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Port Competitiveness at Sapangar Bay Container Port from Shipping Lines Perspectives in BIMP EAGA Region

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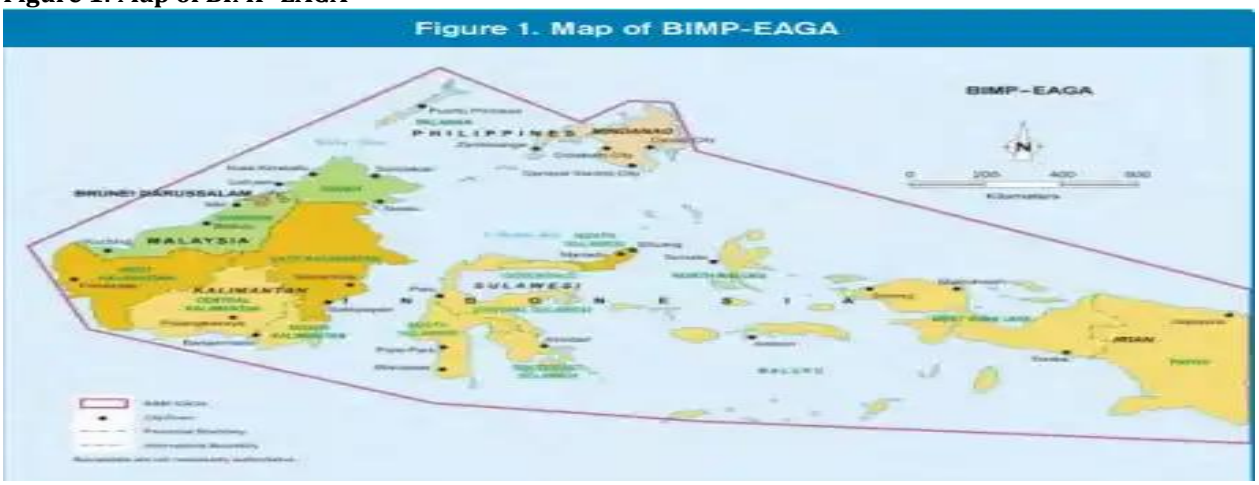
Abstract: Feeder ports in the archipelago of the sub-region of BIMP EAGA often face challenges in terms of connectivity due to the dispersed nature of the islands. Realizing the untapped economic potential in the area and the robust geopolitical landscape that has taken place in the last decades, there is an exigency of the countries in BIMP EAGA to improve their port to be the preferred choice by shipping lines. A port's competitiveness holds a paramount significance for shipping lines to call a certain port. Thus, this study aims to examine the perspective of Main Line Operators (MLO) on the level of importance of the competitiveness of the ports in BIMP EAGA, especially Sapangar Bay Container Port. Ten Main line Operators (MLO) of Intra Asia were selected to respond to the questionnaires using the Analytical Hierarchy Process (AHP). The result revealed that the MLO ranked the most important attributes from top to bottom were port efficiency and facilities (EP), port pricing and support services (PP), Hinterland Characteristics (HC), Maritime Accessibility (MA) and lastly Institutional Regulatory (IR). The specific priorities and preferences of shipping lines in this sub-region may be influenced by factors such as trade patterns, port infrastructure, market demands and overall competitiveness of the ports in the region. The findings of this study contribute to the general understanding of port competitiveness in the BIMP EAGA from the perspective of the MLO and may guide the policymakers, port authorities and industry stakeholders in addressing the specific needs and prioritizing their strategic planning to improve the port.

Keywords: *BIMP EAGA, Port Competitiveness, Main Line Operators (MLO), determinants of competitiveness*

1. Introduction and Background

BIMP EAGA is an archipelago in the subregion of South East Asia which is rich in mineral and natural resources. BIMP EAGA comprises the whole country of Brunei, Kalimantan, East Indonesia, East Malaysia and Southern Philippines. There are many smaller islands remotely situated from their national hub ports and depend very much on sea transportation to distribute the goods needed by the more than 73 million combined population in the region. The transportation of goods to the remote areas depends on a relay transshipment activity where goods are unloaded from a bigger size vessel in a gateway port and loaded onto barges or craft to transport the goods to other smaller ports in the region. Based on a study by BMT AP, (2017) there are approximately 3 million TEUs of containers being distributed in the region. The complexity of the intermodal transportation to distribute the goods and bound by the Cabotage policy of each country makes high logistics costs unavoidable. Realizing the need for a seamless transportation network, especially by sea linkages, the BIMP EAGA road map had drawn up a plan to improve infrastructure at the designated seaports, airports and land routes to connect the rural communities and hinterlands, BIMP EAGA Vision 2025 (retrieved on 25th July 2023). Nevertheless, port development is a capital-intensive program that needs huge investment.

Figure 1: Map of BIMP-EAGA



Source: http://investvine.com/aseans-southern-grouping-gets-active/

In South East Asia, cooperation among the Governments such as ASEAN has established many efforts to address its less developed sub-regions, especially in the aspects of economic growth. Aligned with the purpose of the ASEAN, the Brunei Indonesia Malaysia Philippines East ASEAN Growth Area (BIMP-EAGA) was established in 1994 to address the social and economic development of their less developed and more remote territories. The member countries of the BIMP-EAGA comprise the whole Sultanate of Brunei Darussalam, Sabah, Sarawak and Labuan in Malaysia, North, Central, South and Southeast Sulawesi, Central, East, West and South Kalimantan, Maluku and Irian Jaya in Indonesia; and Mindanao, Palawan of Philippines. The EAGA's biggest challenge is the geographically disjointed area separated by distance and by sea (BIMP EAGA Roadmap to Development, 2006). The areas with vast resources of agri-based and tourism sectors are located on the many smaller islands of Indonesia and the Philippines, thus making the connectivity even more challenging. Most of the Ports in this region depend on the critical mass consolidated at their national hub port where Main Liners Operators (MLO) choose to hub at major ports for more cargo volume to lower their freight cost. The cargo meant for smaller ports around the region will be transported by feeder vessel making the logistic cost higher with double handling and time taken to bring the cargo to its destination.

