

MARINE PORT SUPPLY BASE DEVELOPMENT IN TOK BALI INDUSTRIAL PARK, KELANTANR.T Wing Shin¹, E.Z.A.Engku.Daud², M.H. Abdul Rahman³

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ABSTRACT

Oil product is the main commodity in maritime international market. As one of the oils and gas exporter, the country demand adequate support from industries to fully utilised the resources in order to become competitive in global trade. The urge towards support facilities for oil and gas industries become vital to enhance the productivity of oil and gas. There are three supply base port that support the oil and gas industries in Malaysia. The researcher focus is toward the one that located in Tok Bali, Kelantan. The Tok Bali Supply Base officially commence in July 2015. There are three phases for the development of Tok Bali Supply base port. The first and second phase mainly cover the oil and gas sector. The third phase will cover on the general cargo sector. The other researcher concern is the ECRL project. With the new government in helm, the ECRL continue the project with several adjustment with the number of terminals. Fortunately, the new ECRL route still covers the Tok Bali area. Yet, the facilities provided did not have a clear concept and implementation. With qualitative method that used by the researcher to interviews with the expertise in that course may help to visualise the development concept on the Tok Bali Supply Base port.

Keywords: oil and gas, development, supply base, facilities, international market, project, support facilities

1.INTRODUCTION

This research is to study the new port development at Tok Bali Supply Base (TBSB), Malaysia. Kelantan located at east coast in peninsular Malaysia. Tok Bali is a small fishing village located at the north east area of Kelantan state near to Besut, Terengganu.

Tok Bali Supply Base get authorisations from Malaysia's government in January 2015, established and started the operation in July 2015. According to The Edge Market [1], Ahmad Zaki Resource Berhad (AZRB) has acquired the 51% stake in Tok Bali Supply Base commence in January 2019 from Matrix Reservoir Sdn Bhd still remains the stake at 49%.

There are three phases of development at Tok Bali Supply Base. The first phase and the second phase mainly covers the development of oil and gas facilities and operation. Whereby, the third phase cover the development of general cargoes requirements.

Currently, Tok Bali Supply Base acquire five vessel's berths, equipped and support by 5,000 square meter bonded warehouse, administration offices such as government agencies and from the private entities, agencies supplying water and bunkering operation, customs and all relevant government administrative. However, government link companies with supporting offices also can be founded or located at this base area.

To compare with other marine supply bases in Malaysia, Tok Bali Supply Base is considered as one of the newest in the industries. With merely five years in operations, the operator still remains rooms for better development and growth to support the oil and gas industries in Malaysia especially for Malaysia-Thailand Joint Development Area, North Malay Basin and the Malaysia-Vietnam Commercial Arrangement Area. As the research progress, the researcher will be able to identify the current and future developments of Tok Bali Supply Base.

Before the oil exploitation, Kelantan is one of the poorest states in Malaysia. Currently, Kelantan being blessed by oil and gas industry. The Tok Bali Supply Base cover Malaysia-Thailand Joint Development Area, North Malay Basin and the Malaysia-Vietnam Commercial Arrangement Area. The researcher felt that there is something missing regardless of the industry growth in cargo facilities and operation to support the local industries in Kelantan.

2. THE DEMAND FOR MEGA-SHIPS

This chapter will cover about the seaport and the development toward it. There are several aspects that need to be touch on this chapter regarding the new designated seaport at Tok Bali, Kelantan. In recent decades, the maritime industry has made significant contributions to the world economy. The UNCTAD reported "Maritime Review by 2015" shows that approximately 80 percent of global commodity trade was completed in volume across ports and maritime transport routes. Chin, et al. (2012) stated that seaport research has identified strong patterns in the evolution of research topics. This mostly exposes trends in port management and operations such as government plan, evolution in technology and administration approaches. In general, the evolving trends identified in the 2000s capture shifting management environments that the port industry has being implemented. For example, the arise of greater inter and intra-port competition whereby ports incorporation into logistics and supply chains, growing private sector participation due to port privatisation, and directing possibilities for future port study. "Ports are often responsible for multimillion, or even billion, dollar capital projects that range from terminal developments to bridge replacements in the port's area" Yusuf, et al. (2014).

