# IMPACT OF THE KRA CANAL ON CONTAINER SHIPS' SHIPPING TREND AND PORT ACTIVITIES IN THE STRAITS OF MALACCA

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**ABSTRACT**

The Straits of Malacca is one of the busiest straits and the shortest route connecting Asia and Europe. The congestion and the geographical condition of the Straits of Malacca have created concern to user states especially China that suggested a canal and ready to finance the construction of the canal which will be located somewhere across the southern part of Thailand. According to China, this canal is able to solve the congested situation in the Straits of Malacca and also poses a more rational option to reduce travelling time and costs. The plan to construct Kra Canal will pose several impacts to Malaysia's ports, which have been analysed using PESTEL analysis.

**Keywords:** Straits of Malacca, Kra Canal, Containers Throughput, PESTEL Analysis

## BACKGROUND

Maritime transportation has been the backbone and currently still continue supporting the development and growth of the global economy. International shipping industry is currently responsible for 80% of global trade. World seaborne trade volume increased by 4% in 2017 from 2.6% in 2016 and 1.8% in 2015. Total volume of cargo has reached 10.7 billion tons, where 24.3% was contributed by containerised cargo (UNCTAD, 2018). The delivery of cargoes is connected through ports located in strategic locations along the shipping routes across the globe. Countries around the world trade raw materials, components or finished products such as medicines, electronic accessories, crude oil and also automotive parts. All these business transitions depend heavily on vessels as the main transportation.

Delivering of cargoes around the globe by using vessels can be completed by selecting limitless number of routes connecting North America, Europe and Pacific Asia through the Suez Canal, the Panama Canal and the Straits of Malacca (Rodriguez, 2017). Vessels sail to ports for different purposes such as discharging, loading, repair and crew change. Choosing a suitable route to deliver cargoes can produce significant benefits to shipping companies. Usually, the objective of selecting proper shipping route is to minimise operational cost. However, these routes came with its own hazards such as treacherous sea condition, piracy and heavy traffic. This paper will focus on the impact of container vessels shipping trend that may affect the Straits of Malacca, if the Kra Canal located in the southern part of Thailand becomes a reality and also to analyse the impact created by the Kra Canal to Malaysia's port activities by using PESTEL analysis.

### Container Trade in Malaysia's Main Ports

Global containerised trade increased by 6.4% in 2017. The increase in trade was supported by a recession in Brazil and the Russian Federation, increased in demand from China and United States and improved commodity prices (UNCTAD, 2018). Table 1 shows the number of vessels using the Straits of Malacca from 2010 until 2017. Based form Table 1, it shows a decreasing number of container ships operating in Malaysian ports. Beside the demand of goods from Malaysia, the latest technology and size of container ships also play an important role that contribute to the reduction of number for container ships operating in the Straits of Malacca. The increase in size also comes together with the increase in the efficiency of operating a container vessel, in which a vessel around 8,000 Twenty-foot Equivalent Unit (TEU) would consume about 225 tons of bunker fuel per day at 24 knots. At 21 knots this consumption drops to about 150 tons per day, a 33% decline (Rodrigue, 2017). This translate into operating cost efficiency.

Table 1 Number of Vessels Reporting Under STRAITREP from 2010 until 2017
(Source: The Marine Department of Malaysia)

| Type of Vessel | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| VLCC / Deep Draft | 4333 | 4539 | 4732 | 4825 | 4993 | 5324 | 5973 | 6711 |
| Tanker Vessel | 16247 | 16223 | 17345 | 18296 | 18765 | 18470 | 19466 | 20629 |
| LNG Carrier | 3579 | 3830 | 4014 | 4248 | 4173 | 3936 | 4057 | 4137 |
| Cargo Vessel | 8445 | 7996 | 7950 | 7613 | 6989 | 7144 | 7225 | 7090 |
| Container Vessel | 24806 | 25552 | 24639 | 24658 | 25071 | 25389 | 25768 | 24446 |
| Bulk Carrier | 11642 | 10851 | 11678 | 12658 | 13454 | 15168 | 15547 | 15411 |
| Ro-Ro | 2624 | 2545 | 2980 | 2998 | 3146 | 3117 | 2873 | 2629 |
| Passenger Vessel | 1071 | 877 | 861 | 1063 | 1041 | 925 | 1294 | 1776 |
| Livestock Carrier | 45 | 47 | 38 | 55 | 59 | 76 | 75 | 50 |
| Tug / Tow | 545 | 414 | 529 | 563 | 676 | 467 | 580 | 533 |
| Government Vessel | 37 | 57 | 50 | 58 | 96 | 87 | 53 | 54 |
| Fishing Vessel | 20 | 20 | 52 | 27 | 51 | 53 | 25 | 28 |
| Others | 739 | 577 | 609 | 911 | 830 | 803 | 786 | 962 |
| **TOTAL** | **74133** | **73528** | **75477** | **77973** | **79344** | **80959** | **83740** | **84456** |