The implementation of the Cabotage policy by certain regions makes it even more challenging for these smaller ports. For Malaysia, the members of the BIMP-EAGA are Sabah and Sarawak. Located on the Northern side of the Borneo Island, Sabah which shares the border with Sarawak and Northern Kalimantan of Indonesia and with coastlines of 1,387 kilometers long, Sabah is surrounded by the South China Sea in the West, Sulu Sea in the Northeast and Celebes Sea in the Southeast. Due to its long coastline and poor land connectivity, the seaport is the most important mode of transport of goods throughout the State. For a port to meet the challenges of today's demand, the port can be competitively positioned when port users are presented with a competitive offering relative to other connected ports, (Dyk and Ismael, 2015 as cited in Bhatti 2019). With the competing ports along the same geographical areas, it will be a challenge for all the ports to compete due to insufficient cargo volume to achieve economy of scale. It will also depend on the stakeholders to select the port that can best benefit them economically. Yeo, Roe and Dinwoodie (2008) in their study concluded that each group of port stakeholders will tend to evaluate the seaport that is most competitive for them to select and use. This research aims to examine the port competitiveness from the perspective of shipping lines specifically those liners calling to Sapangar Bay Container Port in Sabah.

2. Literature Review

Port competitiveness is defined as a port's capacity to outperform other ports in attracting trade, logistics, transportation, and industrial enterprises (Notteboom et al., (2022). This encompasses the port's aptitude to gain a comparative advantage by enhancing its infrastructure, ensuring top-notch services, and optimizing cost-effectiveness. To bolster port competitiveness, the key strategies involve enhancing operational efficiency, elevating service standards, and implementing cost-reduction measures (Baştuğ et al., 2022). By

pursuing these improvements, a port can position itself as a more attractive and reliable option for businesses and industries seeking to engage in international commerce and logistics activities. According to Prahalad et al. (1990), the competitive edge of a company refers to the core capabilities that enable it to acquire distinct benefits and transform them into lasting advantages, positioning the company competitively within the market.

Porter's, (1990) definition of competitiveness is the ability or expertise that arises from acquiring knowledge, leading to the creation and maintenance of high-performance competition. The competitiveness of a company will position them into unique characteristics that set them favorably by their customers. As stated by Tongzon, (2007), the competition among countries in the area of logistics is growing intense and economic benefits are becoming significant as a result of the increasing trade and investment flows between countries. Hence, in the context of port, port competitiveness is the crucial attribute that enables them to stay competitive in the market. The UNCTAD port competitiveness study focuses on the factors that contribute to the port's ability to attract and retain shipping lines, facilitate trade and improve the global supply chain efficiency. The various factors that mostly influence a port's competitiveness include port infrastructure or port facilities, the efficiency of the port operation, the connectivity to the hinterlands, sustainable practices, institutional and policy frameworks and trade facilitation.

Figure 2: Study by Lin (2008) on the Preference of Port Stakeholders on Port Competitiveness

Decision Maker/ Stakeholders	Criteria
Shippers	Cost, quality of Operations, locations, frequency of shipping services, speed/time, efficiency, facilities, information systems, hinterland connections, congestion
Forwarders	Efficiency, quality of Operations reputation, cost, frequency, location, speed/time, information systems, hinterland connections,
Shipping Companies	Cost, location, facilities, quality of operations, speed/time, efficiency, congestion, frequency of shipping services hinterland links, information systems
Terminal Operators	Facilities, Quality of Operations, cost, location, hinterland connections, information systems, congestion, efficiency connections

Based on the study by Lin (2008) to improve the competitiveness of Keelung Harbor as shown in **Figure 2**, there are similarities in the port competitiveness criteria preferred by port stakeholders, i.e. cost, quality of operations, efficiency, hinterland connections, and location and information systems. Previous research and academia on port selection were studied in detail by Moya et al. (2017) and Steven et al. (2012) as cited in Parola et al. (2017) and concludes that most predominant port selection criteria from the literature in no random order are geographical location, port infrastructure, port efficiency, nautical accessibility, and port efficiency. Osundiran et al. (2001) examine the port choice indicators by stakeholders in Sub-Saharan African countries and conclude that efficiency is one of the critical determinants of port selection. According to Lupi et al. (2019), hinterlands refer to a geographical area where a transportation hub, like a port, provides its services and engages with its users. It represents the portion of the market that a terminal serves within a specific region, compared to other terminals operating in the same area. The hinterland refers to the inland area surrounding a port that serves as the origin or destination of cargo transported through the port. Yuen et al. (2011) mentioned that China and its neighboring countries are striving to position their seaports as a gateway for their respective hinterlands. Port competitiveness is a vital component for them to benchmark and sustain in the market.

Congestion is widely recognized to affect port competitiveness; hence many great efforts have been aimed to improve the efficiency at the operation, policy and research levels (e.g., De Borger, Proost, & van Dender, 2008; Heaver, 2006; Yuen, Basson, & Zhang, 2008; as cited in Yuen et al., 2012). The study by Valls et al. (2020) concludes that the ports in a specific hinterland region that have all the intermodal connectivity will potentially capture more market share. Hence the accessibility of maritime transport to the port and the hinterlands and other modes of transport such as road, and rail connectivity are important to ensure cargo

movement to all these links is efficient. According to Yi and Shu, (2016), a strategically located port can be an intersection of major trunk and feeder systems which provides not only the conventional exports, imports and transit cargo operations but also becomes a logistic hub port for integrated value-added activities. The ultimate goal is to shorten lead time, reduce transportation costs and strengthen international competitiveness. Kim, (2014) reiterated that sustainability practices play a crucial role in moderating the connection between competitiveness, specifically in terms of operational efficiency, service quality and operational performance. This refers basically to ports that prioritize and adopt sustainable practices tend to enhance their overall competitiveness in several ways. Mateus (2019) study on the Port of Lisbon concluded that the divergent interests of land-based and maritime stakeholders stem from their distinct customer expectations. Hence, managing their relationship can be challenging, as disruptions on one side can significantly affect the other, potentially affecting their port competitiveness.

