value of 0.647, although quite low, still shows an acceptable level of consistency between these indicators. The AVE value

of 0.647 indicates that most of the variation in the data can also be explained by the digitalization construct.

The Facility variable has an outer loading of 0.923, indicating that indicators related to facilities (F1, F2, F3, F4, F5, F6, F7) have a high contribution in describing this variable. A Cronbach Alpha value of 0.687 indicates an acceptable level of consistency between facility indicators. The AVE value of 0.687 also indicates that most of the variation in the data can be explained by the facility construct. Port Performance: The Performance variable has an outer loading of 0.948, indicating that indicators related to performance (K1, K2, K3, K4, K5, K6, K7, K8, K9, K10) have a high contribution in describing this variable. The Cronbach Alpha value of 0.684 indicates an acceptable level of consistency between performance indicators. The AVE value of 0.684 also indicates that most of the variation in the data can be explained by the performance construct. These results support the validity and reliability of the constructs measured in this study, so that further analysis can be carried out with confidence that the measuring instruments used are strong enough to describe the observed variables.

Results of discriminant validity analysis using HTMT (Heterotrait-Monotrait) ratio of Accessibility, Digitalization, Facilities and Performance variables. HTMT is one method used to evaluate the extent to which different constructs should differ from each other in a study. The values in the table are the ratio between heterotrait correlation (between two different variables) and monotrait correlation (between two same variables). In discriminant validity analysis, the HTMT value should be lower than 1 to confirm that different constructs should have a lower correlation than the same construct.

Based on the table above, the results of the discriminant validity analysis are as follows: Accessibility, HTMT between Accessibility and Digitalization is 0.89, which is lower than 1. This shows that the constructs of Accessibility and Digitalization of Goods Transport Ports have good discriminant validity, meaning they are quite different from each other. other. The HTMT between Accessibility and Facilities is 0.881, also lower than 1, indicating that the Accessibility and Facilities construct has good discriminant validity. The HTMT between Accessibility and Port Performance is 0.761, which is also lower than 1, indicating that Accessibility and Port Performance have good discriminant validity. Facilities: The HTMT between Facilities and Performance is 0.79, which is lower than 1, indicating that Facilities and Performance have good discriminant validity. Digitalization of Goods Transport Ports: HTMT between Digitalization of Goods Transport Ports and Facilities is 0.892, lower than 1, indicating that Digitalization of Goods Transport Ports and Facilities has good discriminant validity. The HTMT between Digitalization of Goods Transport Ports and Port Performance is 0.794, also lower than 1, indicating that Digitalization and Performance have good discriminant validity.

CONCLUSION

These results indicate that different variables in your study have lower correlations than similar variables, indicating that the constructs being measured are different from each other. This supports the discriminant validity of the measuring tool and ensures that the variables are truly measuring the different concepts in the study.

The research results show a positive and significant influence of accessibility on port performance. The most dominant result of the statement on accessibility is that transportation services in the Subang area are adequate and can support port access. The accessibility variable has a positive influence on the performance variable, which means that increasing accessibility will contribute positively to increasing performance. The impact of accessibility on performance is statistically significant at the 95% confidence level and the P-value is less than , so the null hypothesis (H0) is rejected.

Based on the results of the hypothesis test, it shows that the statement on the dominant facility variable is that the safety service standards for passengers and goods at Patimban

Subang Port are adequate. The facility variable has an influence on the performance variable of 0.286, so that improvements in facilities will contribute positively to increased performance. The impact of facilities on performance is statistically significant with a confidence level of 95% and the P-value is smaller than , so the null hypothesis (H0) is rejected.

Based on the results of the hypothesis test, it shows that the most dominant statement on the digitalization variable is that requests for cargo ship services via the Inaportnet system at Subang's Patimban Port can be fulfilled quickly. The digitalization variable has an influence on the performance variable, so that increasing digitalization will contribute positively to increasing performance. The impact of digitalization on performance is statistically significant, with a confidence level of 95% and a P-value smaller than , so the null hypothesis (H0) is rejected.

Based on the results of hypothesis testing on the joint impact of the variables accessibility, facilities and digitalization on performance, it shows statistical significance with a P-value smaller than , so the null hypothesis (H0) is rejected.

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