THE STRATEGIC DEVELOPMENT OF MARITIME CONNECTIVITY IN THE BORDER AREA IN INDONESIA

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ABSTRACT

Indonesia is an archipelago where eight out of 38 Indonesian provinces are characterized by islands. Thus, the connectivity between islands is substantial in supporting economic development. This research aims to display the possible maritime connection and excavate the obstacles to improving maritime connectivity in the area. This research is qualitative comparative research using the Miles and Huberman model and analyzes it with the Graph Connectivity Node theory, comparing it with actual nodes in the areas and materializing the possible challenge and obstacles in connecting the nodes using RCA and 5 Whys Analysis as the tool. The data is obtained through two ports located in Kepulauan Riau Province. The research finds that the obstacles in connecting the node are infrastructure, budget, and interconnection with other forms of transportation. Therefore, the impact of this research on improving the node lies in the policy to overcome the obstacles encountered.

Keywords: economic development; connectivity node; Archipelago; maritime connectivity; strategic development

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INTRODUCTION

The Border Area is a strategic area that has a role in maintaining the integrity of the country's territory so special management is needed to provide legal certainty regarding the scope of the country's territory, the authority to manage the

country's territory, and the sovereign rights of the country (Muzwardi *et al.*, 2020). The border area is a strategic area to maintain the country's territorial integrity, so special management is needed (Itasari, 2020). Thus, the integration of border area communities can encourage capital mobility which plays an important role in developing border areas (Efriani, 2020).

The border area of Indonesia has a strategic position in regional and global geopolitics and geoeconomics. On the one hand, this position provides great opportunities for Indonesia, but on the other hand, it also provides various challenges and threats. The border areas of Indonesia in general consist of water areas. With the condition that the majority of the borders are water, it is necessary to build strong maritime connectivity so that the flow of both domestic and international trade becomes smoother and more efficient (Li, 2017). In addition, maritime connectivity is a connecting line that integrates archipelagic areas through the development of a solid sea transportation component. This is what later became the basis of the "sea highway" program in Indonesia. The sea highway program aims to distribute goods evenly throughout Indonesia, especially to areas that fall into the underdeveloped, outermost, and remote categories (Nur *et al.*, 2020) to improve equality based on the Indonesian economic concept based on the Family Principle (Rizaldi, 2022). Thus, the sea highway program in Indonesia seeks to build effective maritime connectivity so that it can guarantee logistical distribution throughout Indonesia and facilitate commercial access abroad (Kurniawan, 2022). The Riau Archipelago is Indonesia's border area which has maritime boundaries with Vietnam, Cambodia, Malaysia, and Singapore. Thus, sea traffic becomes the life center of the economy in the region.

That is why an integrated development strategy is needed so that economic development can be carried out on an ongoing basis. This is important to do so that both domestic and international traffic of goods and people can run smoothly and efficiently (Al Syahrin, 2018). This is in accordance with the Sea Highway program designed by the government, so that inter-island connectivity and affordability can increase so as to increase development equity and create maritime security in Indonesia (Gultom, 2017).

LITERATURE REVIEW

Specifically, several studies on connectivity in economic development show that integration between areas has an important role in accelerating economic development. Wang *et al.* (2019) found that the transportation network plays a vital role in stimulating demand and economic boom in China. This is because China is experiencing a delay in industrialization. Meanwhile, Baniya *et al.* (2020) research on trade networks on the New Silk Road found that initiatives in belt and road development increased trade flow between related countries. This shows that network connectivity and the nodes built in the network become a catalyst in economic development so that it is transformed into a form of sharing economy that has the potential to advance economic ecosystems as a result of increasingly efficient distribution in Germany (Wruk *et al.*, 2019). The same thing was stated by Ter Wal (2013), where development is directed into a triadic form, namely building connectivity with partners of partners so that they are directly connected to form a triad (a set of three nodes) in a network that has the potential to strengthen one another. Connectivity development is directed to be even. The development of uneven connectivity has the potential to clog distribution channels as stated by Deng *et al.* (2022) in the port network along the Yangtze River. Therefore, exploring the key factors in constructing and developing network connectivity is necessary.