3. Research Methodology

The article forms part of a major study on evaluating the port competitiveness from the industry expert to develop a strategic market positioning of a port in the BIMP EAGA region. The purpose of this study, the Sapangar Bay Container Port in Sabah, Malaysia was chosen to be the case study. The method used for data collection is based on the analytical hierarchy process (AHP). AHP is a multi-criteria decision model that has been used in decision-making, priority rating and performance evaluation (Saaty, 2008). Developed by Professor Thomas L. Saaty in the 1970s, AHP is a structured decision-making method where multiple criteria and alternatives are involved. These comparisons are made using a scale of absolute judgments that represent the dominance of one element over another (Saaty, 2008). The scale is indicated in **Figure 3**.

Figure 3: The Level of Importance and Definition

Level of importance	Definition	Explanation
1	Equal importance	Two elements contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one element over another
5	Strong Importance	Experience and judgment strongly favor one element over another
7	Very strong importance	One element is favored very strongly over another, its dominance is demonstrated in practice
9	Extreme importance	The evidence favoring one element over another is of the highest possible order of affirmation

2,4,6,8 can be used to express intermediate values

In AHP, the consistency ratio (CR) is used as a measure to assess the consistency of the pairwise comparisons made by the experts during the decision-making process. The interpretation of the CR is based on a comparison to a threshold value of less than or equal to 0.1. The purpose of the CR is to evaluate the reliability and consistency of the judgment made by experts and a low CR indicates a high level of consistency, meaning that the judgments are reliable and robust. On the other hand, a high CR suggests that the judgments are inconsistent, which may introduce uncertainty and reduce the reliability of the decision-making process, (Saaty, 2008). The main criteria and sub-criteria of the port competitiveness attributes were studied from the literature review. A set of questionnaires based on the AHP method was developed and a pilot test was carried out with industry experts to test the AHP questionnaires. Based on the consultation of industry experts, the researcher has categorized the port competitiveness criteria and sub-criteria shown in **Figure 4**. Sustainability Practices are excluded in this study to focus more on the basic port competitiveness in the region.

Figure 4: The Criteria Evaluated using AHP

Goal indicator	Main Criteria	Sub- Criteria Attributes	
To determine the most important criteria of Port Competitiveness by the Main Line Operator (MLO).	Hinterland Characteristic (HC)	The availability of import and export cargoes within the local hinterland.	HC1
		There must be a sufficient volume of import and export of goods within the regional hinterlands to be transshipped at the port.	HC2
		There must be an efficient intermodal connectivity within the hinterland to the port and vice versa	HC3
	Maritime Accessibility (MA)	The port must be located in a strategic location, e.g., situated near the international trade lane/point of connectivity to a few hinterlands whether by sea or land transport.	MA1
		The depth of the approach channels to enter the port limit must be sufficient to allow for a safe passage for the transshipment vessels	MA2
		The depth of the approach channels to enter the port limit must be sufficient to allow for safe passage for the transshipment vessels.	MA3
		The sailing frequency of MLO and/or feeder vessels to the port should be consistent	MA4
	Efficiency of Port Facilities And Services (EP)	There must be suitable equipment available to maintain the terminal's efficiency for transshipment vessels.	EP1
		There must be consistent operational efficiency on the quayside and yard for a fast turnaround time of vessels at berth	EP2
		There must be consistent operational efficiency in the terminal (yard area) for a fast turnaround time for haulers.	EP3
		There must be a shorter dwell time and faster turnaround time for containers in port.	EP4
	Port Pricing And Support Services (PP)	The port must have a competitive Port Tariff compared to neighboring ports.	PP1
		There must be efficient cargo documentation clearance by the Port and Authorities.	PP2
		The availability of an electronic single-window system for seamless operation	PP3
		The availability of ancillary services such as bunkering and freshwater supply.	PP4
	Institutional Regulatory Framework (IR)	There must be a clear line of jurisdiction and aligned policies in terms of maritime policy among local Authorities.	1R1
		The Authorities need to ensure security policy is in place to provide safe passage within coastal waters.	1R2
		The Government should provide effective trade facilitation to enhance bilateral trade.	1R3
		There must be political stability in the state to give confidence to investors and to provide a conducive environment for economic development.	1R4

Finalization of the questionnaires was developed and distributed to the respondents by email, and by hand with earlier notification and explanation of the purpose of the study. Ten respondents from the shipping lines operating around South East Asia for the Intra-Asia routing have participated in the study. The target population is those shipping lines or shipping agents calling at least one of the ports in BIMP EAGA. The study

focuses on the container vessels and has made the call to ports in BIMP EAGA as the port of call or as a transshipment port. The respondents are deemed industry as port experts with more than twenty years of experience in the maritime industry. Respondent was selected among Senior Management of the top ten shipping lines and main shipping agents which vessel operating around the Intra Asia ports covering ports in Borneo Island except for Kalimantan. This study sample is confined to container vessels carrying between 400 to less than 2000 TEUs per call. The demographic profile of the respondents is shown in **Figure 5**.

Figure 5: Profile of Respondents (Industry Experts)

Profile of Respondent	Shipping Lines /Shipping Agent
Designation or Position in the Company	Chief Executive Officer, Chief Operating Officer, General Managers (Operation), Marketing Executive.
Age Group	35 to 65 years
Working Experience	More than 20 years in the industry
Operating Fleet/ area of coverage	Intra-Asia
Port of call	Hong Kong, Nansha, Port Kelang, Bintulu, Kota Kinabalu, Muara, Singapore, Manila, Vietnam, Thailand.

4. Results

This section presents sets of results relating to the level of importance of the main attributes of the port competitiveness and also the sub-criteria of the main attributes from the perspective of the shipping lines in BIMP EAGA. Based on the outcomes of the pairwise comparison performed by the industry experts mentioned in **Figure 5**, the Calculation of the importance weightings of the five main attributes is shown in **Table 1** and illustrated further in the chart shown in **Table 1a.**

Table 1: Results of the Level of Importance on the Main Criteria Attributes of Port Competitiveness

Main Criteria	Weightage (%)	Consistency Ratio (%)
Hinterland Characteristic	17.9	
Maritime Access	10.4	
Efficiency Of Port Facility and Services	33.5	1.0
Port Pricing & Support Services	29.7	
Institutional Regulatory Framework	8.5	
TOTAL	100	