Marine Sea-Port is one of the vital infrastructures to support the maritime and logistics industry in a region. The business will be able to be facilitated on the industry regarding to the port development. Alderton, (2008) stated that seaports are area that support facilities for berthing and anchoring ship and also place to transfer goods from ship to shore or ship to ship by using equipment. Kennedy et al. (2010) write that the operation of a jetty and others port facilities, operation of port travelers for transport, operation of cargo loading or unloading, haulage and warehousing services within a port area is defined as a port. Seaport daily business is described as cargo handling activity, operated by a specific company (gang or team), involving of labour and machines. Dismukes, (2014) mentioned that the ports play a vital role in supporting the offshore oil and gas exploration and manufacturing sector and the maritime industry as a whole. At ports, vehicles supporting offshore platforms (especially ships and helicopters) are located and maintained. The port also provides the storage, transfer and lift points for the necessary structures, equipment, supplies, personnel and other elements that are essential for offshore installations. Offshore exploration and production activities are highly dependent on these goods and services and thus ports are vital for the industry as a whole.

I. Types of Seaports

Seaport have their function regarding to the design and main industry in that area. Some seaport possesses adequate water depth so that big vessel can enter and berthing at the port. Pettit and Beresford [8] described port functions vary in terms of demand and the transition from basic gateways to bigger and more complex logistics hubs. The port's role depends on the type of supply chain in operation and on the overall characteristics of supply and demand. The determination of short and long-term planning that can be used to ease the use of assets is based on the characteristics of supply and demand. Often

the characteristics of supply and demand are the uncertainty between the different levels as well as different product types. There are several types of port that serves their specific purposes to support the logistics industries.

Container Port. Thanks to globalisation developments in economic trade around the world, containerised trade has increased significantly in recent years. In general, container ports tend to play a significant role in a country's trade and economic activities, can defined container ports serve as a key center for the efficient flow of containerised cargo. In general, they deliver the primary interface for demand and supply forces to communicate and serve as essential marketplaces for consolidating and discovering the physical trade of containerised shipping capacity between buyers and dealers. Container ports provide the primary interface where physical exchange between buyers and sellers of containerised shipping capacity can be consolidated and realised. The port will therefore become the focal point for containerised cargo flows if the port operator can complement and add value to the shipping lines and shipper's objectives quoted by Yap, (2014). According to Caldeirinha et al. (2013) the containerised cargo has grown rapidly with the hinterland and the growth of transshipment in ports at the entrance points of shipping lanes and inland economic centers. The demand for port container terminal increases due to traffic growth in container terminals, demanding more investment in new terminals, rising competition between nearby port terminals and within the same port, questioning customer's loyalty based on their search for satisfaction maximisation.

Oil and Gas Port. An oil port is a port that can accommodate giant oil tankers. It is a deep-water harbour that can receive, load, offload, and store oil. The storage for crude petroleum in oil ports is usually temporary cite by Market Business News.

Inland Port. A dry port is the port that located inland. Dry port is more like supplementary port that support containerisation industry. Cullinane, (2013) wrote "while the development of the maritime scope of the port's operating environment is clearly identified and reasonably widely studied, far less attention has been paid to the port's spatial growth of its hinterland (other than simply its expansion". Reference made by Padilha, (2011) wrote that the successful implementation of the dry port concept will have the mutual effects of reducing congestion, leveraging the pressure on storage space and reducing port handling, as well as lower the transaction costs for shippers. Design and architecture of port require certain criteria for commercial and social aspect. The Port development involves the components in port, which is the harbour, wharves, container yard, custom area, administration area, terminals, and the loading bay. A harbour is a protection and relief location, a small bay or another sheltered piece of a water area, usually very well secured against rough seas and strong flows, and sufficiently deep to dock ships and other specialities. It is also a location where port services such as comfort for boats and shipping facilities are provided cited by Sadeghi, (2012). Container Yard. Martin, (2012) stated that increasing the physical size of container ships demand the container terminals to provide deeper water, wider quays and cranes with greater coverage and height to allow more containers across and higher deck stacks. A decent container yard area should be able to cater the daily demand of container that enter the port so that the container will be placed properly. As for the Roles of any seaport, it play a vital roles to the nations and the industries. The flow of economic development cannot progress without a decent port in a country. The role of ports in global commerce and shipping decides how ports could enhance or weaken countries' economic development and maritime trade. The effect of globalisation on port choice and how changes in logistics and distribution patterns influence the development or decline of ports.

