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EXECUTIVE SUMMARY

1. Introduction

International trade through globalization of production and consumption pattern highlights the importance of container transportation because it provides technical and economic advantage Wang, (2006). Further, competition between container ports is intensified due to the rapid development of international container and intermodal transportation that has changed the market structure.

In order to understand the market characteristics of pure and perfect competition (PPC) the following is the assumptions Cariou, (2008):

i. Homogeneity of goods and services.
ii. Profit maximization
iii. Atomicity of sellers
iv. Perfect information
v. Free entry/exit

Moreover, relaxation on any of this configuration would lead to situation where market becomes less competitive that would provide no benefit to consumers. Such market can be dealt with using different tools to analyse firm's behavior according to market characteristics.

2. Objectives

The objectives of this paper is to assess the competitiveness of Muara Container Terminal Brunei Darussalam and the regional port in the BIMP-EAGA area in the defined market (stevedoring market) only, assess the level of port competition by highlighting key elements found in most literatures such as market concentration, market shares and strengths and weaknesses of ports and areas within the BIMP-EAGA region. In competitive port environment DEA is used to bench mark the relative efficiency and performance of competing ports in the BIMP-EAGA region. Finally, recommendations to promote port efficiency and competition are proposed.

3. Port Evolution

Port has evolved in stages from first to second generation and then to third generation. First generation is assuming the function of interface between ship on one hand and landside. Second generation port go beyond the traditional port function towards an industrial centre. Third generation appears because of containerization.

Not only had it performed as transport centre but as logistic platform and cargo transformation as well as cargo distribution Shuo Ma 2007.

Marlow and Paixao, (2001) states that :
"the diverse nature of ports in terms of size, function and geographic characteristics leading to a very heterogeneous(made up of different players of different interest, who are engage in strong … Voorde *et al*, (1998) service range, will put ports under constant pressure and result in increasing port competition".

Port competition can be classified into three catergories: intra-port competition, inter-port competition and intermodal competition (UNCTAD, 1992).

Further, Inter-port competition exert the most intense pressure because it posses three different levels of competition namely competition between ports, competition between areas and competition between ranges (competition between hinterland) Marlow and Paixao, (2001) as cited in Verhoeff, (1981) competition definition.

Unctad, (1992) explain that traditionally, port is regarded as being in monopolistic situation often with limited scope of activities and role such as cargo loading/unloading and storing. Thus allow decision makers at government, municipality or enterprise level to favour conservative policies often led the port towards organizational isolation.

Wang and Cullinane, (2004) states that before the era of containerization competition between the port is relatively minor. However, with the introduction of hub and spoke system and rapid development of integrated transport and logistics have changed the situation completely. Furthermore, two tendencies emerged in the port industry namely concentration and deconcentration of port traffic.

Haralambides, (2002) describes trade liberlisation, land infrastructure development, containerization and multimodal integrated transport have transformed port to be more competitive, dynamic and efficient.

4. Literature review

Due to the increase in trade and the effect in economies of scales led to the creation of port consolidation and the emergence of "main port concept". Port strategic planning can be used to intensify port competitiveness. The development of port strategy requires identification and analysis of port competition in order to increase market share. Unctad, (1992).

(Marlow and Paixao, 2001) explained one of determinant factors for port competition is port geographical location on the main trade routes and near production and consumption centre. Furthermore, a port must form part of complete transport system with good hinterland connections and accessibility. Moreover, Port physical infrastructure would enable a port to offer wide range of services and improve economies of scale.

(Song and Yeo, 2004) explained that variety of factors contribute to port competitiveness such as expansion of port facilities, the upgrading of equipment, leasing of terminal to major carriers, the identification and development of feeder routes, offering competitive port tariff and increasing port efficiency.

(Unctad, 1992) states that for port consolidation process to take in place, port's strategy need to be developed by analyzing port competition key factors such as geographical location, hinterland transport connection, port services, price, socio-economic stability and telecommunication need to be analysed.

Wang and Cullinane, (2006) conducted port accessibility model analysis index of selected port in liner network to assess port competitiveness. If a container port becomes accessible by liner shipping network there would be a potential for containerized cargo move to the port. He supported that a throughput at any container port is significantly correlated to its degree of accessibility to its liner shipping network and other container port.

Song and Yeo (2004) addressed port competitiveness and selection by shipping lines in Chinnese main port. They have identified 73 factors (illustrated in table 1) for port competitiveness based on survey to 180 ship owners, shipping company executives, shippers, terminal operators, academics and researchers. Five most important criteria for port competitiveness are cargo volume, port facility (infrastructure and superstructure), port location, service level and port expenses. The study revealed that location factors are the most important factors for port competitiveness.

Table: 1 List of the elements of port competitiveness	
Application of EDI system	Ability of port personnel
Average hours of port congestion	Port accessibility
Berth/terminal availability	Port congestion
Building port MIS	Port facilities
Capacity of transportation connectivity	Port marketing
Capacity/status of facilities available	Port operation
Cargo volume of handling transhipment	Port operation by government
Changes in social environment	Port operation by local autonomous entity
Changes in transport and cargo function	Port operation by private sectors
Complete preparation of multimodal transport	Port operation by strategies
Concentration of volume by export/import	Port operation time
Customs clearance system	Port ownership
Dredging: yes or no	Port productivity
Easy access to port	Port service
Easy access to port	Port size
Economic scale of hinterland	Port tariff
Effectiveness of terminal operation	Possibility of mutual reference of electronic
Existence of cargo tracing system	computation network
Existence of port hinterland road	Price competitiveness
Existence of terminal operating system	Response of port authorities concerned
Existing pattern of navigation routes	Road network to be fully equipped
Extent of port EDI	Sea transportation distance
Financial factors of port	Securing deep draft
Free time of container freight station	Securing exclusive use of equipment
Frequency of ships calling	Securing fairway
Handling charge of TEU	Securing navigation facilities/equipment
Handling volume of export/import cargo	Securing railroad connection
Inland transportation cost	Status of national economy
Inter-linked transportation network	Sufficiency of berth
Internal politics	Sufficiency of securing information equipment
Loading time	Technical factors of port
Location factors of the port concerned	Terminal facilities
Market position within the area	Trade market
Mutual agreement of port users	Trade/commerce policy
Navigation distance	Transportation distance
Nearness to hinterland	Types of port operation/management
Nearness to main trunk	World business
Number of liners calling at ports	

Source: Song, D.W, and Yeo, K.T. (2004). Competitive analysis of Chinese container port using the AHP

4.1 Concentration

Wang and Cullinane, (2004) states that port competition is intensified as a result of increase in port traffic therefore it is important to examine the tendencies towards concentration and deconcentration of port traffic in the container transportation industry. The study used Gini coefficient and HHI to determine the level of concentration of container ports in the Hamburg-Le Havre range and in the U.S east coast and west coast.

4.2 Port pricing

Haralambides, (2002) explained that port pricing should reflect the investment cost based and the marginal cost pricing in financing port infrastructure in order to realize full cost of recovery. However, some publicly financed ports only consider increasing market share in the regional port competition. Therefore, a social cost-benefit analysis should be assessed to determine if the benefit of low tariff is localized or exhausted to regional area/community. In competing port terminal excess capacity signify economies of scale in providing quick turnaround times to larger ships and increase ships call but on the other hand often it is seen as inefficient, waste of resources and limit pricing thus not lead to full cost recovery.

4.3 Logistics

Jacobs, (2007) explained that

Ports need to become embedded in the global supply chain to remain competitive. "Ports will compete not simply on the basis of operational efficiency or location, for example, but on the basis that they are embedded in chains (or supply chains) that offer shippers greater value" as cited in (Robinson, 2002, p. 250).