However, based on previous research, no research has explicitly explored maritime connectivity, and it is necessary to conduct research to fill the gaps. Thus, this research focuses on the possibility of maritime connectivity that can be built at the research location and explores obstacles in the development of maritime connectivity in the Riau Archipelago. Therefore, the novelty of this research is a strategic recommendation for overcoming obstacles so as to maximize maritime connectivity in the Riau Archipelago. This research is comparative qualitative research. This research was conducted by comparing the concept of Graph connectivity nodes with actual connectivity in the research area. After comparisons were made, the existing obstacles were identified using Root Cause Analysis (RCA) with 5 Whys analysis as the analytical tool. This is an effort to maximize

maritime connectivity in the research area so that network nodes are developed optimally and evenly.

METHODOLOGY

Qualitative analysis is an analysis tool used in this study. The analytical tools in this study consist of observation and analysis of discourse studies and literature studies. The purpose of using qualitative methods in this study is to compare actual maritime connectivity with the theory of Graph Connectivity so that an optimal and integrated strategy for developing maritime connectivity can be formulated (Creswell, 2009). Observations were made to obtain visual information related to the condition of the port at the research location regarding the shape and condition of the port, which is part of the connectivity node. While analysis of discourse studies and literature studies is used to look at stakeholder perceptions of problems and obstacles to port development as maritime connectivity making it a historical and infographic basis which is then compared with the Graph Connectivity Node theory.

The technique used in data analysis uses the model from Miles and Huberman. The model from Miles and Huberman divides the steps in data analysis activities into several parts, namely data collection, data reduction, data display, and conclusion and verification. In the first model analysis, both primary and secondary data were collected based on categorization according to the problem which was then developed to sharpen the data through further data searches.

Next, data reduction was carried out. Data reduction is a form of analysis that sharpens, classifies, directs, discards unnecessary data, and organizes data in such a way that final conclusions can be drawn and verified (Miles, Huberman & Saldana, 2014). Data reduction takes place continuously as long as the activity has not been terminated. The product of data reduction is a summary of field notes, both from initial notes, expansions, and additions in accordance with the objectives of the activity. After obtaining the data as needed, the data presented is carried out. Data presentation is a series of information organizations that allows research conclusions to be carried out. The presentation of data is intended to find meaningful patterns and provide the possibility of drawing conclusions and providing action (Miles, Huberman & Saldana, 2014). Presentation of data in the form of narrative sentences, pictures/schemes, networks, graphs, and tables as the narrative.

The verification and conclusion stages are part of a complete configuration activity (Miles, Huberman & Saldana, 2014). The conclusions were also verified during the activity. Conclusions are drawn since the researcher compiles records, patterns, statements, configurations, causal directives, and various propositions. In addition, after drawing conclusions, recommendations will be given so that the development strategy can be implemented in a directed and integrated manner. The implementation of data analysis using the Miles and Huberman models can be seen in Figure 1.

