Analysis of Factors Influencing Container Shortage in Tanjung Priok Port, Jakarta

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Abstract:- The pandemic has put pressure on global maritime supply chain activities resulting in slowdowns and delays. This is reflected in the container crisis, which has caused a shortage of containers at Indonesia's busiest port, Tanjung Priok Port. This study aims to identify the factors that contribute to container shortages based on the perspectives of strategic partners who are considered a relevant source of information on the phenomenon. The study also seeks to determine the extent of the impact of container shortages and identify appropriate solutions. The study employs a qualitative, descriptive methodology and utilizes Nvivo software to provide a comprehensive visualization of the data. Seven informants were selected for this study using purposive sampling. The data collected through interviews revealed that the shortage of containers was caused by congestion, lockdowns, trade imbalances, container imbalances, demand and supply imbalances, and a shortage of vessel space. Based on the analysis, the lockdown has had a significant impact. The shortage of containers has disrupted export activities with the highest coverage level, and container repositioning is the most effective solution compared to others.

Keywords:- *Container, Shortage, Export, Supply Chain.*

I. INTRODUCTION

The economic and trade sectors are growing rapidly, and a well-functioning logistics system is crucial for smooth trade. Container sea transportation plays a vital role in connecting producers with consumers, leading to an increase in demand. Indonesia, being a maritime country with a vast sea area, has enormous potential for economic development. Changes in the geography of global trade are apparent, with developing countries playing a significant role in economic growth and seaborne trade [1]. Shipping goods by sea, using containers as a cost-effective shipping method, has become one of the primary ways to transport manufactured products worldwide.

Trade between countries heavily relies on shipping, with ships being a key means of transportation. Export and import activities have a significant impact on economic growth [2]. Therefore, it is important to pay attention to the development of the maritime transportation sector, which is closely related to the economy of countries, including Indonesia, due to its large sea area. Tanjung Priok Port, situated in North Jakarta, is Indonesia's busiest port, handling over 30% of the country's non-oil and gas commodities and facilitating 50% of the flow of goods in and out of Indonesia. In 2018, the port's loading and unloading capacity reached 7.5 million TEUs.

The Covid-19 pandemic in 2020 disrupted global supply chains and international trade activities, including maritime transportation, which heavily relies on container usage. The pandemic caused a significant increase in production and trade, leading to market imbalances and container shortages at various ports [3]. The world container index showed significant movement, with container prices exceeding $10,000 in September 2021 [4]. Despite the negative impacts, the global economic recovery from the pandemic seems to be progressing faster than anticipated. Containers experienced the highest increase in the last 10 years., as shown in figure 1.
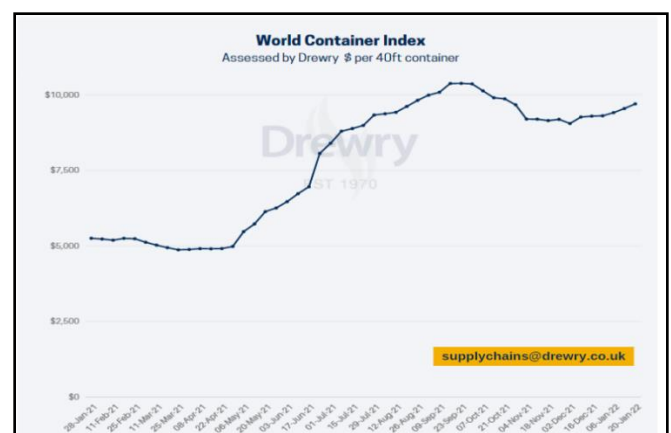

Fig 1. World Container Index

The International Monetary Fund (IMF) has projected a global economic growth of 5.5% in 2021, which is an increase of 1.8% compared to 2019. This growth is driven by faster-than-average growth rates in developing countries. Additionally, global seaborne trade is expected to exceed 2019 levels, with an increase of 0.5% to 12 billion tonnes in 2021, indicating annual growth of 4.2% [5]. The Indonesian government has prioritised economic recovery. The government has implemented various policies to mitigate the impact of the Covid-19 pandemic on the economy, both at the micro and macro levels. These efforts, combined with the world's adaptation to the new situation, have gradually revitalised the trade sector.