As for the National Economy perspective, seaport play a crucial role in sea commerce and are the country and region's economic drivers. As mentioned by Patil, (2014) the demand for shipping has led to an increase in the number of ships travelling around the world and visiting ports as well. It is recorded that more than 90,000 vessels are sailing around the world on 3,000 ports. Seaport functionality as an Intermodal Transportation System. As reported by United State Environmental Protection Agency, 92014) seaport act as vital transport hubs that promote the movement of goods to local communities

and markets around the world. Ports can link goods to consumers through the highway system, railways, air transportation and domestic marine highways (water transport routes), as indicated in the figure below. Some ports include seaports as well as smaller inland and intercostal ports which promote goods movement between seaports and local communities. Intermodal transport refers to the transfer of goods between multiple modes of transport. With the increasing Port Related-Employment or business, for example the city of Bremen, Germany, more than 77,250 people were directly and indirectly working based on the seaport created in 2015, the statistics show that the increase of 2.0 % for the 2010 to 2015 analytical period. This relates to 18.4% of the workforce in the state of Bremen in 2015. The main seaport sectors (port industry, shipping, hinterland transport, service providers) alone account for 33,050 port-related workers, 1.7% more than in 2010 cited by Lemper et al. (2015). Referred to Bunkering operation, reference made by Wankhede from European commission, (2018) bunkering is an example of a ship procedure that has been the cause of a number of accidents in the past. Bunkering may be fuel oil, sludge, diesel oil, cargo and so on. Fuel or diesel oil bunkering requires extreme care and alertness to avoid fire accidents or oil spills of any kind. Port Competitiveness remains one of the vital aspects in order to sustain in the business. Some of port are built by government, but after some period the government start to privatise the ownership of the port so the government can reduce their expenditure on for the port's operational cost. This issue has emerged in a more general sense with relation to economic competitiveness, in particular on the growth of developed port with liberalisation and adjustment. Enhancing productivity is crucial to increasing the economy's underlying growth rate and enhancing living standards. The level of competition between competitors in a market will depend on the level of competition, the structure of the costs of the business, the degree of specialisation, the price shifting, and the strategic goals cited by Jagan Jeevan, (2011). The future of seaport is an idea toward greener, sustainable and environmental-friendly style. With proactive in green sustainability efforts or approach, the industries can be sustained strategically in term of profit and operation in the international trade and business. Zawawi et al. (2013) indicated that developed western countries like Germany and the United States make extensive use of information technology in their logistics activities and are therefore considered to be the most advanced logistics players. Meanwhile, developing Asian countries like Singapore also enjoy the benefits of IT as their logistics operators are gradually pledging to implement IT systems into their organisational operations. For example, Port Simulation. Simulation is the process of imitation, vision of real event that been applied into software to see the result based on the variable Despite the growing popularity of other mixed-integer modelling methods, port simulation still made substantial gains in the past five decades and has enhanced its drive in port and terminal research. Simulation has been a very valuable and successful decision support method for port developers due to its ability to produce swift and reliable solutions to a multitude of port-related problems, while its effectiveness has been mostly proven in port operations cited by Dragovic (2016). Matters on Electrification of Port. Dhupia S. (2013) stated that electrification projects around the port areas, like use of automated cargo handling system, energy optimised cargo handling, electrification of railroad access and use of hybrid vehicles in and around the port area have been discussed which allow for a general reduction in pollutant emission and improves the surrounding air quality. With the proper development and approach, this kind of innovation will lead to a better port operation in term of gas emission. The utilisation of electricity for ship operation can support the campaign for green power usage. We move on to remote Pilotage. According to Gralak, (2010) the E-Navigation design will include the Remote Pilotage Application. In the first stage of its development, RPS should be a navigational aid intended for the traditional pilotage system. It is very tough to predict the future progress of RPS, but the program could be expected to develop in two key directions. Firstly, the build-in framework. Whereby, the ship's information will be sent to shore data processing centers and the main ship navigation aid decisions will be taken onshore. Secondly, the distribution system. The distribution system will be focused on the design of smart ship self-organizing systems that will allow information to be transmitted between the other ships and that will be able to digest data and support navigator decision.