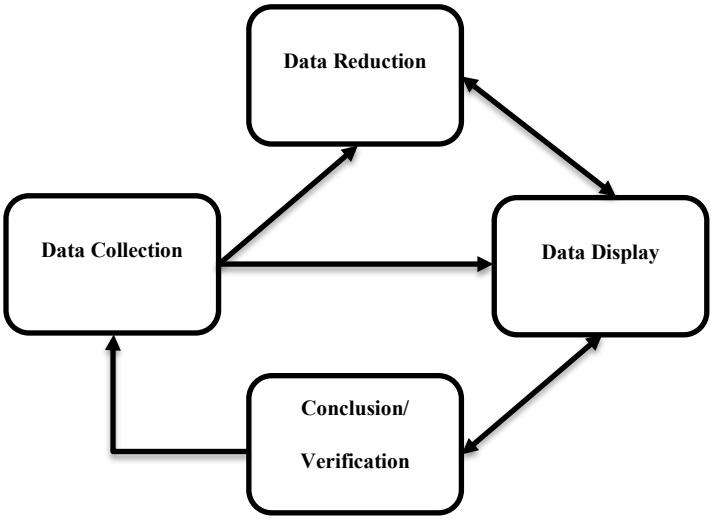

Figure 1. Miles and Huberman's Data Analysis Techniques

This research was conducted in Riau Archipelago Province which has 28 passenger ports and four container ports. In this study, there are two ports that are being studied, namely the Dompak Passenger Port and the Malarko Container Port. The two ports were taken as the subject of study based on similarities, namely that they were built by the Ministry of Transportation of the Republic of Indonesia and have not yet been operationalized. Data collection in this study was carried out during 2020-2022 by observing the conditions of the port development stages which are part of this study.

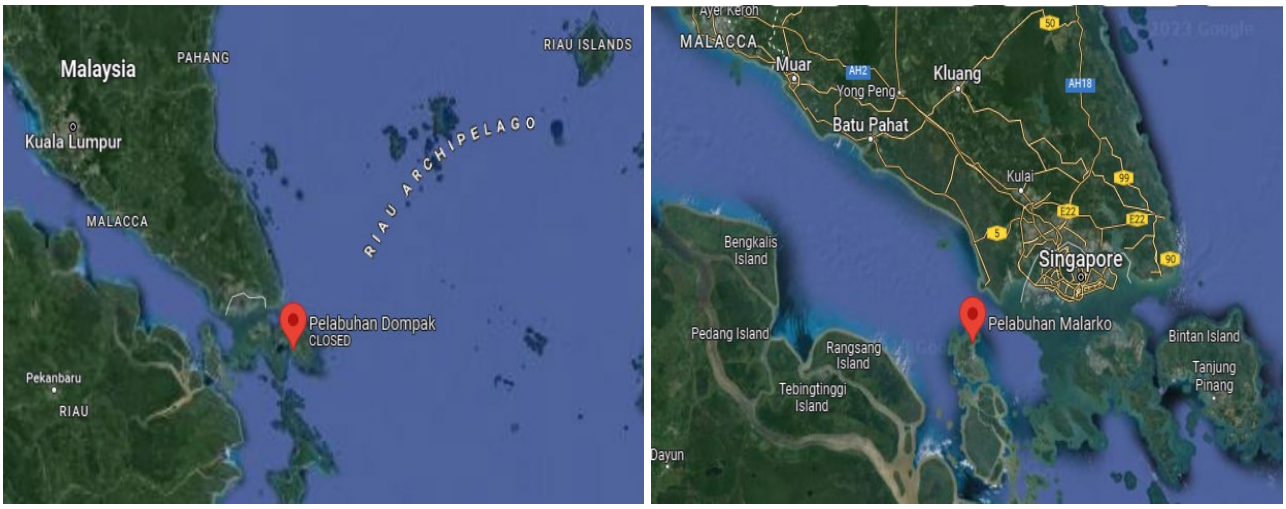

Figure 2. Research Locations of the Dompak Ferry Port (Left) and the Malarko Container Port (Right)

After knowing the connectivity of the Malarko port and the Dompak port, the root causes of the delay in port development are explored using Root Cause Analysis (RCA) with the 5 Whys Analysis method as an analysis tool (tool). As Katherine et al. (2008) stated, Root Cause Analysis (RCA) is an analysis framework used to determine the systemic causes and prevent recurrences of adverse events. In addition, RCA is useful because RCA methods provide tools to speed up the work of the process engineer troubleshooting an abnormal situation, and the review should help in selecting appropriate methods (Lucke *et al.*, 2022). Besides that, RCA should be done immediately. This is in accordance with the opinion of Williams (2001), which states that after the error or variance occurs, a root cause analysis should be performed as soon as possible. Otherwise, important details may be missed.