Fig 2. Foreign Trade Development Data

According to the Minister of Trade Lutfi, as reported in an article by [6] Indonesian exporters face a monthly shortage of approximately 5,000 containers due to high demand resulting from the international trade war during the Covid-19 pandemic. Shipment data via the Tanjung Priok port, referring to the BC 1.1 document for 2021, shows an 8% increase in imports and a 5.02% increase in exports, reflecting the trade dynamics in Indonesia that year.
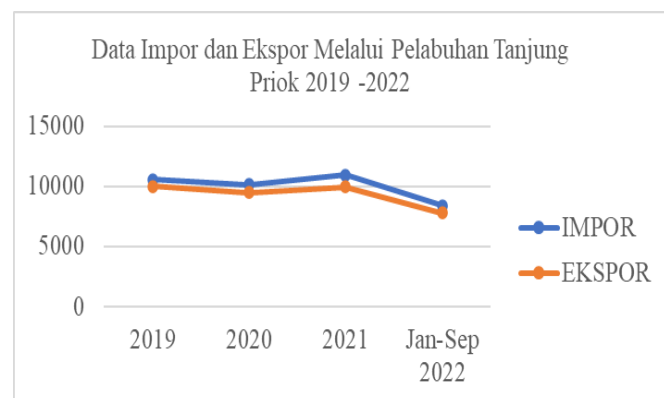

Fig 3. Import and Export Chart in Tanjung Priok Port 2019-2021

II. LITERATURE REVIEW

A. Management

According to George Terry, management is a unique process consisting of planning, organizing, mobilizing, and controlling actions carried out to determine and achieve predetermined targets through the use of human resources and other sources [7].

Meanwhile, according to Ricky W. Griffin, management is the process of planning, organization, coordination, and control of resources to achieve goals effectively and efficiently[8].

According to Kreitner, management is a process of working together with and through others to achieve organizational goals effectively and efficiently using limited resources in a changing environment [9].

From the several definitions above, the author concludes that management is a process to achieve common goals in accordance with those that have been determined through a continuous process of planning, organization, control, and control.

B. Microeconomics

Microeconomic theory is a field in economics that studies the behavior of individuals, both consumers and companies, as well as determining market prices and the quantity of inputs, goods, and services traded in the market. Microeconomics interacts through individual markets, considering scarcity and government regulations [10]

Microtheory can be defined as the smallest economic science because it is based on models and the scope of analysis in economics [11]

Micro theory attempts to study general balance to maintain overall market balance at the same time [12]

➢ Supply

In economic terms, the supply of goods and services can mean that an individual or group of people is willing to sell some goods or services in a certain period and price level [13]

The definition of supply according to Sudarmanto is defined as some goods and services offered or sold by producers to consumers at a certain time and price level [14]

➢ Demand

Demand itself can be interpreted as the desire or desire of an individual or group of people to be able to obtain some goods or services, accompanied by the ability to buy them at certain conditions and a certain price level [15]

Based on the opinion of [16] demand in microeconomics can be defined as the number of goods or services that consumers are able and willing to buy during a certain period under certain conditions.

Meanwhile [17]believes that demand is economic goods that consist of some goods and services that consumers want to buy in a certain period, time, and price level. This period can be one year and the circumstances that must be taken into account include the price of goods purchased, consumer income, number of dependents, tastes, etc.

From the theory above, the author concludes that the smallest part of economics is management economics which discusses how businesses are run and examines individuals as consumers and companies as producers who interact and work with each other in carrying out economic activities.

Most individuals in society do not allocate their economic resources independently and centrally and manage their economic resources jointly between households and companies, then economists study the interaction of the two sectors, in simple terms the interaction of the two sectors occurs in demand and supply.