Further more; an important way for ports to become successfully embedded in international chains is through provisions in leases, concessions and other contractual agreements offered to operators and other port users. These long-term contracts (that can be termed 'institutional arrangements'), including tariffs and port dues, provide a port manager with a strategic instrument to attract cargo, customers and private investment, and create long-term commitments. As such, these institutional arrangements are of vital importance in port competition. "A port management strategy solely based on the provision of terminal infrastructure does not provide all the necessary conditions for capturing important footloose clients on a more sustainable basis" as cited in (Notteboom & Winkelmans 2001, p. 80).

4.4 Institutional

Caranero states that:-
Ports should specialized for instance labour policy need to be fixed by modernization. A mother port means it institutionally can invest to protect its trade it needs to have an adequate legal background that allow it to compete like Rotterdam port is doing they have a branch that invest in dry port in Hungary just to protect their trade in Rotterdam and to boost the possibility to compete.

Llanto, (2005) states that the PPA(Philippines Port Authority) is a statutory body from the beginning (1974) responsible for regulating entry for private to operate and construct ports and owns several ports. Further he

explained in 1986 Malaysia introduce PPP private sector participation in managing port facilities. Transformation of Indonesia port from public to private entity was done in 1985. In contrast, Brunei port is subject to government rules and regulation often limited and too bureaucratic.

With this PPP setup the problems arise for instance when there is a threat to PPA's ownership and revenue. PPA will not issue permit to private sectors apply to operate and expand port thus limit competition. There is varying degree of private sector participation according to the structure of port system Brooks, (2004) (illustrated in table 2a & 2b).

Table 2 a

Responsibilities	Service	Tool	Landlord	Private
Infrastructure	Public	Public	Public	Private
Superstructure	Public	Public	Private	Private
Port labour	Public	Private	Private	Private
Other functions	Majority public		Mixed	Majority private

Source: Brooks, (2004) allocation of responsibilities under the World Bank models

Table 2 b

Governance	**Regulator functions**	**Port functions**	
		Landlord	Operator
Public	• Licensing, permitting • Vessel traffic safety • Customs and immigration • Port monitoring • Emergency services • Protection of public interest on behalf of the community • Determining port policy and environmental policies applicable	• Waterside maintenance (e.g. dredging) • Marketing of location development strategies, planning • Maintenance of port access • Port security • Land acquisition, disposal	• Cargo and passenger handling • Pilotage and towage • Line handling • Facilities security, maintenance, and repair • Marketing of operations • Waste disposal • Landside and berth capital investment
Mixed public/private			
Private			

Source: Brooks, (2004) port devolution matrix as cited in Baltazar and Brooks' (2001)

Rios and Macada, (2006), conducted study on analyzing the relative efficiency of container terminals of Mercosur in Brazil using DEA. The higher the level of efficiency and productivity of the terminal the lower the exports cost of goods. Therefore, allow the potential to gain a comparative advantage in international markets. Table 3 summarises their literature review. The same technique also used by Barros, (2006) to evaluate the performance of Italian seaports. Efficiency is of major importance and due to increase competition in European seaports DEA is employed by benchmarking the port performance of other competitors.

Table 3 DEA technique in ports

Reference	Data description	DEA model	Inputs	Outputs
Roll and Hayuth (1993)	20 ports	CCR	● Manpower ● Capital ● Cargo uniformity	● Cargo throughput ● Level of service ● Users' satisfaction ● Ship calls
Martinez-Budria et al (1999)	26 spanish ports	BCC	● Labour expenditures ● Depreaciation charges ● Other expenditures	● Total cargo moved through the docks ● Revenue obtained from the rent of port facilities
Tongzon (2001)	Four Australian and 12 other international ports	CCR Additive	● Number of cranes ● Number of container berths ● Number of tugs ● Terminal area ● Delay time ● Labour	● Cargo throughput ● Ship working rate
Valentine and Gray (2001)	31 container ports out of the world's top 100 container ports	CCR	● Total length of berth ● Total of investments	● Number of containers ● Total tons throughput
Itoh (2002)	Eight ports of Japan	Window	● Terminal area ● Number of berths, cranes and employees	● TEUs handled
Serrano and Castellano (2003)	Nine ports of Spain	BCC	● Berth size ● Terminal area ● Number of cranes	● TEUs handled ● Total tons throughput
Turner et al (2004)	26 North America container ports	-	● Berth size ● Terminal area ● Number of cranes	● TEU handled
Cullinane et al (2004)	25 of 30 biggest terminals in the world	Window, CCR and BCC	● Berth size ● Terminal area ● Number of berth cranes ● Number of yard cranes ● Number of straddle carriers	● TEU handled
Wang and Cullinane (2006)	104 European container terminals	CCR and BCC	● Total length of berth ● Terminal area ● Equipment costs	● Container throughput

Source: Rios and Macada, (2006) Analysing the relative efficiency of container terminals

5. BIMP-EAGA regional port market Overview

Market characteristics

BIMP-EAGA is home to some 50m people and a high number of ports (ref. figure 2 appendix 4), although many of these facilities are small and handle mainly breakbulk cargoes. Nevertheless, there are a relatively high number of ports now handling containers (in some format), whether at multipurpose breakbulk and general cargo facilities or at specialist container terminals, such as at MCT.

The main transhipment volumes in the BIMP-EAGA region have been identified by Drewry (2004) as being concentrated in the Philippines and Indonesia. Excluding their respective domestic cargoes, the total international transshipment cargo amounts to be approximately 1 million TEUs in the Philippines (*Manila) and 2 million TEUS in Indonesia (*Jakarta, *Surabaya and the outports). However, closer examination reveals a strong entrenchment factor by their respective ports such as Manila, Jakarta, and Surabaya. The most realistic transhipment market, which MCT could contest, would be from East Malaysia whose volumes total 457,000 TEUs today. Due to data limitation the throughput in 2007 in table 4 appendix 2 does not specify transshipment volume.

Notes: * Not included in the BIMP-EAGA region

6. Assessment of port competitiveness

BIMP-EAGA port market is not concentrated in one particular region only Drewry, (2004). A national cargo has to be handled at specific port due to the ultimate destination/origin of the goods. On the other hand regional cargo (transshipment) could potentially call at a number of different facilities within the region. Transshipment is a footloose business in nature. This market is subject to element such as where there is a sufficient volume of base cargo, lower transshipment cost, hinterland market due to larger local market, port efficiency among other things. Moreover, there is high number of ports in the region which means that there is relatively high degree of competition between ports for some regional cargo.

6.1 Strength and weakness

One part of assessment to assess port competition is to look at strength and weakness of the different ports and regions and the different areas that comprise the BIMP-EAGA port region (table 5).

Table 5
Strength and weakness of ports and areas within the BIMP-EAGA region

Country	Region/Port	Strength	Weaknesses
East Malaysia	Sarawak	Bintulu has designated container terminal	All ports and terminals reliant upon ships gear for box moves to/from ship and quay (except Bintulu)
		Bintulu is not reliant upon ships gear for ship-to-shore box activities	Lower productivity than MCT due to lack of equipment
		Bintulu has deepest water at facility of any competing port in the region	All facilities are multi-purpose handling general cargo and containers (with exception Bintulu)
		Pending Terminal at Kuching has designated container facility	Bintulu reportedly has plans to increase container capacity, but has remained unconfirmed for some time
		Region accounted for about 15% in 2002 and 20% of total regional volume in 2007	Questionable whether Bintulu needs additional capacity as utilisation in 2002 is under 60%
		Spare capacity available at all ports in Sarawak	Container handling equipment needs modernising/investment
			Low transhipment stevedoring tariff costs are not sustainable indefinitely, unless being subsidised by other sources of revenue
	Sabah	Region accounted for almost 10% in 2002 and only reach 11% of total regional volume in 2007	Kota Kinabalu has little spare capacity
		Kota Kinabalu tariff vessel costs low	Need to consider investment in container handling equipment
		Container tariff stevedoring rates for both transhipment and local cargo are low	Capacity that is available (Sandakan/Tawau) is not at more desirable facility (ie Kota Kinabalu)
		Some spare capacity available, especially at Sandakan	Container handling productivity lower than at MCT
	Federal Territory	Sufficient capacity for local port hinterland demands	Only consists of Labuan port
		No need expansion of facilities in foreseeable future	Less than 1% of total regional container traffic in 2002
Brunei	Muara (MCT)	Involvement and experience of PSA Corp	Lower volumes than Kuching, Bintulu, Kota Kinabalu and competing ports in Philippines (South)
		Known plans to increase capacity, yard, equipment	Vessel and transhipment stevedoring tariff costs more expensive than Bintulu and Kota Kinabalu
		Confirmed intentions to further invest in additional/improved handling equipment	Cross border trade weakened by levels of bureaucracy and "red-tape"
		Better quality handling equipment than almost all regional competitors which is reflected in terminal productivity	Relatively low volume of base cargo