Smart Container initiative cited by Katulski, (2014) indicated that the proposed new container monitoring system approach has a dual concept design. The system's basic concept is the Smart Container Module (SCM), which is designed for container installation and should essentially be an integral part of each container. The Ship / Port Subsystem with its self-operating container control network is another system term. Benchmarking the standard to build and develop a competitive and progressive a port is to benchmark the modern seaport that had been established around the world. There are several of guideline in order to build a seaport and sustain in the industries for decade. Darwin Marine Supply Base, northern Australia, Rigzone, (2015) reported that officially running the supply base is in May 2014, the Northern Territory Government owns the Marine Supply Base and runs the ASCO Company, a firm that specialising in marine logistics and maritime supply bases around the world. The government has invested \$110 million in three assigned berths for the offshore supply and service sector and a hardstand of 4000m² for cargo preposition. This dedicated building has reduced ship's turnaround time from 24 hours to 12 hours. Stated by The Territory. As for Mussafah Offshore Supply Base. Baxter, (2015) stated that the center, with its modern facilities, occupies 148 hectares of fully developed land alongside the stream. The organization is well-placed to meet the challenge of supporting the region's oil and gas industry in an age of modern technology. ESNAAD owns and operates a comprehensive logistics support center in Mussafah, Abu Dhabi that spans over 1.4 million square meters to meet the target industry's current and future needs. The facility operates 24 hours a day throughout the year and is designed with highly sophisticated fire detection and fire lighting system, providing security round the clock through an access control protocol. Based on researcher view, Songkhla Petroleum Support Base in southern east part of Thailand. Petroleum Development Support Base (PSB) is the subsidiary of PTTEP International. It is the only dedicated supply base supporting oil and gas industry in the Gulf of Thailand. It operates year-round, 24 hours a day. The base facilities include six-berth jetties, warehouses, open storage yards, bulk storage tanks and silos, cold storage, workshops, and a waiting area for inbound and outbound for lorry drivers. Whereby in Kemaman Supply Base in the state of Terengganu, East coast of Malaysia. Stated by Zuraimi et al. (2013) KSB is stationed in Terengganu and started operations in 1982 as an onshore support base exclusively dedicated to the maintenance and supply of offshore oil operations. It was designed and developed exclusively as a comprehensive logistics supply base for the offshore oil exploration and production industries of Peninsular Malaysia. Due to the current natural shelter and the 850-meter breakwater built as a protection from the seasonal east and south-east winds, KSB is an all-weather port. The 360-meter quay with an 8.0-meter depth allows it to receive 5 to 6 supply vessels at any time. All of these berthing facilities are dedicated to the specialized use of supply vessels and cargo traffic correlated with oil and gas. Over 220 petroleum supply and service companies operate at KSB with varying degrees of manufacturing and technical service capacity. It is the largest concentration of established petroleum producers in Malaysia.

3.METHODOLOGY

The main reason of this research is to determine the future development of port supply base at Tok Bali, Kelantan. The researcher would identify the current development and facilities provided in that area. It also gives the opportunity to the researcher to get to know about the current problem at the place and to give suggestion improvement for the future purpose.

This chapter discussed the details on how the research has been conducted and the methodology used by researcher. It is important to study in the details for the research and methodology in order to obtain good findings. With the proper research method and guidance from the supervisor, the researcher will be able to get an accurate data and information to support the flow of research topic.

Research Methodology. Research methodology is used to obtain data and information for the purpose of research theme. The method that the researcher used to collect the data is from primary and secondary data.