C. Supply Chain Management
Pujawan and Mahendrawathi explained that supply chain management is a network of several companies that work together to create and deliver products and services to final consumers. Some of these companies include distributors, shops or retailers, suppliers, factories, and supporting companies such as logistics service companies [18]

According to Stevenson, supply chain management is strategic coordination that aims to integrate demand and supply management [19]

According to Russell and Taylor and Chase et. Supply chain management is a supply chain consisting of a continuous organization of resources, a process that creates and delivers products and services to end customers [20]

From the several definitions put forward by the experts above, it can be concluded that supply chain management is a flow of activities that are integrated between materials, information, resources, and other supporting parties such as logistics services to get goods or services to end consumers effectively and efficiently.

D. Scarcity
Scarcity is a situation where resources to meet needs are very limited in number while human needs are unlimited [21]

In economics, the definition of scarcity can be divided into two meanings:

- Scarce means that human needs are many and cannot be met, while the available resources or objects are limited, so scarcity occurs.
- Scarce in the sense that humans need to make sacrifices to fulfill their needs, because of limited economic resources or means of satisfying needs [22]

According to economist Roger Arnold from California State University, scarcity is part of economics where every person or society is based on the fact that desires are greater than limited resources to fulfill their desires [23]

III. METHDOLOGY

This research uses a descriptive qualitative approach, as explained by [24]. A qualitative approach in this research was used to explore and understand central symptoms, namely the factors that influence the scarcity of containers. To achieve in-depth understanding, the author conducted interviews with research participants, asked general and rather broad questions, and collected information in the form of text or words for analysis.

Determining informants in this research uses a purposive sampling technique, taking data sources in the form of informants with certain considerations [24]determining the informant, the author assumes that the informant is considered to know best and is able to provide the desired information and is considered to have power and authority in the social situation or object under study.

Informants in the form of strategic partners related to the container shortage that occurred at Tanjung Priok Port, will then be used as primary data through in-depth interviews in order to obtain adequate, relevant and valid information. These informants include:
- Mediterranean Shipping Company (MSC)
- Ocean Network Express (ONE)
- Tanto Intim Line
- Port authority
- INSA (Indonesian National Shipowners Associatoion)
- PT New Priok Container Terminal One (NPCT1)
- Indonesian Forwarders Association (ALFI)

This research focuses on an in-depth understanding of the factors that influence container scarcity, with the author going into the field and interacting directly with related parties or strategic partners. Research data is collected and analyzed during the research process.

This qualitative approach seeks a deep understanding of the phenomenon or reality under study, by exploring the meaning of what happens in natural settings. One of the characteristics of qualitative research is exploring phenomena in depth through interviews, observations and direct experience.

This research also uses descriptive research, as explained by Sukmadinata (as quoted by [25]. Descriptive research aims to describe phenomena in detail based on existing facts. In this context, descriptive research is used to reveal in detail the factors that influence container scarcity.

Overall, this research seeks to reveal various in-depth and detailed details of the phenomenon studied, namely the factors that influence the scarcity of containers, through analysis of interview results, data, direct observation and documentation. A qualitative and descriptive approach was used to investigate this issue holistically.

IV. RESULTS

This research interviewed seven strategic partners related to the container shortage as informants, they came from shipping companies, container terminal companies, port authorities, shipping business associations, and Indonesian logistics and forwarder associations. The names of strategic partners used in data processing are MSC, ONE, Tanto, OP, NPCT1, INSA, and ALFI. Data from the seven informants was compiled in transcript form then imported into Nvivo 12 software and then analyzed.