Brunei	**Muara (MCT)**	Some base container traffic generated by regular customers on weekly schedules	
		Brunei GDP growth amongst SE Asia or of any developing country in the world - also has a high take-up of containers per head of population	
		Over 60% of weekly customer schedules are connections to major container facilities- ie Singapore, Hong Kong, Johor	
Indonesia	**Kalimantan/Sulawesi**	No spare capacity available, with current utilisation more than 100%	Very poor quality facilities at ports in Kalimantan
		Strong base container cargo for ports-large share of box traffic for region (18% in 2002, 25.9% in 2007)	Very low container volumes at ports in Kalimantan
		Hatta Quay at Makassar has good facilities-ship-to-shore cranes, sufficient water depth, yard etc	Majority of container handling limited to Makassar-hence higher utilisation
	Eastern Indonesia	Strong base cargo for ports-14% of total regional volumes in 2002,	Little spare spacity-utilisation over 80%
		Ports handle diverse cargo base, so not reliant upon one commodity (such as container traffic)	No known or confirmed plans to increase capacity
			Inability to offer designated container terminals-all boxes moved at multipurpose berths only
Philippines	**Mindanao/ Visayas**	Highest container volumes in 2002 of any BIMP-EAGA regional area	Traffic reliant upon strong domestic container demand
		Spare capacity available -current utilisation around 76%	Questionable whether additional capacity being constructed for Mindanao Container Terminal is required
		Has large share of regional container traffic (over 37%)	New terminal development is likely to draw container traffic from within Philippines terminals as opposed to competing facilities
		High propotion of container traffic is domestic cargo- unlikely (or unable) to move to other competing regional ports	Investment needed in newer, better handling equipment
		Increasing container capacity by 2005	Philippine Port Authority perceived as bureaucratic
		Involvement of ICTSI as terminal operator at SBCT in General Santos	Port tariffs reflect some high additional costs-ie an additional wharf charge of US$14.07 per box is levied
		Has established container facilities, offering Panamax cranes	Restrictions at some berths-ie domestic berths handle domestic tariff only

Source: Drewry Shipping Consultant Ltd and author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority,

From the table it is clear that there is lack of infrastructure, insufficient facilities, little spare capacity, lower productivity, some ports has strong local cargo base, majority of containers handled at terminals in Indonesia and Philippines are domestic/intra island cargo, bureaucratic no authority for port development and no plan to increase capacity in majority of the terminals in the region with the exception of very few ports. Ports possessed few weaknesses can transform their weaknesses into strength by developing competitive advantage and strategies.

6.2 Port tariff

There are factors that MCT can consider in order to attract and retain transshipment traffic such as productivity, equipment, tariff and service flexibility. MCT transshipment rates are at par compared to benchmarked rates across major transshipment hub. It is higher than Kota Kinabalu rates because it offers higher handling facilities where as Kota Kinabalu depend on ship gears for ship operation. However, Bintulu rates is low it could be highly subsidized by other activities and may not be sustainable in the long run (table 6). MCT has offered Hub shipping line comparable transshipment rates to Bintulu but has not successfully attract the lines' entire transshipment business from Bintulu, this confirm the resilience and importance of Bintulu's local cargo base over Muara.

Undue restrictions on setting cost-based tariffs may jeopardize port operations and may reduce the attractiveness of port development to private investors Llanto, (2005).

Table 6 Comparison of port transhipment tariff

	Muara (MCT)		Bintulu		Kota Kinabalu	
	B$	US$	B$	US$	B$	US$
20ft loaded	100	57.45	22.5	12.93	85	48.83
20ft empty	65	37.34	12.5	7.18	85	48.83
40ft loaded	150	86.18	28.75	16.52	127.5	73.25
40ft empty	89	51.13	25	14.36	127.5	73.25
Average per teu-per move**	71.77	41.23	15.23	8.75	69.07	39.68
Average per teu-per cycle**	143.54	82.46	30.46	17.5	138.12	79.35
Average per container per move**	114.81	65.96	24.37	14	110.5	63.48
Average per container complete cycle**	229.64	131.93	48.76	28.01	220.99	126.96

Source: Drewry Shipping Consultants Ltd Muara terminal market study

6.3 Utilization

The overall utilisation of Port capacity in the BIMP-EAGA region in 2007 is 73.6%. Therefore supply exceeds demand by 37%. Taking into consideration MCT's superior location and handling facilities, its 43% utilisation still indicates that the transhipment tariffs will remain very low as shipping lines continue to have ample
alternatives. (see table 7). As well as having plenty of spare capacity moving forward into the future.

Table7
Utilisation of sub-regions in BIMP-EAGA region, 2005,2006,2007

Region	2005			2006			2007		
	Throughput	Capacity	% utilisation	Throughput	Capacity	% utilisation	Throughput	Capacity	% utilisation
Sarawak	360,012	575,000	62.6%	422,423	575,000	73.5%	502,342	575,000	87.4%
Sabah	147,800	285,000	51.9%	229,084	285,000	80.4%	271,010	285,000	95.1%
Federal Territory	0	25,000	0.0%	0	25,000	0.0%	0	25,000	0.0%
Muara	101,000	250,000	40.4%	100,719	250,000	40.3%	108,000	250,000	43.2%
Kalimantan/Sulawesi	554,179	615,000	90.1%	558,326	615,000	90.8%	632,679	615,000	102.9%
Eastern Indonesia	83,564	300,000	27.9%	100,623	300,000	33.5%	113,127	300,000	37.7%
Mindanao	704,354	780,150	90.3%	685,602	780,150	87.9%	707,050	780,150	90.6%
Visayas	146,477	500,000	29.3%	134,258	500,000	26.9%	115,471	500,000	23.1%
Total	**2,097,386**	**3,330,150**	**63.0%**	**2,231,035**	**3,330,150**	**67.0%**	**2,449,679**	**3,330,150**	**73.6%**

No data is available for Labuan port- Federal Territory handled 12,680 TEU in 2002
Source: Drewry Shipping Consultant Ltd and author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority,

6.4 Market share

MCT accounted for 4.4% of the total BIMP-EAGA container market which is relatively small compare to Bintulu 10.3%, Kota Kinabalu 7.6% and Makassar 11.5% from Malaysia and Indonesia respectively. It is clear that there is only limited number of ports that handled majority of the cargo. With exception ports in the Philippines which individually account for 12.2% for Davao, Cagayan de Oro 6.6% and General Santos 4.2% in table 8. This is due to higher volume of domestic cargoes. This shows market share is distributed evenly across the ports within the region. MCT market share is reducing to 4.4% while there is increase in the throughput in 2007. This suggest competition is intense for transshipment and local cargo and its hold on the market appeared to be slipping.