Table 1a: Result of the Level of Importance of the Main Attributes in Chart Form

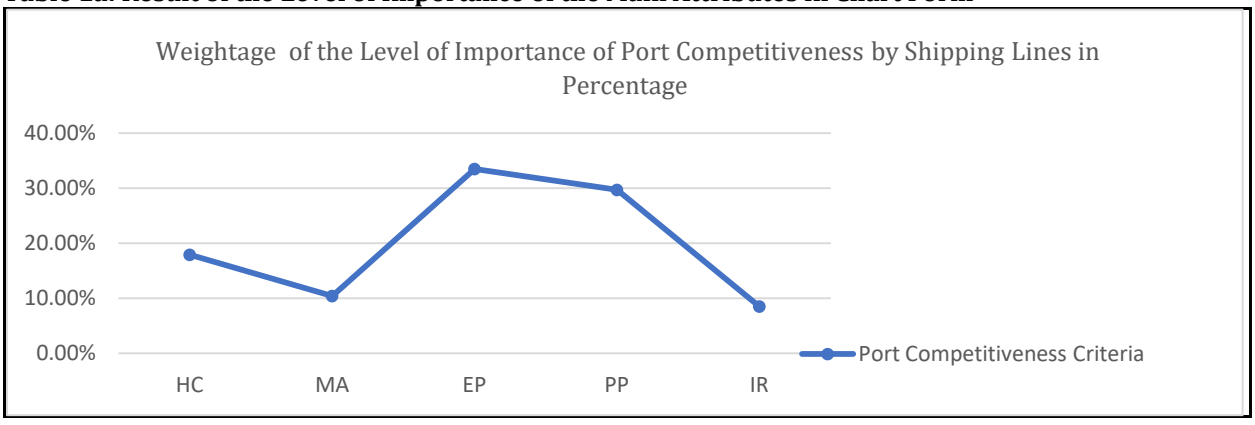
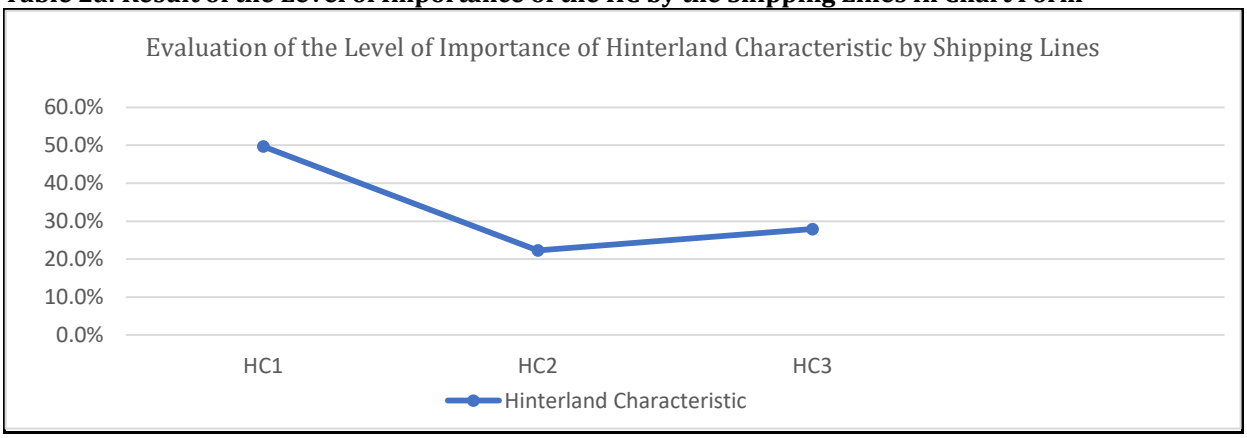


Table 1 and Table 1a show the result of the ranking selected by the shipping lines based on their perspective of the level of importance of the main criteria of the port competitiveness attributes. The shipping lines prioritized the efficiency of the port facilities and services (EP) as the most important, followed by the port pricing and ancillary services (PP), hinterland characteristics (HC), maritime accessibility (MA) and lastly the institutional regulatory framework (IR). The consistency ratio (CR) calculated is 1.0**,** implying that the survey results are consistent and reliable. The following results are the outcome of the pairwise selection performed by the shipping lines on the level of importance of the sub-criteria of the port competitiveness attributes. On the hinterland characteristics as indicated in **Table 2 and Table 2a** below, the shipping lines had ranked the most important attribute as the availability of the import and export cargoes within the local hinterland (HC1), followed by an efficient intermodal connectivity within the hinterland (HC3) to the port and vice versa and lastly the sufficiency of import and export volume within the regional hinterlands to be transship at the port (HC2). The consistency ratio (CR) calculated is 0.6%**,** implying that the survey results are consistent and reliable.

Table 2: Result of the Level of Importance on the Sub-Criteria of Hinterland Characteristics

Variable	Attributes	Weightage (%)	Consistency Ratio (%)
HC1	The availability of import and export cargoes within the local hinterland.	49.8	0.6
HC2	There must be a sufficient volume of import and export of goods within the regional hinterlands to be transshipped at the port.	22.3	
HC3	There must be an efficient intermodal connectivity within the hinterland to the port and vice versa	27.9	
TOTAL		100	

Table 2a: Result of the Level of Importance of the HC by the Shipping Lines in Chart Form

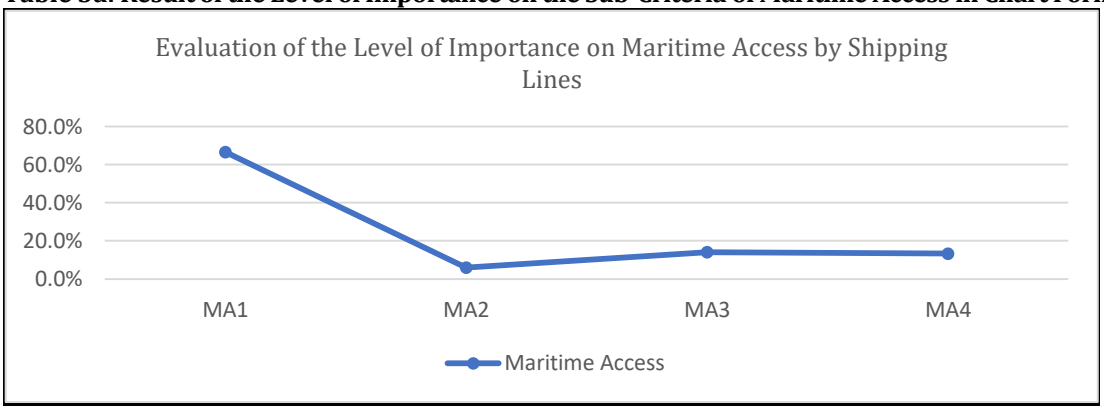


In **Table 3 and Table 3a** shown below, the shipping lines had ranked that the most important attribute in maritime accessibility is the strategic location of the port (MA1), followed by (MA3) sufficient depth at the berthing terminal to cater for minimum size of MLO, third rank is consistent sailing frequency of mainliners and/or feeder vessels (MA4) and lastly the depth of the approach channels to enter the port limit must be sufficient to allow for safe passage for the vessels (MA2). The CR calculated is 0.4% which is high in consistency indicating the results are reliable.