One of the NVivo software features for displaying text visually is Word Frequency Query. This feature helps writers display the frequency of interesting and informative words. Based on search results using this feature, it is known that the word "container" dominates informant conversations with a percentage of 2.80% of all data, followed by the words "scarcity" and "vessel".
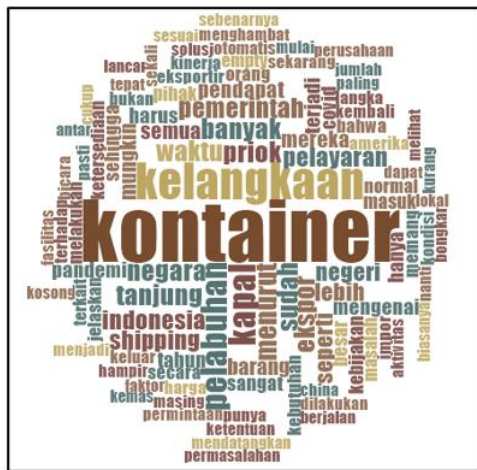

Fig 4. Words that appear frequently in the data

Then the text search query feature is applied to help understand the words in the word cloud above. In this research, the author intends to understand the use of "container shortages" which is the most dominant word and also the keyword in this research, presented in the form of a word tree.
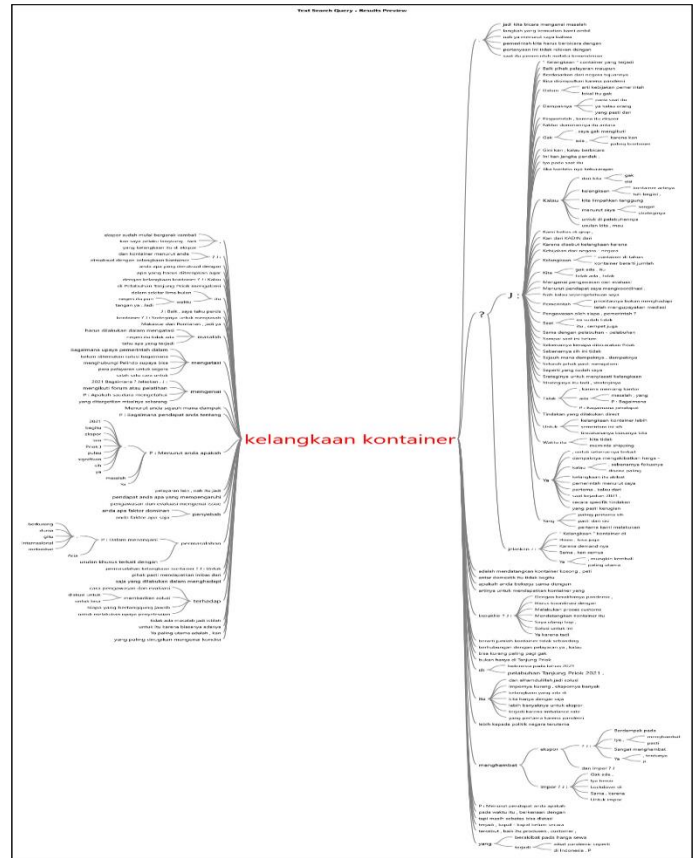

Fig 5. Word Tree of the use of the word "container shortages"

By exploring the word tree above, it is found that the shortage of containers is generally caused by congestion, lockdown, trade imbalance, container imbalance, demand and supply imbalance, and scarcity of vessel space. then the factors resulting from the word tree exploration are displayed in the project map.
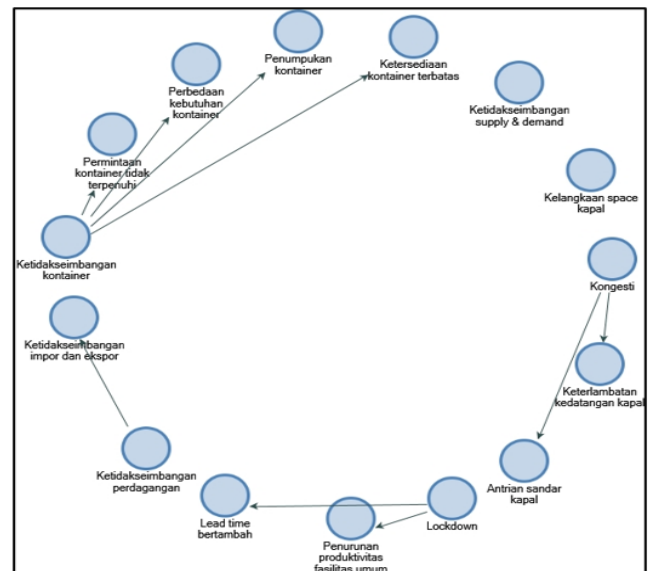