Table 8
Market share of ports in the BIMP-EAGA region

			2005 Market Share	2006 Market Share	2007 Market Share
Region	**Port**	**Terminal Operator**			
East Malaysia					
Sarawak	Kuching	Kuching port authority	6.6%	6.8%	6.7%
	Rajang	Rajang port authority	2.5%	2.4%	2.7%
	Bintulu	Bintulu Port Sdn. Bhd.	6.8%	8.9%	10.3%
	Miri	Miri port authority	0.7%	0.7%	0.9%
	Sarawak total				
Sabah					
	Kota Kinabalu	Sabah Port Sdn. Bhd.	6.8%	7.0%	7.5%
	Sandakan	Sabah Port Sdn. Bhd.	0.0%	0.0%	0.0%
	Tawau		0.0%	3.3%	3.6%
	Sabah total				
Federal Territory	Labuan		0.0%	0.0%	0.0%
	Federal Territory total		0.0%	0.0%	0.0%
Brunei					
	Muara	Muara, PSA MCT	4.7%	4.5%	4.4%
	Brunei total				
Indonesia					
Kalimantan	Banjarmasin	PT (Persero) Pelabuhan Indonesia IV	0.0%	0.0%	0.0%
	Pontianak	PT (Persero) Pelabuhan Indonesia II	0.0%	0.0%	0.0%
	Samarinda	PT (Persero) Pelabuhan Indonesia IV	6.0%	5.8%	5.7%
	Balikpapan		3.2%	3.0%	3.2%
	Kalimantan total				
Sulawesi	Makassar	PT (Persero) Pelabuhan Indonesia IV	11.0%	11.0%	11.5%
	Pare-Pare		0.0%	0.0%	0.0%
	Bitung		4.7%	4.4%	4.6%
	Pantoloan		0.9%	0.8%	0.8%
	Sulawesi total				
Eastern Indonesia	Biak	PT (Persero) Pelabuhan Indonesia IV	0.2%	0.2%	0.2%
	Ternate		0.5%	0.6%	0.7%
	Jayapura		1.1%	1.2%	1.5%
	Ambon		1.6%	1.7%	1.7%
	Sorong		0.5%	0.8%	0.6%
	Eastern Indonesia total				
Philippines					
South Mindanao	Davao	Filipinas Port Services, Inc.Davao Integrated Port Services & Stevedoring Corp.	10.5%	11.6%	12.2%

	General Santos	South Cotabato Integrated Port Services, Inc.	5.1%	4.4%	4.2%
	Zamboanga	Unified Stevedoring & Arrastre Corp. Zamboanga Arrastre and Stevedoring Corp. PTC-Mindanao Port Services, Inc.	3.0%	2.7%	2.6%
	South Mindanao total				
North Mindanao	Cagayan de Oro	Oroport	9.4%	8.0%	6.6%
	Iligan	Iligan Merged Arrastre and Stevedoring Co.	1.2%	1.1%	0.8%
	Nasipit	Nasipit Integrated Arrastre & Stevedoring Srvcs, Inc.	1.9%	1.5%	1.1%
	Ozamiz	Integrated Port Services of Ozamiz	1.4%	1.3%	1.2%
	Surigao	Bilang-Bilang Arrastre/Stevedoring Service, Inc.	0.2%	0.2%	0.2%
	North Mindanao total				
	Dumaguete	Cipres Srevedoring and Arrastre, Inc.	1.1%	0.9%	0.6%
Visayas	Iloilo	Iloilo Integrated Arrastre and Stevedoring Co. Visayan Veterans Port Services, Inc.	4.0%	3.8%	3.1%
	Ormoc	Ormoc Dockhandlers, Inc.	0.4%	0.4%	0.2%
	Tacloban	Leyte Integrated Port Services, Inc.	0.4%	0.3%	0.3%
	Tagbilaran	Tagbilaran Maritime Services, Inc.	0.8%	0.7%	0.5%
	Visayas total				
	Other		2.8%	-	-
	Total BIMP-EAGA market		**100.0%**	**100.0%**	**100.0%**

Source: Author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority
Note. Red character indicates data is unavailable
Labuan port- Federal Territory handled 12,680 TEU, Sandakan - 23,439 TEU, Banjarmasin-1 Pontianak-98,747 TEU in 2002

6.5 Concentration

The degree of competition in this maritime transport is measured using the Herfindahl index (H). Table 9 (a) & (b) in appendix 1 summaries the index of all ports in 2005 and 2007. In general the index trends shows an increase from 0.06257 in 2005 to 0.068005 in 2007. This could be due to the domestic or transshipment services in particular ports having experienced particularly high growth in the last three years particularly in East Malaysia ports. The increase is less significant to be considered towards concentration of port market. Therefore high degree of competition.

6.6 Infrastructure

Table 10 appendix 3 summarised the facilities available in number of different ports within the BIMP-EAGA region. The terminal handled both general cargo and container. There are only few ports that use container terminal gantry for ship operations namely Muara container terminal, Bintulu in Sarawak East Malaysia, Makassar in Sulawesi Indonesia, General Santos in Mindanao, Cagayan de Oro, Davao. It is clear that specialized equipment needed for a productive container terminal is not readily available throughout majority of ports in the region. Therefore shipping lines moving the containers has to compromise with the type of service and facilities offered by the facilities. Facilities offered by MCT are superior among other ports in the region.

7. Benchmarking relative efficiency and performance of MCT using DEA

Table 11a Relative efficiency of Muara container terminal and regional ports in the BIMP-EAGA region in CRS model

No.	Terminal	2005	2006	2007	mean	Difference 2005-2006	Difference 2006-2007
1	Kuching	46.73	43.53	40.32	43.53	-3.20	-3.21
2	Bintulu	85.03	100.00	100.00	95.01	14.97	0.00
3	Kota Kinabalu	87.43	80.90	37.38	68.57	-6.53	-43.52
4	Muara MCT	93.12	86.71	78.45	86.09	-6.41	-8.26
5	Makassar	100.00	100.00	100.00	100.00	0.00	0.00
6	Bitung	40.26	36.12	37.15	37.84	-4.14	1.03
7	Ambon	31.88	29.83	27.73	29.81	-2.05	-2.10
8	Davao	100.00	100.00	100.00	100.00	0.00	0.00
9	General Santos	77.07	61.54	57.91	65.51	-15.53	-3.63
10	Zamboanga	81.64	67.06	61.29	70.00	-14.58	-5.77
11	Cagayan de Oro	64.89	50.09	38.33	51.10	-14.80	-11.76
12	Iloilo	69.28	58.70	45.50	57.83	-10.58	-13.20
13	Samarinda	100.00	100.00	100.00	100.00	0.00	0.00
14	Balikpapan	77.40	72.70	80.31	76.80	-4.70	7.61

Source: Authors' computation using Zhu linear programming

Table 11b Terminal most frequently appeared as reference

No.	Terminal	2005	2006	2007	Total
1	Davao	8	8	8	24
2	Samarinda	2	2	2	6
3	Makassar	4	1	1	6
4	Bintulu	-	3	3	6

Source: Authors' computation using Zhu linear programming

Table 11c Terminal benchmarks against efficient terminals

Terminal	Benchmarks against		
	2005	2006	2007
Kuching	Davao	Davao	Davao
Bintulu	Makassar	Bintulu	Bintulu
Kota Kinabalu	Davao	Davao	Davao
Muara MCT	Makassar	Bintulu	Bintulu
Makassar	Makassar	Makassar	Makassar
Bitung	Davao	Davao	Davao
Ambon	Davao	Davao	Davao
Davao	Davao	Davao	Davao
General Santos	Davao	Davao	Davao
Zamboanga	Davao	Davao	Davao
Cagayan de Oro	Makassar	Bintulu	Bintulu
Iloilo	Davao	Davao	Davao
Samarinda	Samarinda	Samarinda	Samarinda
Balikpapan	Samarinda	Samarinda	Samarinda

Source: Authors' computation using Zhu linear programming

The model construction: inputs are number of crane depending on the quantity it is possible to operate more ships and faster, the bigger area the more it can stack, length of berth the longer it is the more ships can be handled all lead to port efficiency.