Table 3: Result of the Level of Importance on the Sub-Criteria of Maritime Access

Variable	Attributes	Weightage (%)	Consistency Ratio (%)
MA1	The port must be located in a strategic location, e.g., situated near the international trade lane/point of connectivity to a few hinterlands whether by sea or land transport.	66.6	0.4
MA2	The depth of the approach channels to enter the port limit must be sufficient to allow for safe passage for the vessels	6.0	
MA3	The depth at the berthing terminal must be sufficient to cater for a minimum size of Main Liner Operators (MLO)	14.1	
MA4	The sailing frequency of MLO and/or feeder vessels to the port should be consistent	13.3	
TOTAL		100	

Table 3a: Result of the Level of Importance on the Sub-Criteria of Maritime Access in Chart Form

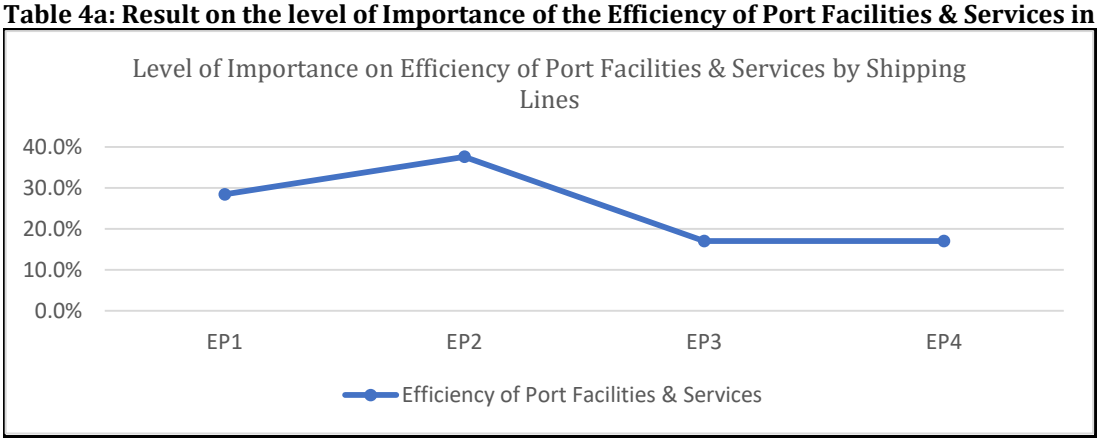


The result shown in **Table 4 and Table 4a**, indicates the most important attributes would be the consistent operational efficiency on the quayside and yard for a fast turnaround time of vessels at berth (EP2), second rank to (EP1) which stated that there must be a suitable equipment available to maintain terminals efficiency for the vessels, followed by the same ranking of both (EP3) and (EP4) where consistent operational efficiency at the yard for fast turnaround time of haulers and short dwell time of container port. The CR calculated is 0.5% indicating the results are consistent and reliable.

Table 4: Result of the Level of Importance on the Sub-Criteria of Efficiency of Port Facility & Services

Variable	Attributes	Weightage (%)	Consistency Ratio (%)
EP1	There must be suitable equipment available to maintain the terminal's efficiency for the vessels	28.4	
EP2	There must be consistent operational efficiency on the quayside and yard for a fast turnaround time of vessels at berth	37.6	
EP3	There must be consistent operational efficiency in the terminal (yard area) for a fast turnaround time for haulers.	17.0	0.5
EP4	There must be a shorter dwell time and a faster turnaround time for containers in port.	17.0	
TOTAL		100	

Table 4a: Result on the level of Importance of the Efficiency of Port Facilities & Services in Chart Form



As indicated in **Table 5 and Table 5a,** the shipping lines evaluated port pricing must be competitive compared to neighboring ports (PP1) as the most important, second-ranking is the efficiency of documentation clearance by the Port and Authorities (PP2), followed by the availability of electronic single window system (PP3) and last ranking is the availability of bunkering and fresh water supply (PP4). The CR calculated is 0.1% indicating a high consistency ratio and reliability.

Table 5: Result of the Level of Importance on the Sub-Criteria of Port Pricing & Support Services

Variable	Attributes	Weightage (%)	Consistency Ratio (%)
PP1	The port must have a competitive Port Tariff compared to neighboring ports.	33.2	
PP2	There must be efficient cargo documentation clearance by the Port and Authorities.	27.9	
PP3	The availability of an electronic single-window system for seamless operation	23.9	0.1
PP4	The availability of ancillary services such as bunkering and freshwater supply.	15.0	
TOTAL		100	

Table 5a: Result on the Level of Importance of the Port Pricing & Support Services in Chart Form