The analytical tool used in this study is the 5 Whys Analysis in the opinion of Peerally *et al.* (2016) RCA is not a single technique. Rather, it describes a range of approaches and tools drawn from the field including human factors and safety science that are used to establish how and why an incident occurred in an effort to identify how it was, and similar problems might be prevented from happening again. Furthermore, the 5 Whys analysis attempts to reveal the hidden influence of a distant cause, which illustrates the importance of digging deeper into a causal pathway (Card, 2016). The RCA method uses the 5 Whys Analysis Technique which can be seen in Figure 3. **Figure 3.** The 5 Whys Analysis technique as an RCA analysis tool

Figure 3. The 5 Whys Analysis technique as an RCA analysis tool

DISCUSSION

The Riau Archipelago Province is the main connectivity node of Indonesia's sea transportation gateway in the Western Region. As a connectivity node, the Riau Archipelago has a sea transportation component consisting of nodes/nodes, vehicles/modes of transport, and ways/networks/shipping routes. There are three main modes of transportation in the Riau Archipelago: Ro-ro Ferry, Ferry (fast boats), and speed boats. The three types of ships cover almost all domestic areas. Meanwhile, for international shipping with Riau Islands connectivity to Singapore and Malaysia, Ferry (fast boat) is used. Thus, it can be seen that the

port is a maritime connectivity node in the Riau Archipelago that functions both as a container cargo port and a passenger crossing. The geographical conditions of the Riau Islands Province can be seen in Figure 4.