The analysis: The results showed that two terminals were efficient along the three period (2005,2006,2007) Davao, Makassar and Samarinda. MCT efficiency deteriorated during this period from 93.12% to 78.45%. This could effectively due to low utilization of the present yard area and gantry crane in relation to the throughput. But it maybe the case of present situation the input may consider future increase of traffic. Other reasons are as follows. MCT nearest competitors Bintulu port increased its efficiency from 85.03% to 100% and Kota Kinabalu lost its efficiency from 87.43% down to 37.38%. The analysis of three years revealed that Davao is the most frequently served as reference of total 24 in table 11b.

For the improvement of less efficient terminal port managers can adapt organizational practices from the 100% efficiency terminals Rios and Macada, (2006).

Other reasons for being inefficient:

Productivity of terminals, productivity of crane, availability of equipment, not enough equipment, working hours of one terminal maybe 24hrs and the other is less, tractor/trailer are not balance with container crane, if more crane is working on big ship therefore higher productivity than small ship, if a ship has a lot of cargo to

discharge it is faster than a small one. These factors need to be studied in details and more time is needed to gather information and to analyze.

8. Conclusion

The study revealed that there are no relatively larger ports, shipping companies and their alliances are increasing their market share in the expense of smaller ports in the BIMP-EAGA region. In order for a port to survive and be an active part of regional system of ports, it has to compete aggressively for cargo and ships call Leong, (2007). The regional ports can only compete over regional cargo as some ports handled domestic intra island cargo. The terminal

operators that operate the port are mainly port authority and local stevedoring company except Muara port is managed and operated by major player PSA as well as Makassar port which run by ICTSI under cooperation agreement with Pelindo IV. Therefore from port market perspective the BIMP-EAGA region is in pure and perfect competition situation.

Muara MCT appears well suited as a relay hub, being located at the northern rim of the BIMP-EAGA zone. In addition, there is considerable competition, with Kuching and Bintulu having upgraded and or built new cargo-handling facilities recently. Each of these ports is keen to exploit a secondary hub role and it is largely for this reason that all three facilities are also investing in a mix of value-added and logistics ventures. Muara Port's ability to attract transshipment cargo will depend on its ability to level the playing field, to know what competitors are doing, develop significant competitive advantage and offer competitive shipping cost.

9. Recommendations to promote competition

- Institutional change

Industry restructuring allow more responsibility and authority as autonomous body to manage and develop port for instance to cut lengthy procedures in procurement equipment, planning process, investment control, operate and improve the port using its own financial means and maintain revenue that port has generated. This way it will respond faster to changing needs of the industry. In view of the regional ports which operate the ports independent from government rules and regulations, thus (refer to proposed modality of industry restructuring fig. 1a) of service and increase competitiveness.

Fig. 1a Source: Authors' own source

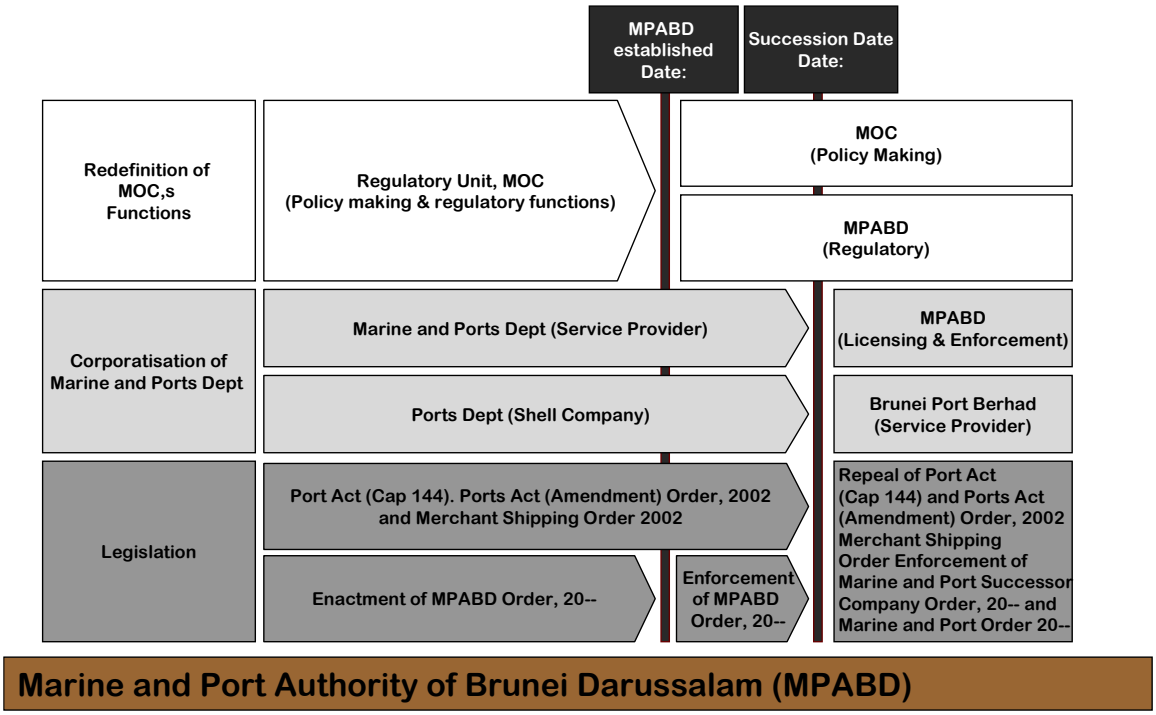


Fig. 1b Source: Authors' own source

- Introduce multi terminal operators to boost the possibility to compete although economies of scale can be compromised in this arrangement. In port lease agreement it is recommended to set up elements where throughput should be increase annually and no increase in price this way to reduce monopoly/increase competition Cariou (2008) and Crook and Ircha (2008).

- Customer relationship marketing- CRM to have good relationship with customer it is not necessarily the cheapest, the competition make so intense some of the customer put more effort on relationship management Ma, (2008).
- To have service differentiation or cost leadership. MCT need to be specialised in order to beat competition or cheap to attract shipping line.
- By knowing the above weakness MCT should devise port strategic planning Unctad, (2008). This would enable MCT to gain market share.
- Chan, (2008) explained:

  " cost is important but it is not the only factor to beat the competition. There are other factors such as productivity, reliability, branding, and management standings, etc. Some ports even use ISO standards as a measure of quality".
- Basic platform for promoting competition is to have a level playing field. If one port is operating to local (interpret to mean unfair "standards") and another port is complying with international standards, then, the first port can be seen as operating at an anti-competitive standards. To promote competition means ideally the ports should be complying with international standards. The reference point would be the various conventions that originated from the IMO.
- To streamline procedures with other government agency with regards to cross-border bureaucratic procedures.
- To stimulate export oriented industry clusters to catalyse the growth of MCT.