Fig 6. Project map of factors causing container shortages

From the project map above, it is known that congestion has child nodes, delays in ship arrivals and ship berth queues, the lockdown has child nodes, decreased productivity of public facilities and increased lead time, then trade imbalance has child nodes, import and export imbalance and then container imbalance has 4 child nodes, namely unmet container demand, differences in container requirements, container buildup, and limited container availability.

Furthermore, the project map above can be presented using a hierarchical diagram. It is known that the informants consider lockdown to be the factor that has the greatest influence on container shortages, followed by supply and demand imbalances and trade imbalances. The pandemic-related lockdown affected the domestic sector due to the disruption of international supply chains where a country was still dependent on imports and it was found that an average of 64 countries experienced a significant decline in supply chains of around -30.2 percent [26] The following is a hierarchical treemap diagram of factors that influence container shortages
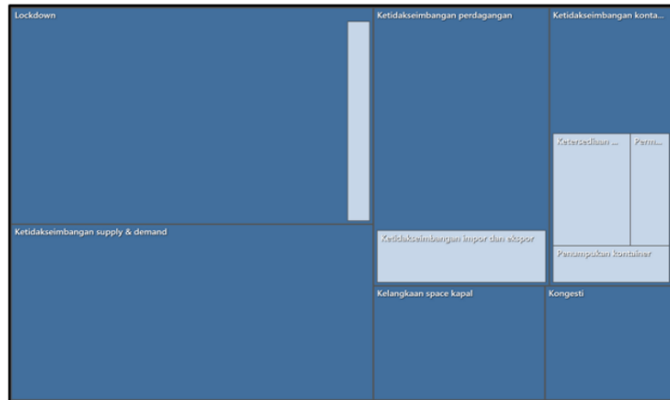

Fig 7. Hierarchical Tree Map Diagram of Factors Influencing Container Shortages

By using the coding by attribute value chart feature, the percentage of factors causing container shortages for each informant can be explained as follows:
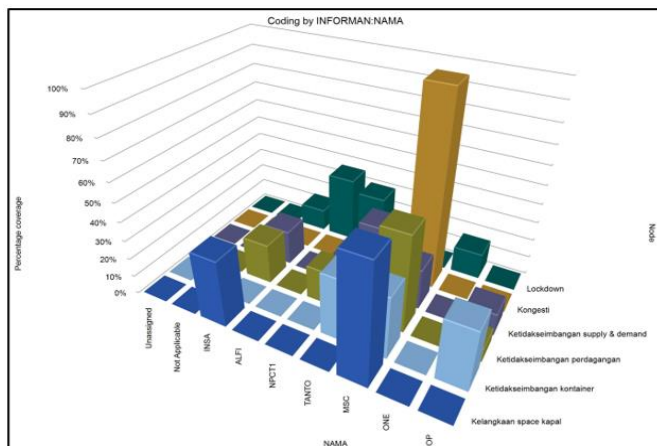

Fig 8. Coding themes for each informant

Knowing the extent of the impact of the shortage of containers, the author uses two Nvivo 12 features, namely first, the hierarchy chart feature to determine the trend of analysis in the form of visualizations that have the smallest to largest parts, secondly, the coding chart by attribute value which is used to determine the percentage of themes for each informant.