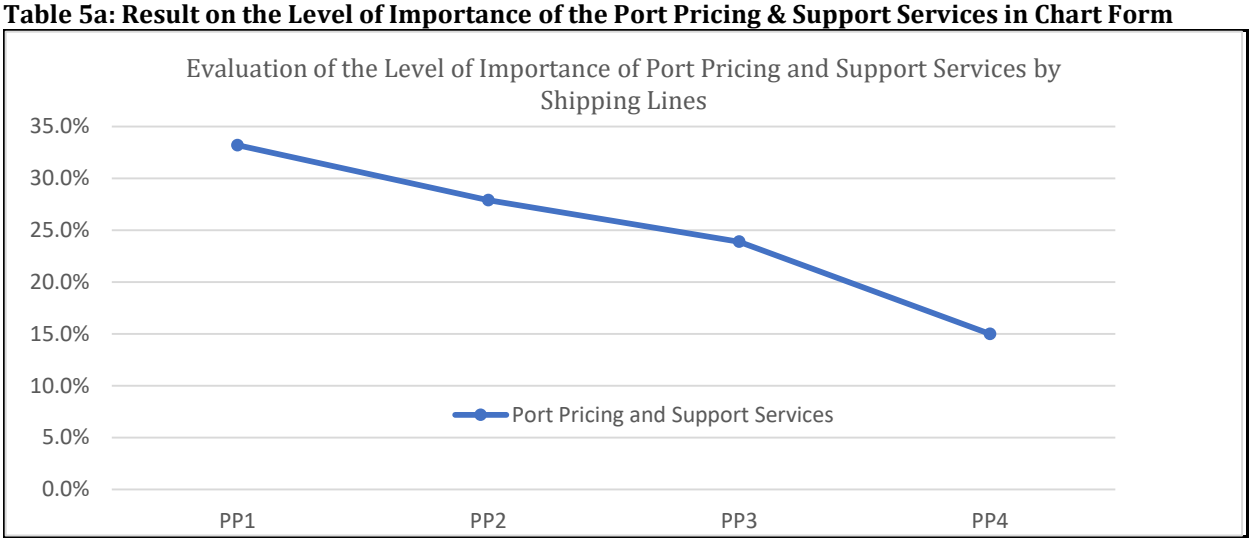
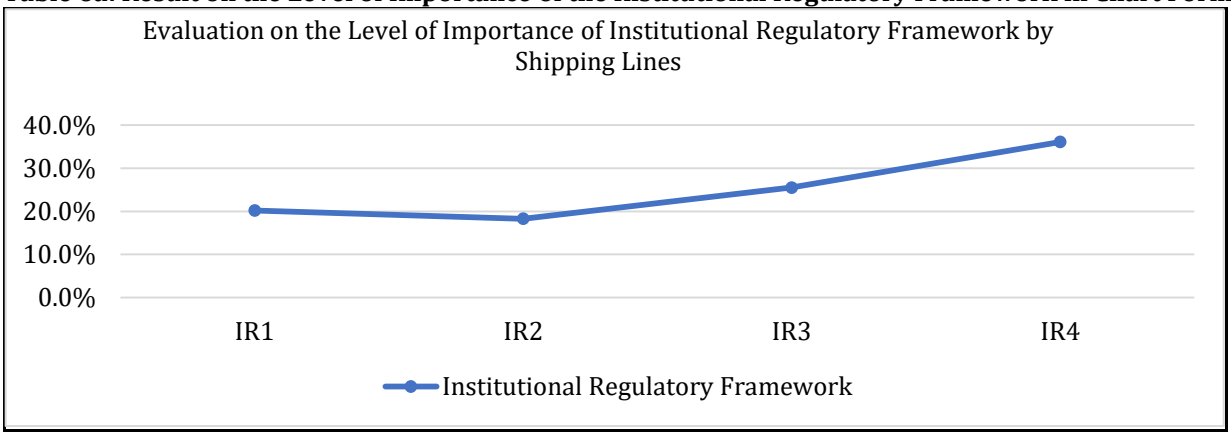


Table 6 and Table 6a show the shipping lines prioritize (IR4) political stability and a conducive environment for economic development, followed by effective trade facilitation to enhance bilateral trade (IR3), on the clear line of jurisdiction among the local authorities (IR1) and lastly for the authorities to ensure security policy to be in place for safe passage within coastal waters (IR2). The CR calculated is 0.1%, implying that the survey results are consistent and reliable.

Table 6: Result of the Level of Importance on the Sub-Criteria of Institutional Regulatory Framework

Variable	Attributes	Weightage (%)	Consistency Ratio (%)
IR1	There must be a clear line of jurisdiction and aligned policies in terms of maritime policy among local Authorities	20.2	0.1
IR2	The Authorities need to ensure security policy is in place to provide safe passage within coastal waters.	18.3	
IR3	The Government should provide effective trade facilitation to enhance bilateral trade.	25.5	
IR4	There must be political stability in the state to give confidence to investors and to provide a conducive environment for economic development.	36.0	
TOTAL		100	

Table 6a: Result on the Level of Importance of the Institutional Regulatory Framework in Chart Form



Discussion

Sapangar Bay Container Port: Sapangar Bay Container Port (SBCP) is managed and operated by Sabah Ports Sdn. Bhd. by Port Privatization exercise in 2004 by the Sabah State Government and Sabah Port Authority. SBCP is located in Sapangar Bay, approximately 9 km north of Kota Kinabalu, to the West Coast of Sabah State, East Malaysia. SBCP handles ninety percent of container cargo and ten percent of roll on roll off cargo. SBCP has handled approximately 287,959 TEUs on average per annum for the last 3 years (2022, 2021, 2020). Its terminal facilities comprise four ships to Shore Gantry Crane (STS Crane), Rubber Tyred Gantry Crane (RTG), Reach Stackers and other relevant equipment as described in **Figure 6**. With 500 meters of quay length of outer berth, SBCP's current capacity is approximately 500,000 TEUs. SBCP's ship productivity recorded an average of 18 GMPH in 2022. The number of vessels calling SBCP is approximately 468 vessels (2022) with Length overall (LOA) ranging from 94 LOA to 220 LOA. Most of the vessels are plying from Port Klang/Johor Port/ PTP or Singapore to SBCP and vice versa and a few Intra Asia vessels call directly to SBCP from Shekou, Hong Kong, Nansha looping to Bintulu, Muara, and Manila.

Figure 6: Port Facility in SBCP

FACILITY	INFRASTRUCTURE	SUPERSTRUCTURE
Quay length	3 Outer berthing 500 meters	
	2 Inner berthing 145 meters	4 units of STS Gantry Cranes
Quay width	respectively	Single lift
	50 meters	(17 meters outreach)
Depth	12 meters	
Maximum vessel size (DWT)	45,000.00	
Yard Area	30,000 ground slot	9 rubber Tyred Gantry Crane
		2 units shuttle carriers
		6 Reach stackers
		9 Empty Handlers
		27 Prime Movers
Reefer Points	280 units	
Container Freight Station	4,500 sq. meters	4 Forklifts

Source: Sabah Port Sdn. Bhd. July 2023.