Appendix 1 Table 9a
Herfindahl(H) for each ports in the BIMP-EAGA region 2005

			2005 TEU volume	2005 % Market Share	H
Region	**Port**	**Terminal Operator**			
East Malaysia					
Sarawak	Kuching	Kuching port authority	143,096	6.6%	0.00440
	Rajang	Rajang port authority	54,377	2.5%	0.00063
	Bintulu	Bintulu Port Sdn. Bhd.	147,800	6.8%	0.00469
	Miri	Miri port authority	14,739	0.7%	0.00005
	Sarawak total		360,012		
Sabah	Kota Kinabalu	Sabah Port Sdn. Bhd.	147,800	6.8%	0.00469
	Sandakan	Sabah Port Sdn. Bhd.	0	0.0%	0.00000
	Tawau		60,658	2.8%	0.00079
	Sabah total		208,458		
Federal Territory	Labuan		0	0.0%	0.00000
	Federal Territory total		0	0.0%	
Brunei	Muara	Muara, PSA MCT	101,000	4.7%	0.00219
	Brunei total		101,000		
Indonesia					
Kalimantan	Banjarmasin	PT (Persero) Pelabuhan Indonesia IV	0	0.0%	0.00000
	Pontianak	PT (Persero) Pelabuhan Indonesia II	0	0.0%	0.00000
	Samarinda	PT (Persero) Pelabuhan Indonesia IV	129,834	6.0%	0.00362
	Balikpapan		68,168	3.2%	0.00100
	Kalimantan total		198,002		
Sulawesi	Makassar	PT (Persero) Pelabuhan Indonesia IV	236,776	11.0%	0.01204
	Pare-Pare		0	0.0%	0.00000
	Bitung		101,051	4.7%	0.00219
	Pantoloan		18,350	0.9%	0.00007
	Sulawesi total		356,177		
Eastern Indonesia	Biak	PT (Persero) Pelabuhan Indonesia IV	4,204	0.2%	0.00000
	Ternate		10,176	0.5%	0.00002
	Jayapura		22,792	1.1%	0.00011
	Ambon		35,195	1.6%	0.00027
	Sorong		11,197	0.5%	0.00003
	Eastern Indonesia total		83,564		

Philippines South Mindanao	Davao	Filipinas Port Services, Inc.Davao Integrated Port Services & Stevedoring Corp.	225,721	10.5%	0.01094
	General Santos	South Cotabato Integrated Port Services, Inc.	110,108	5.1%	0.00260
	Zamboanga	Unified Stevedoring & Arrastre Corp. Zamboanga Arrastre and Stevedoring Corp. PTC-Mindanao Port Services, Inc.	64,093	3.0%	0.00088
	South Mindanao total		399,922		
North Mindanao	Cagayan de Oro	Oroport	202,236	9.4%	0.00878
	Iligan	Iligan Merged Arrastre and Stevedoring Co.	24,953	1.2%	0.00013
	Nasipit	Nasipit Integrated Arrastre & Stevedoring Srvcs, Inc.	41,776	1.9%	0.00037
	Ozamiz	Integrated Port Services of Ozamiz	31,046	1.4%	0.00021
	Surigao	Bilang-Bilang Arrastre/Stevedoring Service, Inc.	4,421	0.2%	0.00000
	North Mindanao total		304,432		
Visayas	Dumaguete	Cipres Srevedoring and Arrastre, Inc.	23,330	1.1%	0.00012
	Iloilo	Iloilo Integrated Arrastre and Stevedoring Co. Visayan Veterans Port Services, Inc.	87,193	4.0%	0.00163
	Ormoc	Ormoc Dockhandlers, Inc.	9,391	0.4%	0.00002
	Tacloban	Leyte Integrated Port Services, Inc.	9,388	0.4%	0.00002
	Tagbilaran	Tagbilaran Maritime Services, Inc.	17,175	0.8%	0.00006
	Visayas total		146,477		
	Other			-	
	Total BIMP-EAGA market		**2,158,044**	**100%**	**0.06257**

Source: Author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority
Note. Red character indicates data is unavailable
Labuan port- Federal Territory handled 12,680 TEU, Sandakan - 23,439 TEU, Banjarmasin-142,626 TEU, Pontianak-98,747 TEU in 2002

Table 9b
Herfindahl Index (H) for each ports in the BIMP-EAGA region 2007

			2007 TEU volume	2007 % Market Share	H
Region East Malaysia	**Port**	**Terminal Operator**			
Sarawak	Kuching	Kuching port authority	163,338	6.7%	0.00445
	Rajang	Rajang port authority	65,908	2.7%	0.00072
	Bintulu	Bintulu Port Sdn. Bhd.	251,800	10.3%	0.01057
	Miri	Miri port authority	21,296	0.9%	0.00008
	Sarawak total		502,342		
Sabah	Kota Kinabalu	Sabah Port Sdn. Bhd.	183,608	7.5%	0.00562
	Sandakan	Sabah Port Sdn. Bhd.	0	0.0%	0.00000
	Tawau		87,402	3.6%	0.00127
	Sabah total		271,010		0.00000
Federal Territory	Labuan		0	0.0%	0.00000
	Federal Territory total		0	0.0%	0.00000
Brunei	Muara	Muara, PSA MCT	108,000	4.4%	0.00194
	Brunei total		108,000		
Indonesia Kalimantan	Banjarmasin	PT (Persero) Pelabuhan Indonesia IV	0	0.0%	0.00000
	Pontianak	PT (Persero) Pelabuhan Indonesia II	0	0.0%	0.00000
	Samarinda	PT (Persero) Pelabuhan Indonesia IV	139,046	5.7%	0.00322
	Balikpapan		78,163	3.2%	0.00102
	Kalimantan total		217209		
Sulawesi	Makassar	PT (Persero) Pelabuhan Indonesia IV	282,573	11.5%	0.01331
	Pare-Pare		0	0.0%	0.00000
	Bitung		113,847	4.6%	0.00216
	Pantoloan		19,050	0.8%	0.00006
	Sulawesi total		415,470		0.00000
Eastern Indonesia	Biak	PT (Persero) Pelabuhan Indonesia IV	5138	0.2%	0.00000
	Ternate		16,052	0.7%	0.00004
	Jayapura		35,744	1.5%	0.00021
	Ambon		40,511	1.7%	0.00027
	Sorong		15,682	0.6%	0.00004
	Eastern Indonesia total		113127		

Philippines South Mindanao	Davao	Filipinas Port Services, Inc.Davao Integrated Port Services & Stevedoring Corp.	298,675	12.2%	0.01487
North Mindanao	General Santos	South Cotabato Integrated Port Services, Inc.	103,577	4.2%	0.00179
	Zamboanga	Unified Stevedoring & Arrastre Corp. Zamboanga Arrastre and Stevedoring Corp. PTC-Mindanao Port Services, Inc.	63,675	2.6%	0.00068
	South Mindanao total		465,927		
	Cagayan de Oro	Oroport	161,992	6.6%	0.00437
	Iligan	Iligan Merged Arrastre and Stevedoring Co.	18,737	0.8%	0.00006
	Nasipit	Nasipit Integrated Arrastre & Stevedoring Srvcs, Inc.	27,436	1.1%	0.00013
	Ozamiz	Integrated Port Services of Ozamiz	28,826	1.2%	0.00014
	Surigao	Bilang-Bilang Arrastre/Stevedoring Service, Inc.	4,132	0.2%	0.00000
Visayas	North Mindanao total		241,123		0.00000
	Dumaguete	Cipres Srevedoring and Arrastre, Inc.	15,524	0.6%	0.00004
	Iloilo	Iloilo Integrated Arrastre and Stevedoring Co. Visayan Veterans Port Services, Inc.	75,782	3.1%	0.00096
	Ormoc	Ormoc Dockhandlers, Inc.	5,329	0.2%	0.00000
	Tacloban	Leyte Integrated Port Services, Inc.	7,538	0.3%	0.00001
	Tagbilaran	Tagbilaran Maritime Services, Inc.	11,298	0.5%	0.00002
	Visayas total		115,471		
	Other			-	
	Total BIMP-EAGA market		**2,449,679**	**100.0%**	**0.06805**

Source: Author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority
Note. Red character indicates data is unavailable
Labuan port- Federal Territory handled 12,680 TEU, Sandakan - 23,439 TEU, Banjarmasin-142,626 TEU Pontianak-98,747 TEU in 2002