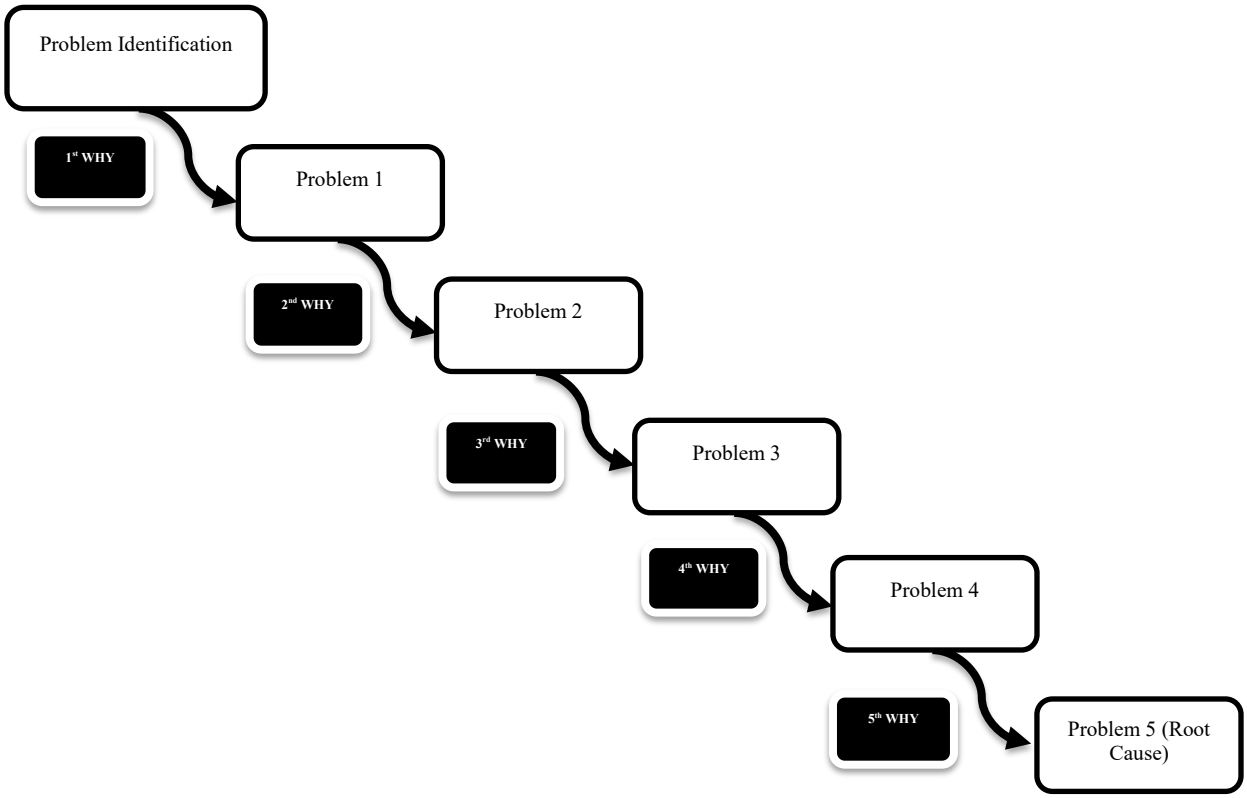

Figure 4. Geographical Conditions of the Riau Archipelago
Source: (Profil Dinas Perhubungan Kepri 2019, 2019)

Figure 4 displays the geographical conditions of the Riau Archipelago, consisting of islands. The port is the heart of transportation in the Riau Archipelago, so the existence of the port becomes a symbol of development in the region. The mobility of goods and people is mostly carried out by ships. Thus, it can be understood that almost all ports in the Riau Archipelago are multipurpose ports so that they can efficiently accommodate the delivery of goods and crossings simultaneously. In the Riau Archipelago, Batam Island is the busiest city and the center of port connectivity nodes. The location of Batam Island is strategic because it is close to international sea lanes, namely the Malacca Strait and the Singapore Strait, and has geographical proximity to ASEAN countries, which total 640 million people. With so many investments from Singapore, this area has become part of Singapore's maritime connectivity so the relationship between the ports of the two regions is very close. Singapore places the Batam port as its feeder port so that exports and imports of goods to and from Batam depend highly on Singapore.

On the other hand, Karimun Regency is an area that has the most strategic location for port development in the Riau Archipelago. The Karimun area has close proximity to Johor and Singapore and is directly opposite the Mega Port Tuas Harbor in Singapore. However, port development in this area is relatively slow and experiencing problems, especially cargo ports which still rely on ports owned by foreign private companies in the Free Trade Zone and Free Port of Bintan and Roro Port in Parit Rempa which are managed by regional business entities. The construction of the Malarko International Cargo Port has been halted due to legal constraints, namely land acquisition on the land side. Meanwhile, the construction of the Dompak International Port in Tanjungpinang City was hampered because there was no agreement between the central and local governments. The

map of international shipping in the Riau Archipelago is shown in Figure 5.