Table 2 shows the total containers handled by Port Klang, Penang Port and Johor Port for the years between 2010 and 2017. These ports are directly located along the Straits of Malacca. Even though there was instability in the world economy that also affected Malaysia, containers movement operated by these ports have constantly increased in number with a slight reduction in certain years. This event was contributed by the development of Kyaupyu Port in Myanmar, which is located on the western part of Myanmar just before entering the Straits of Malacca from the Indian Ocean (Figure 1). Besides Kyaupyu Port, Malaysia also faces strong competition from Singapore that has the second highest container throughput in 2017 with 33.67 million TEU. On the other hand, Port Klang was positioned at eleventh position with 12.06 million TEU in 2017, whilst the highest container handling was dominated by Shanghai, China with 40.23 million TEU.

Table 2. Total Containers Throughput by Ports in Malaysia (Source: The Asean Ports Association Malaysia, MAPA and Marine Department of Malaysia)

| No | Ports | Activities | Years | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** |
| 1 | Klang | Export | 1703581 | 1673333 | 1821995 | 1860613 | 1942773 | 1979828 | 2063736 | 2170053 |
| | | Import | 1732089 | 1739621 | 1873257 | 1915603 | 1962431 | 1976188 | 2038527 | 2174746 |
| | | Transhipment | 5434626 | 6022454 | 6305963 | 6574193 | 7040600 | 7930669 | 9107314 | 7642358 |
| | | **Total TEU** | **8870296** | **9435408** | **10001215** | **10350409** | **10945804** | **11886685** | **13209577** | **11987157** |
| 2 | Penang | Export | 492016 | 570500 | 565516 | 593785 | 594255 | 612993 | 681463 | 723632 |
| | | Import | 506841 | 557050 | 538074 | 565894 | 563557 | 603007 | 661323 | 651922 |
| | | Transhipment | 68316 | 74629 | 62143 | 78034 | 107900 | 101352 | 94334 | 94273 |
| | | **Total TEU** | **1067173** | **1202179** | **1165733** | **1237713** | **1265712** | **1317352** | **1437120** | **1469827** |
| 3 | Johor | Export | 394192 | 344213 | 332905 | 339939 | 350721 | 364705 | 373986 | 411989 |
| | | Import | 371463 | 349632 | 350826 | 380055 | 383407 | 408481 | 428793 | 474096 |
| | | Transhipment | 110613 | 136495 | 117327 | 37029 | 58373 | 27338 | 24234 | 14607 |
| | | **Total TEU** | **876268** | **830340** | **801058** | **757023** | **792501** | **800524** | **827013** | **900692** |

**The Straits of Malacca**

The Straits of Malacca is one of the busiest straits in the world that connects the China Sea with the Indian Ocean (Rimmer and Lee, 2007). The Straits of Malacca is the best and the shortest solution for vessels sailing from the Horn of Africa and the Persian Gulf to East Asia and the Pacific Ocean (Evers and Gerke, 2006; Arof, 2010; Jeevan, Othman and Mohd Salleh, 2018). Although it is located along the world's most vibrant economic region, the geographical structure for the Straits of Malacca combined with high number of vessels passing through, it forms a traffic bottleneck or choke point that is really dangerous for vessels. The Straits of Malacca stretch around 890 km in length with its narrowest point is only 2.8 km (Qu and Meng, 2012) with range of depth of between 20 – 28 metres (Sun, 2017). Figure 1 shows the critical maritime trade chokepoints in the world. Figure 2s show the locations of traffic bottleneck or choke points in the South East Asia and the Straits of Malacca.

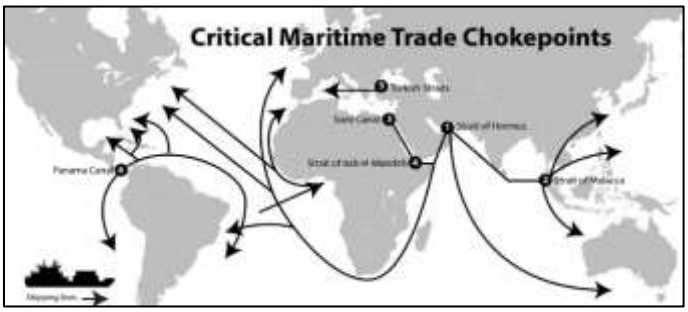


Figure 1. Critical Maritime Trade Chokepoints in The World
(Source: theepochtimes.com)