Fig 9. Hierarchy diagram of the impact of container shortages

After processing the data using a Hierarchy chart, it was found that the impact of container scarcity includes disruption of the export process, harm to entrepreneurs or exporters, increase in container tariffs, decrease in company income, harm to the government, and disruption of container circulation followed by the dominant impact, namely disruption of export processes or activities, export disruption or disruption. Export activities have a central influence, through the coding by attribute value chart feature used, the theme percentages for each informant are obtained as follows.
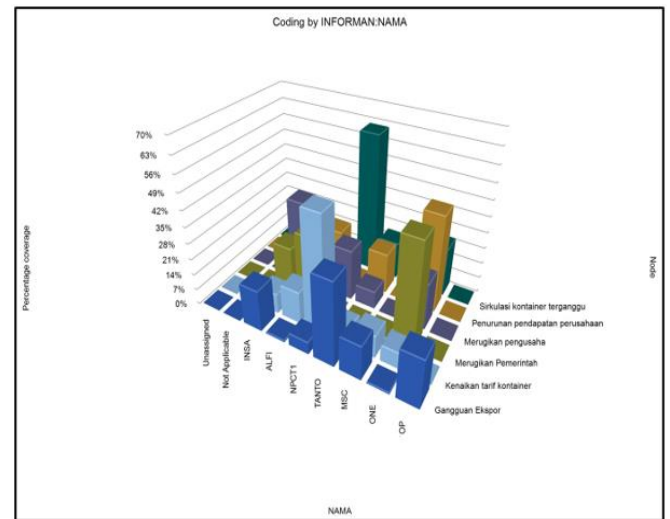

Fig 10. Coding themes on the impact of container shortages for each informant

Based on the results of data processing using the hierarchy chart feature, it was found that there are nine points

in overcoming container shortages including repositioning, government policies related to regulations, coordination with shipping lines, coordination with foreign agents, coordination with associations, government mediation with shipping lines, efficiency of the customs process clearance and expansion of domestic shipping lines by serving international routes, repositioning containers is considered a central solution based on the views of informants, repositioning containers from other ports in Indonesia or outside Indonesia is considered the chosen strategy to overcome the shortage of containers at Tanjung Priok Port.
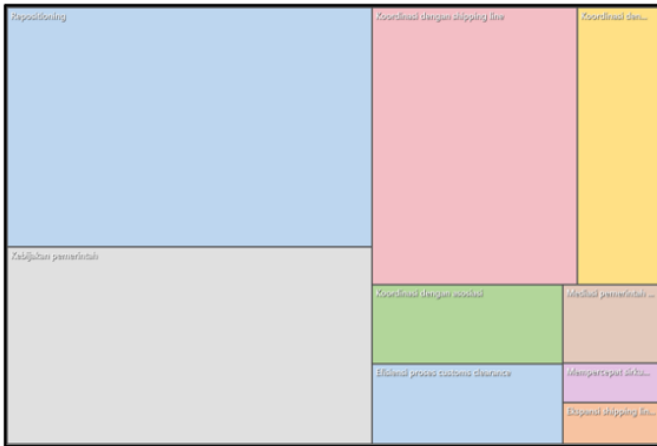

Fig 11. Hierarchy diagram of solutions to overcome container shortages

The percentage of solution themes for each informant with Chart coding by attribute value to facilitate the interpretation process is obtained as follows:

Fig 12. Coding themes for solutions to overcome the shortage of containers for each informant

V. THE DISCUSSION

➢ Based on the movement of empty containers entering the Tanjung Priok port from five terminals, it shows that the need for imports of 40' empty containers is greater than 20' and 45' sizes, that there are differences in the types of import and export containers for imports tend to use the 20' size. because imports are mostly raw materials, while exports are finished goods, so exporters prefer standard 40' or high cube containers because they are considered more economical.

➢ The imbalance in demand and supply due to the pandemic increased ocean freight and during the pandemic, it was a time when shipping lines saw increased profits, the General Manager of the Mediterranean Shipping Company (MSC) in Indonesia explained that "because demand is so high for America compared to other countries So the trading strategy of shipping companies is to flock to provide containers and ships with destinations to America as the main priority, then secondly to Europe and thirdly to intra-Asia.