The objective of this survey is to develop a strategy on how to position a competitive port in the BIMP EAGA region by evaluating its port competitiveness from the perspective of the shipping lines. The researcher will discuss the top three of the main criteria that had been ranked as the most important for the shipping lines to indicate their preference for a port of call. Taking Sapangar Bay Container Port (SBCP) as a reference in this study, below is the summary of the ranking selected by the shipping lines.

Figure 7: Selected Top 3 Port Competitiveness Main Criteria and Most Important Sub-Criteria ranked by Shipping Lines in BIMP EAGA

Goal indicator	Main Criteria	Sub- Criteria Attributes
Port Competitiveness ranked most important in sequence.	Efficiency of Port Facilities And Services (EP)	There must be consistent operational efficiency on the quayside and yard for a fast turnaround time of vessels at berth (EP2)
	Port Pricing And Support Services (PP)	The port must have a competitive Port Tariff compared to neighboring ports. (PP1)
	Hinterland Characteristics (HC)	The availability of import and export cargoes within the local hinterland. (HC1)

The efficiency of Port Facilities and Services: Port facilities encompass a wide range of infrastructure and services, including berths, piers, wharves, terminals, warehouses, container yards and other facilities necessary for the efficient and safe handling of ships, cargo, and passengers. Besides that, port facilities also provide essential services such as customs clearance, immigration control, security, pilotage, tug assistance, bunkering and repairs. Prioritization of the fast turnaround time at the berth is crucial for shipping lines to maximize their vessel utilization and reduce operational costs. The berth or quayside is where the port provides the services to the ship. Efficient quayside and yard operations ensure quick loading and unloading of cargo, minimizing vessel idle time and expediting vessel turnaround time. As reiterated by Wu et al. (2019) a fast turnaround time for vessels can allow shipping lines to maintain reliable schedules and optimize their fleet utilization. This leads to increased productivity and cost savings for shipping lines. Efforts to improve the efficiency of the quayside and berthing area often involve optimizing berth allocation, implementing advanced scheduling algorithms, utilizing automation and technology, and improving coordination between different operations and stakeholders.

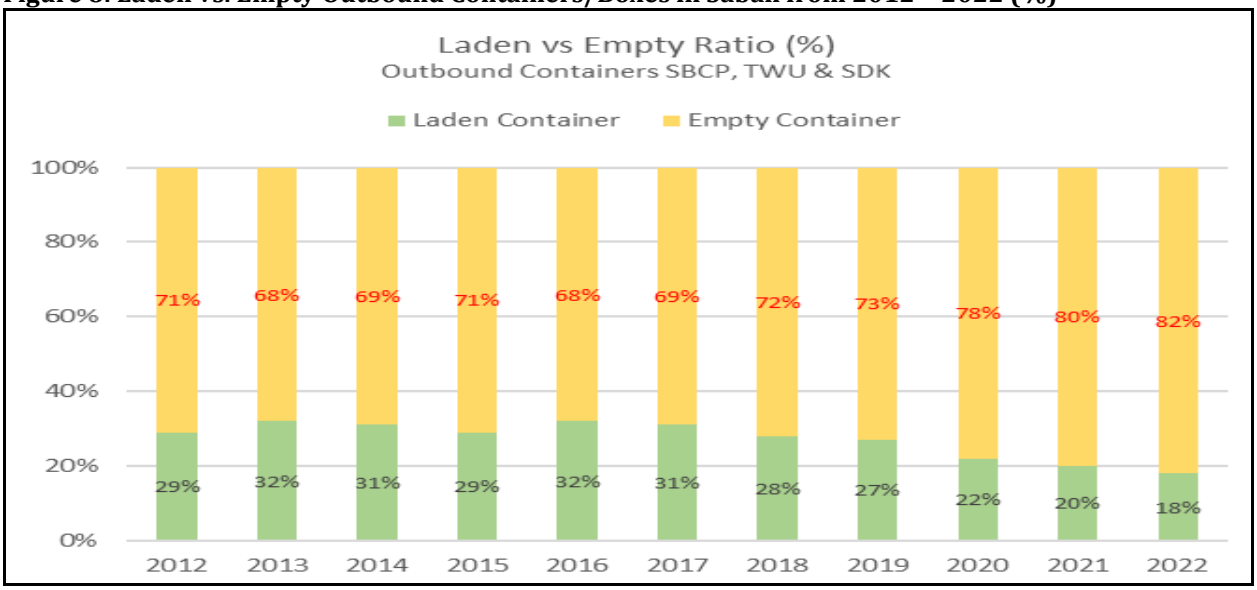
Within the port (Zhang & Zhao, 2018: Luo & Wu, 2013; Chu et al., 2017; Stojakovic & Twrdy, 2019) Nottebom, (2004) stated in his study that larger vessels will have a lower cost per TEU-mile than smaller units with the same load factor. The trend of container shipping in Figure 7 indicated the sizes and their capacity requirement of the depth at her berthing facility. The facility in SBCP as shown in Figure 5 indicates that SBCP

can only handle 45,000 DWT of vessels and with a berth length of 500 meters and a depth of 12 meters, SBCP can handle up to Panamax Class vessel of 250 LOA (Length Overall) and carrying a maximum of 3400 TEUs. SBCP's container handling rate was recorded in average at 18 gross moves per hour (GMPH) in 2022. Wang & Culliane, (2006) found that higher levels of efficiency in container terminals are associated with shorter berth turnaround time and suggest that there is a potential positive correlation between the GMPH and berth turnaround time, as higher efficiency in container terminals allows for faster cargo handling and thus shorter turnaround times. Hence, the selection of shipping lines to rank the efficiency of the ports is the most important criterion for port competitiveness because of the direct impact on the shipping lines that may affect them financially and the possibility of loss of business opportunities.