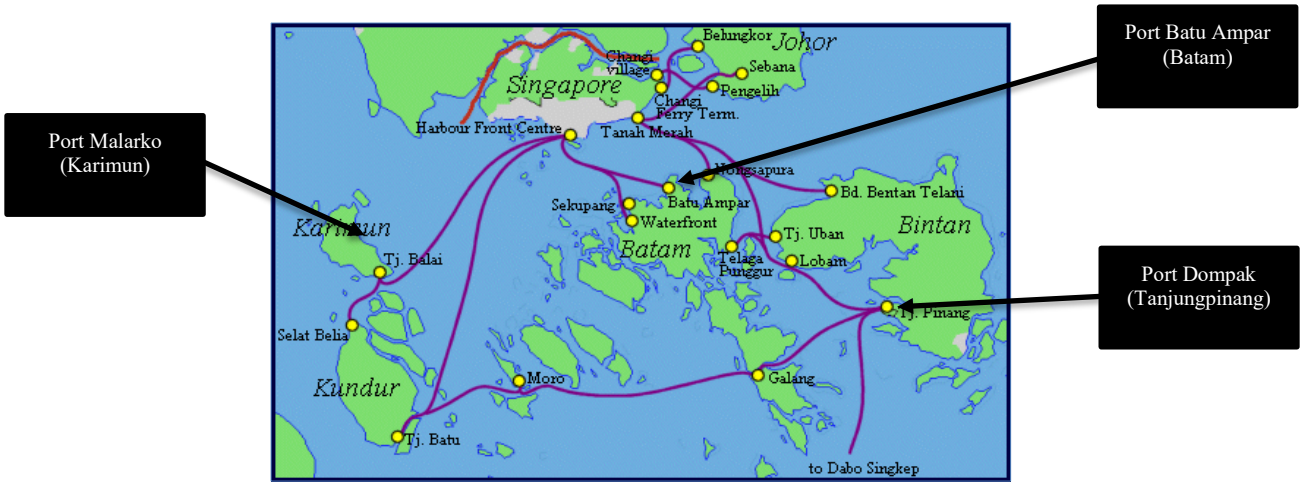

Figure 5. Map of International Shipping in the Riau Archipelago
Source:(https://www.vnbp.org/archive/galang/batam/Galang.htm, n.d.)

Dengan Thus, based on Figure 5, the maritime connectivity nodes at the Port of Malarko (Karimun) and the Port of Dompak (Tanjungpinang) based on the theory of Simple Graph Connectivity can be built from both Malarko-Singapore and Malarko-Malaysia as well as Malarko-Batu Ampar-Singapore and Malarko-Batu Ampar Malaysia. Likewise, the Dompak port (Tanjungpinang) can be built from Dompak-Singapore and Dompak-Malaysia. Figure 4 shows the maritime connectivity pattern of Malarko, Dompak, and Batu Ampar ports with Singapore and Malaysia. Maritime connectivity pattern application based on the simple graph concept at Malarko port and Dompak port can be seen in Figure 6.

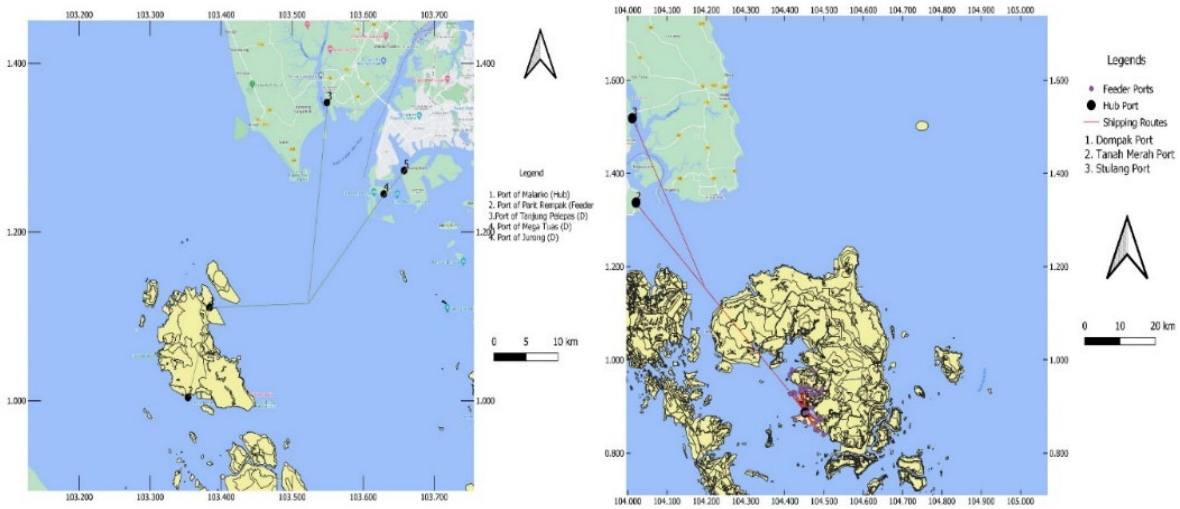

Figure 6. Simple Maritime Graph Connectivity Pattern, pattern application at Malarko Port (Left) and Dompak Port (Right)

Thus, it can be seen from Figure 6 that infrastructure development plays a vital role in maximizing maritime connectivity nodes in the Riau Archipelago province. Infrastructure contributes to the regional economy and promotes economic development directly and indirectly. Economic growth is an important part of economic development, so economic growth is one of the main targets that must be achieved as a multidimensional process that includes various fundamental changes to social structure, societal attitudes, and national institutions while continuing to pursue economic growth acceleration, handling income inequality, and poverty alleviation (Todaro, 2012). The main goal of development is to create the highest GNP growth rate, eradicate poverty, overcome income inequality, and provide employment opportunities and better education.