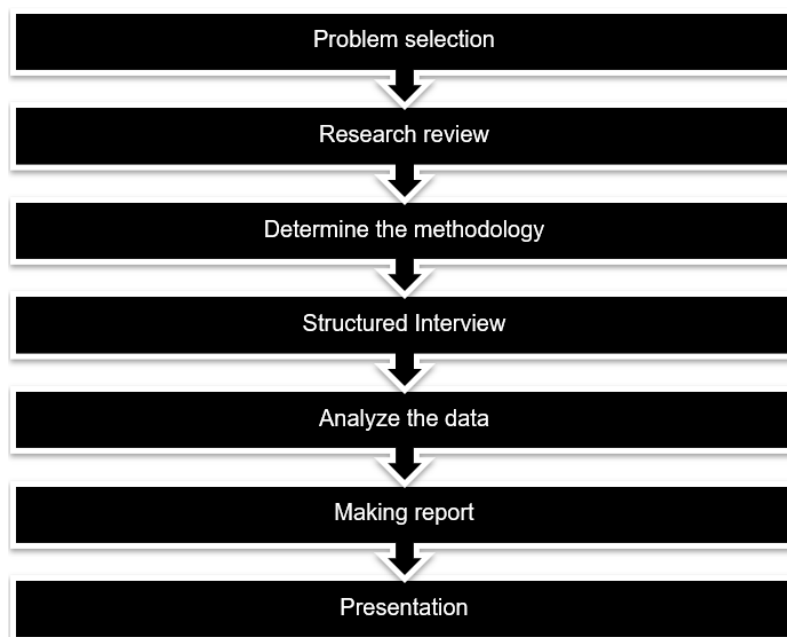
Primary Data. Primary data is an original collection of data collected by the researcher itself. There are various primary data collection method such as questionnaire, observation, interviews and experiments.

The researcher chooses to use both primary and secondary data to collect data. Primary data will be collected through structured interview with the local authorities, private sector and Tok Bali Supply Base top management.

The researcher will ask the questions related to the research topic in order to accomplishes the research objectives. The audio will be recorded from the interview session in order to obtain every information from the respondents.

Secondary Data. The secondary data can be used for references for the researcher to do the research. The researcher can get information in depth on the research related with the objectives. The secondary data to support this study is being taken from articles, books, business magazines and scholar's journals. The previous research stated with the recommendation and problem that will be functional to the researcher as a guidance to conduct the research writing.

Research Procedure. Research procedure is the important part for this research to complete this chapter. This is essential to guide the researcher in completing this project and help researcher in conducting the project is based on the flow chart. This flow chart also helps researcher to keep focus on the objectives and purpose of this research. The flowchart states the problem of the project, review on the existing research and theories, determination of appropriate methodology and research, distribution of the questionnaire, collection of the data, writing the report and presenting the project.



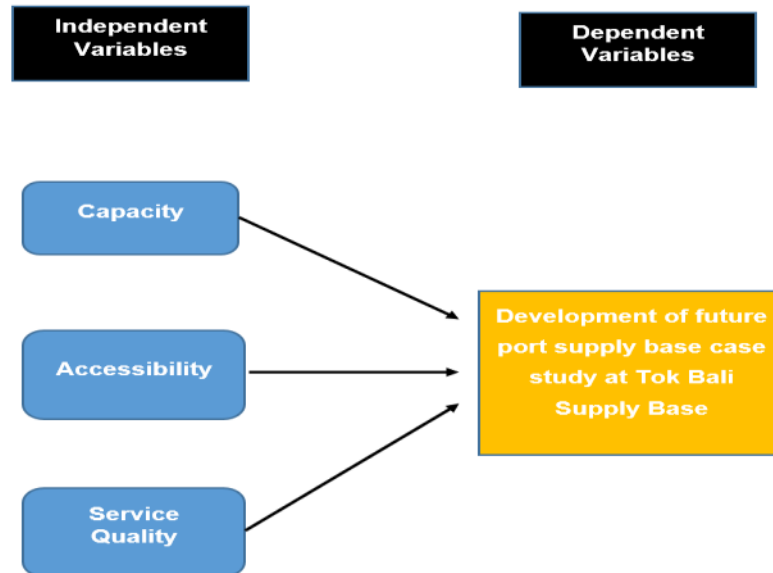


Figure 1: <http://www.krejcie.com>. Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. Educational and Psychological Measurement.