Figure 2. The Dimension of Choke – Point along the Straits of Malacca
(Source: theepochtimes.com)

Based on a report produced by a Singapore based Nippon Maritime Centre (NMC) and the figures from The Marine Department of Malaysia, vessels passing through the Straits of Malacca had consistently increased from 2011 with 73 528 vessels to 84 456 vessels in 2017. Analysing the data further, Klang Vessel Traffic System (VTS) reports an increase number of vessels passing through the Straits of Malacca per day from an average of 222 in 2015 to 231 in 2017. This value is equivalent to around ten vessels entering or leaving the Straits of Malacca every hour or one vessel every six minutes (Nippon Maritime Centre, 2018). There were claims on the limited availability of tools for navigation in the Straits as the littoral states were considered as newly independent countries. The current condition of the Straits of Malacca is limited to Malaccamax-size vessel with a draught of around 21 metres (Pålsson, 2011). A typical Malaccamax vessel dimension has a length of around 400 metres with 60 metre-beam and a deadweight tonnage (DWT) of 300,000 tons (Maritime Connector, 2007).

**The Kra Canal**

In the southern part of Thailand, the Indian Ocean and the South China Sea is separated by a land called the Kra Isthmus (Chuapibul, 1984). It is only logical to create a canal at the narrowest part of the land to reduce the construction cost and to enable the canal to be completed on time. The width of the narrowest part of the southern Thailand is only 44 kilometres. However, because of the mountain reaches up to several kilometres above the sea level, most suggestions about the Kra Canal length vary between 50 to 100 kilometres (Verley, 2015).

The Thai National Energy Authority completed a study in 1972 about four different routes to build the canal. The first route was between Ranong Province and Lang Suan in Chumphon Province, which would be around 120 kilometres in length. This route was not feasible due to the area is rich in ores and contain excessive rocks. It would also require 15 locks to increase the water level. Furthermore, Ranong is located close to the Myanmar – Thailand border. The power to control the canal may be disputed by the two countries. The second route was between Sikao, Tranf Province and Ranot, Songkhla Province. This route was also not suitable because of excessive rocks located along the 180 kilometre-route. It was also not suitable to build berths at the entrance and the exit of the canal. Next route would be 155 kilometres in length located between Satun Province, along Rat Ta Phum and Lake Songkhla, Songkhla Province. However, this route is adjacent to Thailand-Malaysia border. The final route would be between Phangnga Province and Ao Ban Don, Tha Chang District. It is a 200-kilometre route and consider the most appropriate route to construct the canal. The Thai National Energy Authority had estimated the construction cost of the canal based on the price of USD 1.00 equal to 20 Baht in 1972, in which the total cost was USD 450 million, which equal to 9 billion Baht (Chuapibul, 1984). In 2017, the cost to construct the Kra Canal was estimated between USD 20 Billion to USD 28 Billion (The New Straits Times, 2017) with an increase of 99.76%. The proposed dimension of the canal is 102 kilometres in length, 400 metres in width and 25 metres in depth. This dimension is to cater for vessels up to 300,000 DWT and has been verified by the Kra Canal International Forum (2014).


Figure 3. Proposed Location for the Kra Canal

The purpose of the Kra Canal is to directly connect the Gulf of Thailand to the Andaman Sea (Kewalramani, Kanisetti and Kini, 2018) thus

reducing voyage time from one point to another. The plan to construct the Kra Canal as an alternatives route to escape the high traffic in the Straits of Malacca is a great idea. Therefore, this canal will be suitable for vessels to cross and avoid several hazards along the Straits of Malacca (Thapa, Kusanagi, Kitazumi and Murayama, 2007).

**Similarities between the Kra Canal, Panama Canal and Suez Canal**

The main function of all canals is to create a shortcut for vessels to sail and for faster arrival to the destinations. It would require ten hours to cross the Panama Canal that connects the Caribbean Sea and the Pacific Ocean, while it will take four weeks to travel to the same destinations around the Cape of Horn in South America. Regarding the Suez Canal, for example, a vessel from Mumbai (India) headed to England would require to sail around 19,800 kilometres around the Cape of Good Hope in South Africa. However, if the vessel sailed through the Suez Canal, the distance is around 11,600 kilometres (Basa, 2016). Similar concept can be applied to the Kra Canal that connects the Gulf of Thailand with the Andaman Sea. Research has shown that the Kra Canal can save around 1,200 kilometres, which is equivalent to between three and five days of voyage (Kewalramani, Kanisetti, Kini, 2018).