This can be achieved through integrated infrastructure development. The importance of the availability of infrastructure makes the government the authorizing party to provide infrastructure. The government also requires a very large budget to realize comprehensive and sustainable infrastructure development plans. This is in accordance with the opinion of Li & Ma (2022), where transportation infrastructure investment can reduce bilateral transportation costs between connected locations, which has a direct effect on the spatial distribution of economic activity through three main channels, namely (i) trade in goods, (ii) population migration, and (iii) travel thus encouraging economic growth (Kurniawan, 2022).

However, there are obstacles in port infrastructure development. Until now, the two ports have been unable to continue infrastructure development. The construction of the Dompak Port has been halted since 2017 and the Malarko Port has been halted since 2012. This shows serious constraints in port infrastructure development. An overview of problem identification with the 5 Whys Analysis can be shown in Figure 7.

Figure 7 explains the root causes of the problems at Malarko Port and Dompak Port. Based on the analysis, several obstacles hinder the development of port infrastructure. Based on the problem identification stage with the 5 Whys Analysis, why has the Malacca Port has development stopped and cannot be operationalized? The results of the 5 Whys Analysis found that there were construction problems, namely the condition of the pier construction site, which required reclamation and strengthening of the foundation base, which had a greater value than the initial plan. This condition requires land preparation which is worth a big budget. On the other hand, the Ministry of Transportation, as an institution providing the development budget, has not been able to provide additional funds due to changes in price escalation. The Karimun Regency Government, which was involved in the construction of this port, has no plans to continue the construction of the wharf because the Karimun regional budget has been absorbed for development on the land side of the port, namely the construction of offices and land access roads.

In particular, the Malarko Port is constrained by technical construction problems where the length and width of the pier and tidal conditions, cause changes in budget estimates to become larger. This led to land acquisitions that were larger than previously estimated, causing an overbudget, so the budget stopped completely. Locatelli (2018) states that one of the causes of overbudget is a technical factor, namely in this case forecasting errors, especially in estimating tide conditions which cause errors in the construction of the pier. Therefore, proper cost budget control is needed so not only that it can promote smooth development, but also achieve the set economic goals (Jiang, 2020).