➢ In 2021, vessel visits at Tanjung Priok Port decreased by around 5.36% from the previous year, with the reduced frequency of vessel arrivals to Tanjung Priok Port affecting the availability of vessel space for transporting containers.

VI. CONCLUSION

• In the period before and after the pandemic, it is known that the need for imports of 40' empty containers is greater than 20' and 45' sizes. The difference in trade structure at Tanjung Priok Port where import activities are dominated by 20' containers is related to the category of goods to be exported. tend to require 40', 40' HC, and 45' container sizes because they are considered more economical than using 20' containers. Due to the additional logistics costs of using this type of container, exporters for export activities tend to choose 40' standard and 40' high cube container sizes so It is known that container shortages occur in 40' standard and 40' high cube container sizes.

• Six main factors influence the shortage of containers at Tanjung Priok Port, including lockdown, supply and demand imbalance, trade imbalance, container imbalance, shortage of vessel space, and congestion.

• The central factor influencing the shortage of containers is the lockdown in many countries, causing the productivity of port activities to decrease and disrupting the supply chain.

• It was found that the six main impacts of the container shortage include disruption of export activities, increase in container tariffs, harm to entrepreneurs or exporters, disruption of container circulation, decrease in company income, and harm to the government.

• The nine solution points for overcoming container shortages, the one with the highest level of coverage, namely repositioning, was considered the strategy most frequently expressed by informants.
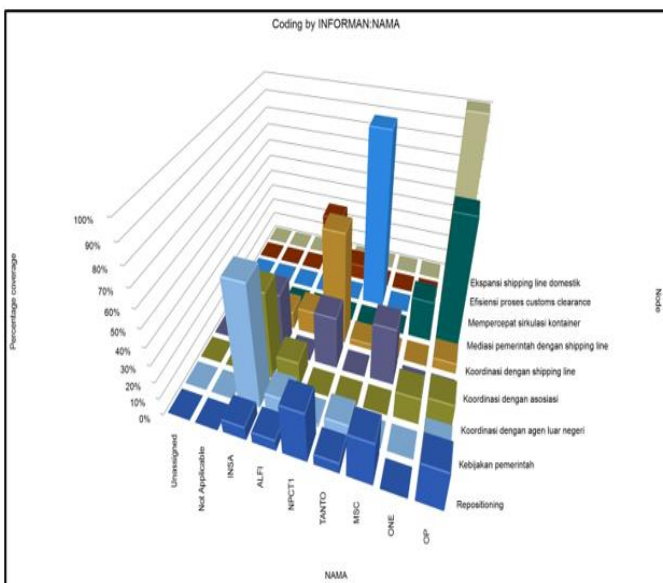
THE RECOMMEDATION

- There is a need to attract international shipping interest in bringing containers to Tanjung Priok port by creating the development of a competitive port ecosystem.
- Encourage domestic shipping companies to play in the international market, thereby reducing dependence on foreign shipping companies considering the high increase in exports.
- There needs to be arrangements to balance the needs of exporters with the needs of certain container sizes by collaborating between shipping lines and the government.
- There needs to be cooperation between large exporters and micro, small, and medium enterprises by sharing ship space and containers for the same purpose because large exporters tend to have long-term contracts with shipping lines.
- Shipping lines and governments need the ability to quickly adapt and be responsive in dealing with sudden environmental changes such as disease outbreaks, war, and natural disasters by implementing strategic management and regular evaluation.

IMPLICATIONS

A pandemic or disease that is endemic in an area can disrupt mobility or community activities that affect the supply chain because the export trend tends to be surplus and there is an imbalance in the need for import and export containers, a strategy to narrow the gap between demand and supply is very necessary by managing internal and external factors to improving the domestic logistics system in the face of increasingly tight business competition.

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