Port Pricing and Support Services: Competitive port pricing or tariff allows shipping lines to reduce their operational costs and remain competitive in the market. Lower port fees and charges can significantly impact the overall transportation costs for shipping lines. By choosing a port with favorable pricing, shipping lines can offer more competitive rates to their customers, attract more business, and maintain their market share. Transparent and competitive port pricing provides shipping lines with cost predictability. Clear and well-defined pricing structures enable shipping lines to accurately estimate and plan their expenses, allowing for better financial management. This predictability helps shipping lines optimize their pricing strategies and make informed decisions regarding their operational budgets. In the context of SBCP, the tariff and charges are based on the Published Tariff book of Sabah Port Authority (Scale of Deus, and Charges) Regulation 1977. There are only three amendments to the tariff so far being the latest in the year 1985 to only revise Schedule Part III. Compared with the other neighboring ports such as Bintulu Port, SBCP's tariffs are still competitive. The support services encompass other ancillary services such as bunkering, fresh water supply and waste disposal. SBCP provides these services through its subsidiary company SP Marine Sdn. Bhd. SBCP is facing a challenge as most of the vessels calling its port will refuel outside of Sabah in West Malaysia or Singapore due to insufficient infra to provide the mentioned services and not a competitive fuel price. A port that provides support services in a stop center may assist shipping lines to save cost and time. Hence, the challenges by the shipping lines when they call SBCP may be the possibility of the shipping lines ranking the port pricing and support services as the second most important attributes of competitiveness.

Hinterland Characteristics: The availability of a strong local hinterland is important for shipping lines because the shipping lines need a sufficient volume of cargo to justify calling at a port. A robust local hinterland with diverse industries and a strong economy can provide a steady flow of import and export cargo, making the port an attractive destination for shipping lines. The availability of a well-connected and efficient local hinterland is crucial for shipping lines when considering calling at a certain port. SBCP has an extensive hinterland area that covers the immediate hinterland of the State of Sabah, extended hinterland of Northern Borneo Island (East Malaysia and Brunei Darussalam) and a potential Regional hinterland of the rest of BIMP-EAGA Region (the provinces of Kalimantan, Sulawesi, the Malukus, West Papua and Papua in eastern Indonesia and the islands of Mindanao and Palawan in the Philippines). With a combined population of 73 million, SBCP has great potential to position itself as the gateway port in the BIMP EAGA region for the Far East market. **Figure 8** shows the ratio of outbound containers of laden and empty boxes. It shows that only about 18 percent to 22 percent were laden containers and approximately 80 percent were empty containers. This indicates that the State does not produce sufficient export cargo due to the scarcity of downstream activities in Sabah. The imbalance of trade had caused the logistics cost to be expensive and the logistics players including the shipping line will increase freight rates to compensate for the cost of carrying empty containers which cost less value to the transporter.

Figure 8: Laden vs. Empty Outbound Containers/Boxes in Sabah from 2012 – 2022 (%)



Source: Sabah Port Sdn Bhd, July 2023.

The economy of Sabah has always been heavily dependent on the export of its primary and minimally processed commodities. Oil and Gas and palm oil sectors will continue to be the main contributors to Sabah's exports, but further steps are required to plow back into the local economy, such as the development of local downstream activities, including manufacturing and logistics. Nascent sectors such as tourism, agriculture (other than palm oil), aquaculture and fisheries have great export potential. Despite being resource-rich, Sabah has not received enough investments in these sectors and the supporting infrastructure such as the hinterland road systems. Despite the State's wealth of resources and minerals, a significant trade imbalance persists. Its economy is fueled by the export of its primary commodities such as crude petroleum, crude and processed palm oil that are often transported in bulk. Containerized export consists of agricultural products such as timber, plywood, paper, stock feeds and stones. Both forms of outbound cargo are largely exported with little to no processing involved. Import boxes on the other hand consist of consumer goods, construction materials, foodstuff and bagged fertilizers. Nevertheless, studies by Peng et al. (2019) concludes that by maximizing the usage and conversion of containers during transportation, logistics enterprise can increase their profits and reduce cost. In conclusion, SBCP should explore business opportunities for repositioning empty containers to increase its port competitiveness. These are the possible reasons for the ranking given by shipping lines as the third most important criterion. Hence, the availability of import and export cargo within the local hinterland will sustain the competitiveness of a port in this region.

Maritime Accessibility: Strategic maritime access is important for shipping lines to access new markets and expand their customer growth to grow their business. Prioritization of a strategic location near international trade and good connectivity to hinterlands reflects the understanding that these factors have a broader impact on trade efficiency, market access, and operational effectiveness than the consistency of sailing frequency and feeder vessel operations alone. Referring to **Figure 9**, the state of Sabah which is located on the Northern side of Borneo has the competitive edge in terms of location. Located near the international trade lane and with minimum diversion, the potential for SBCP to be positioned as the gateway of BIMP EAGA is very promising. However, the shipping lines ranked maritime accessibility as the fourth most important because a strategic location alone will not give any value without port efficiency and facility, competitive port pricing and local hinterlands availability.

Figure 9: The Maritime Accessibility of Sapangar Bay Container Port

Source: Sabah Ports Sdn. Bhd, 2023.

Institutional Regulatory Framework: The political stability and a conducive environment for economic development provide a foundation for sustainable business operations. Shipping lines seek stability in the countries where they operate to minimize the risks associated with political instability, policy changes, or social unrest. A stable and predictable environment allows shipping lines to plan their long-term investments, establish strategic partnerships, and develop reliable trade routes. These factors contribute to the overall sustainability and success of shipping lines' operations in a particular country or region. The political situation in the state for the last 5 years has been quite turmoil coupled with the pandemic of COVID-19 that hit the country in the year 2020, 2021. The political situation is much more stable and positive economic recovery.

5. Conclusion

In this study, an approach to studying the perspective of the shipping lines in BIMP EAGA toward the importance of certain criteria was considered. This is part of an effort to explore the views of the shipping lines towards their selection of a port generally. Based on the five main criteria, port efficiency and port facilities gained the most selection as the most important criteria. Results from this study indicate the need for further understanding and perception of the sub-criteria. To have a more detailed affirmation of the selection of the shipping lines, the perspective of other stakeholders is needed to affirm the selection. Hence, further studies should be conducted to be able to assist the port authorities and port operators to focus on improving the dominant criteria selected to meet the expectation of the MLO in choosing the port of call. Port competitiveness is paramount to the growth and success of the seaports in BIMP EAGA. Whilst other attributes are important from the perspective of the shipping lines port operation efficiency and services should be given priority by the port authorities and port operators to focus on the improvement. Further study on the detail of the sub-criteria to improve the port competitiveness as a whole.

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