Appendix 2 Table 4

Container growth of ports in the BIMP-EAGA region

			2002 TEU volume	2003 TEU volume	2004 TEU volume	2005 TEU volume	2006 TEU volume	2007 TEU volume	Growth
Region	**Port**	**Terminal Operator**	2002	2003	2004	2005	2006	2007	
East Malaysia									
Sarawak	Kuching	Kuching port authority	117,032	138999	141,227	143,096	152,394	163,338	7.08%
	Rajang	Rajang port authority	44,908	50,839	53,740	54,377	53,741	65,908	8.31%
	Bintulu	Bintulu Port Sdn. Bhd.	104,081	145,661	143,783	147,800	199,644	251,800	20.53%
	Miri	Miri port authority	7,422	13,300	14,402	14,739	16,644	21,296	26.14%
	Sarawak total					360,012	422,423	502,342	
Sabah	Kota Kinabalu	Sabah Port Sdn. Bhd.	113,846	0	0	147,800	156,386	183,608	11.61%
	Sandakan	Sabah Port Sdn. Bhd.	23,439	0	0	0	0	0	
	Tawau		33,628	0	0	0	72,698	87,402	20.23%
	Sabah total					147,800	229,084	271,010	
Federal Territory	Labuan		12,680	0	0	0	0	0	0.00%
Brunei	Muara	Muara, PSA MCT	67104	76,515	97,667	101,000	100,719	108,000	10.41%
	Brunei total					101,000	100,719	108,000	
Indonesia									
Kalimantan	Banjarmasin	PT (Persero) Pelabuhan Indonesia	0	0	0	0	0	0	
	Pontianak	PT (Persero) Pelabuhan Indonesia II	0	0	0	0	0	0	
	Samarinda	PT (Persero) Pelabuhan Indonesia IV	0	0	0	125,816	129,834	139,046	5.14%
	Balikpapan		0	0	0	68,168	66,069	78,163	7.61%
	Kalimantan total					193,984	195,903	217,209	
Sulawesi	Makassar	PT (Persero) Pelabuhan Indonesia IV	0	227,884	230,000	236,776	245,803	282,573	5.66%
	Pare-Pare		0	0	0	0	0	0	
	Bitung		0	0	0	101,051	98,926	113,847	6.49%
	Pantoloan		0	0	0	18,350	17,694	19,050	2.04%
	Sulawesi total		0	0	0	356,177	362,423	415,470	

Eastern Indonesia	Biak	PT (Persero) Pelabuhan Indonesia IV	0	0	0	4,204	4,334	5138	10.82%
	Ternate		0	0	0	10,176	14,077	16,052	26.18%
	Jayapura		0	0	0	22,792	27,786	35,744	25.28%
	Ambon		0	0	0	35,195	37,660	40,511	7.29%
	Sorong		0	0	0	11,197	16,766	15,682	21.64%
	Eastern Indonesia total					83,564	100,623	113127	
Philippines South Mindanao	Davao	Filipinas Port Services, Inc.Davao Integrated Port Services & Stevedoring Corp.	176,679	202,016	226,018	225,721	258,104	298,675	11.23%
	General Santos	South Cotabato Integrated Port Services, Inc.	116,807	115,256	120,548	110,108	97,323	103,577	-2.12%
	Zamboanga	Unified Stevedoring & Arrastre Corp. Zamboanga Arrastre and Stevedoring Corp. PTC-Mindanao Port Services, Inc.	62615	69,884	63,499	64,093	60,204	63,675	0.62%
	South Mindanao total					399,922	415,631	465,927	
North Mindanao	Cagayan de Oro	Oroport	182169	194,929	206,215	202,236	178,458	161,992	-2.02%
	Iligan	Iligan Merged Arrastre and Stevedoring Co.	24473	24,006	27,636	24,953	24,499	18,737	-4.37%
	Nasipit	Nasipit Integrated Arrastre & Stevedoring Srvcs, Inc.	25,532	28,456	35,266	41,776	33,619	27,436	3.19%
	Ozamiz	Integrated Port Services of Ozamiz	29,395	28,567	34,623	31,046	29,255	28,826	0.16%
	Surigao	Bilang-Bilang Arrastre/Stevedoring Service, Inc.	5,624	5,970	6,192	4,421	4,140	4,132	-5.06%

	North Mindanao total					304,432	269,971	241,123	
Visayas	Dumaguete	Cipres Srevedoring and Arrastre, Inc.	22,971	23,233	22,470	23,330	20,529	15,524	-6.94%
	Iloilo	Iloilo Integrated Arrastre and Stevedoring Co. Visayan Veterans Port Services, Inc.	97,837	97,665	97,712	87,193	84,485	75,782	-4.86%
	Ormoc	Ormoc Dockhandlers, Inc.	6,102	8,376	9,081	9,391	8,824	5,329	0.69%
	Tacloban	Leyte Integrated Port Services, Inc.	20,978	17,901	16,934	9,388	5,804	7,538	-14.59%
	Tagbilaran	Tagbilaran Maritime Services, Inc.	15,755	18,002	17,788	17,175	14,616	11,298	-5.59%
	Total BIMP-EAGA market					**2,158,044**	**2,231,035**	**2,449,679**	

Source: Author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority,
Note. Red character indicates data is unavailable
Labuan port- Federal Territory handled 12,680 TEU, Sandakan - 23,439 TEU, Banjarmasin-142,626 TEU, Pontianak-98,747 TEU in 2002

Appendix 3 Table 10

Port infrastructure in the BIMP-EAGA region

Region	Port	Berth name/number	Length (m)	Depth (m)	Yard (ha)	No. of cranes or cargo handling method	Berth use/cargo handled	Notes
East Malaysia								
Sarawak	Kuching	Pending Terminal	1248	8.5-11	33	Ships gear	Containers	Also has oil jetties
		Sejingkat Terminal	125	9	1	Ships gear	Containers/general cargo	
	Rajang	Sibu	448	8.5	8	Ships gear	Containers/general cargo	General cargo capacity of 450,000m3. Bulk oil facility at Sungai Merah
		Sarikei	146	7.6	1	Ships gear	Containers/general cargo	General cargo capacity of 104,000m3
		Tanjung Manis	203	10	5	Ships gear	Containers/general cargo	General cargo capacity of 200,000m3
	Bintulu	Container Terminal	480	10.5-13.5	7	2 gantry crane	Containers/general cargo	Expansion plans
	Miri	General cargo berth	254	2.1		Ships gear	Containers/general cargo	Container terminal built?
Sabah	Kota Kinabalu	South Jetty	689	5.8-9.5	4	Ships gear	Containers	Shore cranes only but move
		Berths 1-7	1285	5.8-9.6	25	Ships gear	Containers/general cargo	6-18 teu per hour
	Sandakan	SPA Wharf	576	11	3	Ships gear	Containers	Further 507m general cargo berth
	Tawau	Berths 1 &2	655	06-Sep	12	Ships gear	Containers/general cargo	Also has oil jetties
Federal Territory	Labuan	New Liberty/Victoria wharves	328	7.6-8.2	2	Ships gear	Containers/general cargo	Also a bulk/passenger port
Indonesia								
Kalimantan	Pontianak	Berths 1-3	527	2.5-5	5	2 gantry crane, 2 reach stackers, 3 top loaders, 3 side loader,11 chasis,7 head truck	Containers/general cargo	Wooden jetties