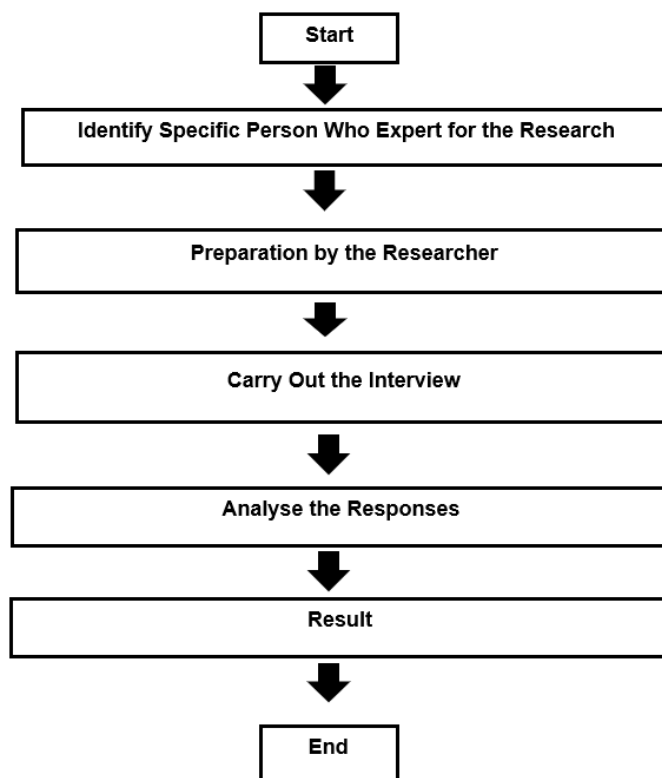


Figure 2: <http://www.krejcie.com>. Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. Educational and Psychological Measurement

4. RESULTS AND DISCUSSION

This part will discuss the results from the interviews to determine the current and future development of Tok Bali Supply Base. Due to the qualitative methodology approach, the researcher collected the primary data by finished the direct interviews at Tok Bali Supply Base. Interviewee Profile. There were five interviews session done with the TBSB staff in order to ensure the reliability of result to support this research. Statistics Solution mentioned that the sample size of should be sufficient to address the research questions. Therefore, the following information are the interview details for all the top management respondents

Themes Description and Explanation. The themes are based on conceptual framework. The 3 variables are capacity, accessibility and service quality.

a) Capacity.

All Top management respondents agreed that the capacity of TBSB will increase in handle the demands of goods and crew's transportation when all four development phases completed. Each phase will have 8 warehouses. Whereby, 6 were normal warehouse and another 2 were chemical warehouse. Next, open yard for every phases. The function of open yard is to store goods like pipelines. Next, Mud plant. Mud plant is for drilling activities. Other than that, TBSB will built maintenance building for every phases. This is to ensure the safety and daily operation to run smoothly with less risks of accidents. The development phase for the capacity as shown by figure below: -



Figure 3: <https://www.tbsb.my/tbmp-published-masterplan/>

- b) Accessibility. The basic criteria of port is to have a decent accessibility by land and by water. Through the interviews done by the researcher, the outcome from respondents were explained. Firstly, land accessibility to TBSB. Currently, land accessibility to TBSB were smooth for the client to transport their goods to TBSB without any delay. In addition, the clients had already analysed the best route to transport their goods for optimised operation. To cater the future demand, the respondent suggested that the authorities to build another lane specifically for industrial vehicles. There was exemption for water accessibility. TBSB had to maintain the depth of water level so that oil tanker ship can berth at the port. The researcher suggested that building of artificial breakwater will encounter the problem regarding to the water accessibility.
- c) Service Quality. The development phase requires a lot of financial investment. With the client's demand, the development pace will run quicker. As a private company, TBSB need to provide sufficient services to the clients so that the Product Sharing Company like Repsol will stay at

TBSB to run their operation. As mentioned by respondent 1, there are 3 aspect that need to be emphasize. Firstly, rate. TBSB will review the negotiation rate for every 3 years to ensure both parties were in agreeable situation. Next, readiness. Readiness in term of facilities and manpower. The facilities need to meet their requirement and Standard Operation Procedure. (SOP). Lastly, Safety. In oil and gas industry, safety is very important. When the situation and operation in TBSB is safe away from hazard and unwanted incident, the clients will feel confident and secure to stay in TBSB.

5. CONCLUSION

The researcher concern about the development of port that act as supply base because they are not recognised as much as the container port or all-purpose port like Johor Port. The supply base also played important roles to support national economy. The development of supply base in Malaysia will benefits the oil and gas industries to improve the production purposely for global demands. With developed supply base, the local industries can growth further to support the employment for the local people.

From interviews and observation made by the researcher at TBSB, the researcher found that Tok Bali Supply Base will be fully developed and will be support by other types of industries in the future.

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