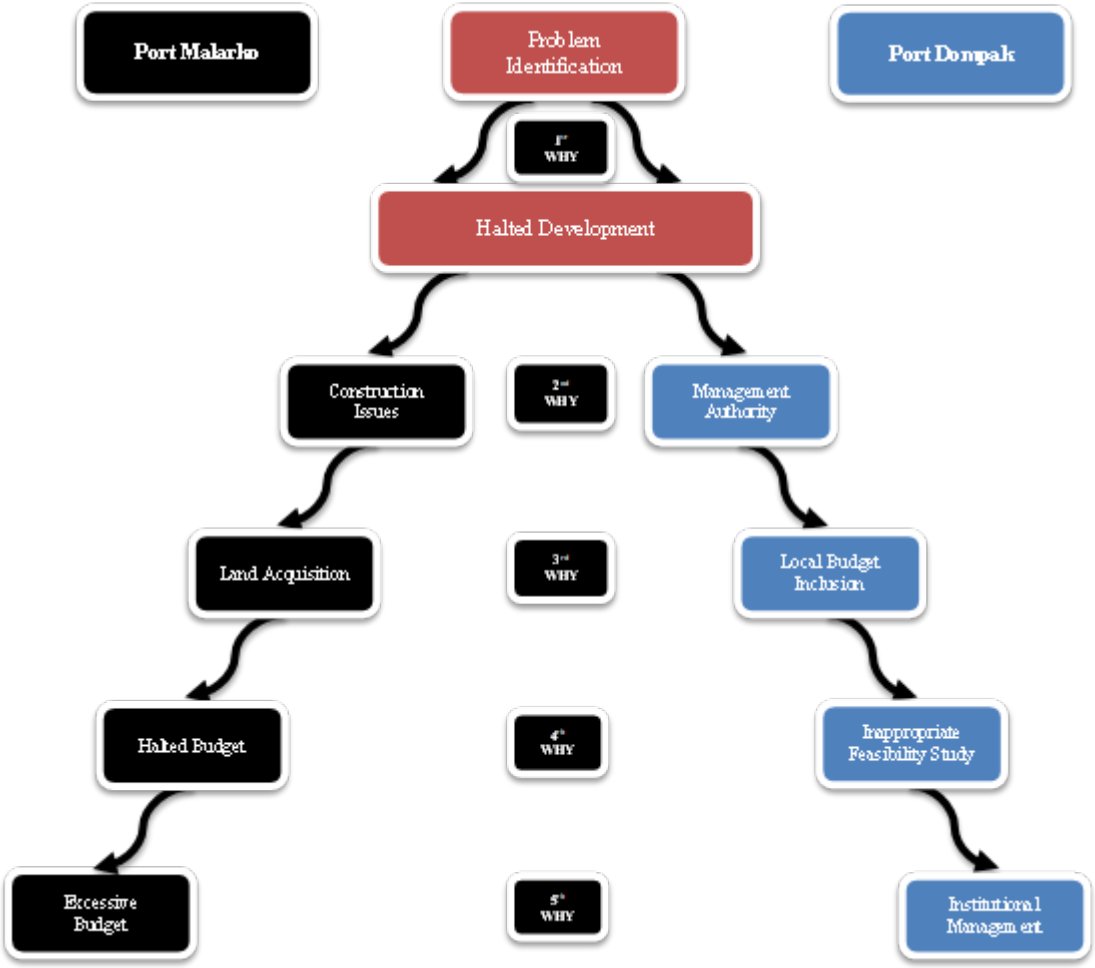

Figure 7. Identification of issues with 5 Whys Analysis

Meanwhile, the Dompak Port, based on the results of the 5 Whys Analysis, found that there were infrastructure development constraints due to differences in perceptions of the port development budget. This difference is a matter of authority between the central government and local governments. This problem often occurs in infrastructure development built by the central government. Based on the central government's budget structure posted to the Ministry of Transportation, the construction of the Dompak Port pier infrastructure is wholly the task of the Ministry of Transportation while the Riau Islands Provincial government has the authority to prepare a feasibility study and land acquisition. The difference in duties and authorities is an obstacle because there is no initial contract related to capital participation, so the institutional aspect of this work contract does not strengthen the ongoing cooperation between the Ministry of Transportation and the Provincial Government of the Riau Archipelago. This problem became a big obstacle when the Ministry of Transportation stopped construction due to a lack of budget. This obstacle ultimately led to an initiative from the Riau Islands Provincial Government to continue the construction of this port. However, this initiative created differences of opinion between the central government and regional governments regarding the authority to manage ports. This happens because there are efforts by the local government to take over development so that there will be regional asset participation.

Meanwhile, the central government wants the port to remain under its control of the central government. Planning studies conducted have not clearly explained this. Therefore, it can be seen that there is no clear institutional management related to Port asset management. Conflicts of interest in managing port assets can occur due to economic factors, namely income from asset management (Mustajib & Perdana,

2022).

CONCLUSION AND RECOMMENDATION

The Riau Archipelago has a large water area and many islands. To build an inter-island maritime connectivity network, a strategy is needed that has priority in building a solid maritime network, starting from building port nodes, shipping lanes, and means of transportation that can overcome maritime connectivity obstacles. The obstacle faced in building the most crucial port node is infrastructure. It is important to make joint efforts between the central government and local governments in overcoming problems of land acquisition, budgeting, and division of authority so that infrastructure development runs smoothly and is integrated to maximize the economic potential in the Riau Archipelago.

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