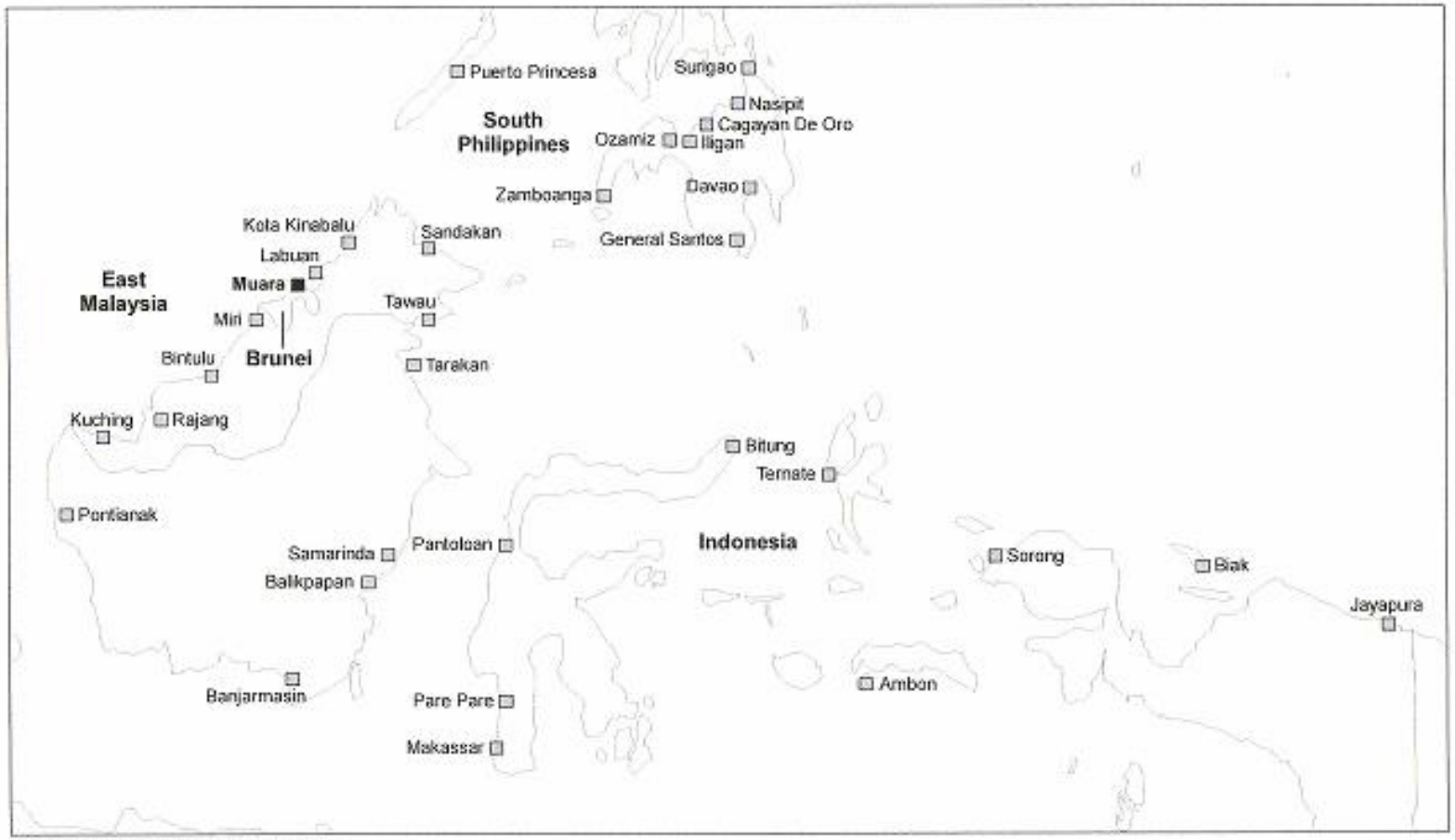
	Samarinda	Two wooden wharves in very poor condition, with 2 x 12t mobile cranes. Not sufficient for container activity	937	5.5	2	2 shore crane, 3 forklif	Containers/general cargo	
	Balikpapan	11 berths-all tanker/dry bulks, no container activity	675	12	1.4	2 shore crane, 3 forklift, 2 truck loader		
	Banjarmasin	Trisakti wharf	200	8.0-10.0	7	Ships gear	Negligible container activity	
Sulawesi	Makassar	Hatta Quay	850	11	12	4 gantry crane,14 head truck,32 chasis,8 transtainer,2 reach stacker,2 top loader	Container	General/bulk wharves, 5mhcs,800m quay
	Pare-Pare	Two wharves	145	8.0-15.0	10	Ships gear	Predominantly livestock	Export livestock and cruise traffic only
	Bitung	Pier nos: 0-150, 150-382, 392-582	1,420	7	5	1 gantry crane, 2 transtainer, 3 head truck, 2 reach stacker, 3 chasis	General cargo	No dedicated container wharf, although has been considered
	Pantoloan	Cargo berth	75	8.4	0	1 x 15t	General cargo	No container-no landside facilities
Eastern Indonesia	Biak	Cargo berth	142	12	0	1 x mhc	General cargo	No container-no landside facilities
	Ternate	Yani Wharf	248	7.6	1	1 x mhc	General cargo	General/bulk wharves
	Jayapura	Wharf 1 & 2	248	5.8-8.8	5	1 x 25t mhc	General cargo	Port condition, no container capability
	Ambon	Yos (Jos) Sudaraso Quay	450	7.5-12.7	10	Mhc's to 40t	Containers/general cargo	Also oil wharf.Max cargo vessel 187m, 12m draft
	Sorong	General cargo berth	280	9.0-11.0	3	Ships gear	General cargo	Oil wharf. Passenger ships via cargo wharf also
South Philippines								
South Mindanao	Davao	9 multi purpose berth	920	10.6	5.3 ha	3xmch's/ships gear Ro-Ro	Containers/general cargo	

	General santos	Makar wharf	740	10.5-12.0	3 ha.	2 panamax/1x mhc Ships gear/Ro-Ro	Container/general cargo	SBCT main container centre (ICTSI)
	Zamboanga	Multi purpose berth	320	10	2.4	Ships gear/Ro-Ro	Container/general cargo	
North Mindanao	Cagayan De Oro	Macabalan wharf phases I/II (6 berths)	1,154m	8.5-11	10.5	1xgantry/mhc Ships gear/Ro-Ro	Container/general cargo	Mindanao container terminal project, roro/tankers/passenger also
	Iligan	Multi purpose berth	520	5.4	8,623 sq.m.	Ships gear/Ro-Ro	Containers/general cargo	bulks
	Nasipit	Container berth	184	7	1	Ships gear/Ro-Ro	Containers/general cargo	
	Ozamiz	Multi purpose berth	633	6.0-7.0	1.6 ha.	Ships gear/Ro-Ro	Containers/general cargo	
	Surigao	Berth 1-4	529	8	1.5 ha.	Ships gear	Containers/general cargo	Predominately port for luxury pleasure craft
	Dumaguete	Pier 1 & 2	166m x 30m 79m x 16m	5.0-8.0	1,945 sq.m.	Ships gear/Ro-Ro	Containers/general cargo	
Visayas	Iloilo	Multi purpose berth	513 Domestic 400 Foreign	6-10.5	1.7 ha. 2.7 ha.	Ships gear/Ro-Ro	Containers/general cargo	
	Ormoc	Multi purpose berth	218 m. Pier	4.0-5.0	2,709 sq.m.	Ships gear/Ro-Ro	Containers/general cargo	
	Tacloban	Multi purpose berth	622	4.0-6.0	6,939 sq.m.	Ships gear	Containers/general cargo	
	Tagbilaran	5 multi purpose berth	265	6.0-9.0	3.3 ha	Ships gear/Ro-Ro	Containers/general cargo	
Brunei	Muara	Muara Container Terminal	250 m	12.5 m	5 ha	2 panamax gantry crane	Containers	Container terminal capacity of 220,000 TEU

Source: Drewry Shipping Consultant Ltd and author's compilation from Brunei, Indonesia, Malaysia and Philippines Port Authority,

Appendix 4

Figure 2
Ports competing with MCT in the BIMP-EAGA region



Source: Drewry Shipping Consultants Ltd

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