Next, the cost to create this canal is very high and requires specialised machineries, numerous man power and lengthy construction time. When construction is completed, the cost to maintain the canal in its maximum operational capabilities would be even higher. Furthermore, as the size of vessels continues to get bigger, certain expansion or improvement needs to be done to facilitate these vessels. Construction cost for the Suez Canal in 1869 was USD 100 million (Briney, 2019), while the cost to construct the Panama Canal in 1941 was USD 500 million. The expansion cost of the Panama Canal was estimated around USD 17 billion (Gardner, Moreno, 2015). In 2017, the cost to construct the Kra Canal was estimated between USD 20 Billion to USD 28 Billion (The New Straits Times, 2017).

These canals were also subjected to confrontation between certain parties (Jeevan, Othman and Mohd Salleh, 2018). Conflicts occurred between United Kingdom and Egypt in 1936 where United Kingdom was given the right to maintain military forces and control entry points. In 1954 both countries signed a seven-year contract resulted in the withdrawal of United Kingdom military forces. Similar event can happen to the Kra Canal. China and Thailand will compete among each other on which country should manage the canal. Currently, China is willing to provide major funding and also technological support to Thailand. By doing so, China hopes to get a major share of the benefits when the construction is completed, which is estimated about ten years. However, Thailand will ensure her sovereign rights are protected from any external powers.

**PESTEL Analytical Tool**

PESTEL is an acronym for an analytical tool formed by six different factors that need to be evaluated, which are Political, Economic, Social, Technology, Environment and Legal. This analytical tool is used to evaluate the external environment before starting a project (Alanzi, 2018). PESTEL can be used to focus in identifying trend, thus the finding from the analysis can be utilised as a proactive measure to anticipate changes, rather than being overtaken by the situation (UNISEF KE Toolbox). Political factors will consider the influence to the economy by the government regarding to certain industries. A long term effect that directly impact the economic performance of a country or company will be determined in the economic section. On the social side, the advantages and the disadvantages to the people of the area in which the project is taking place will be analysed. Analysing process will include cultural expectations, norms, population dynamics, health consciousness, and career altitudes. Global warming and other related factors should also be considered. Technological factor will consider the automation, research and development and the number of technology awareness that a market possesses. All legal aspects related to the project like employment, quotas, taxation, resources, imports, exports and contract duration will be analysed in the legal section. Environmental factor will consider all the variables that can be influenced by the neighbouring environment. The analysis includes but are not limited to climate, weather, geographical location, global changes in climate, environmental offsets, ground conditions, contamination and pollution (Rastogi and Trivedi, 2016).

Regarding to the political aspects, Malaysia and Thailand will have more Memorandum of Understanding related to maritime industry. Malaysia also needs to revise their existing relationship with other countries as the focus of trading will change location. Furthermore, Port Klang, Penang Port and Johor Port will have to establish several partnerships with main container operators to ensure these ports are sustainable. This is to ensure that if new ports are developed in Thailand, Myanmar or India, Malaysia's

ports can still remain competitive. As for the economic aspect, Penang Port will most likely be a new hub for Malaysia. Penang Port needs to grow rapidly to attract ship operators because of its location that is near to the proposed canal. Furthermore, the Tok Bali Port can be developed as a bunker fuel supplier to all vessels, especially for vessels passing through the Kra Canal. The partnership or alliances between port and main container operators will help in providing technical and financial assistance in the development of ports. The negative impact to Malaysian economy is that, main ports are expected to see a reduction in trading activities that will directly affect the port revenue and profit. Reduction in trading will translate into less import and export. Subsequently, it will affect road haulage, logistics and supply chain companies.

The improvement in social lifestyle for people residing in the northern part of Peninsular Malaysia are expected when the changes in investment happen. The downside of the canal project to Malaysia's maritime activities is the increase in unemployment rate. It is possible that logistics and supply chain companies will reduce and downsize their operations and move to the Northern part of Malaysia. As was reported in India, a major container operator shut down one of its container freight stations (CFS) as an overall cost cutting measures and 500 workers were retrenched. Penang Port will see a technological upgrade in its port to increase its efficiency in operations. Based on Table 1, the number of container vessels operating in the Straits of Malacca reduced from 25 768 vessels in 2016 to 24 446 vessels in 2017. A factor contributing to this decline was the increased of sizes of new container vessels. The increase in size of vessels will increase the number of TEU that a container ship can carry. A new container hub will require several arrangements to ensure these large vessels can be accommodated. As the size of container ships increases along with the modernisation of ports, ports just need bigger gantry cranes that can reach further out across the ship, stronger quayside to withstand the weight of larger ships pulling and pushing because of wind and waves effect. However, to ensure these technological advancements can be achieved, a large amount of investment is needed. Penang Port can also apply the green port technology to further attract investors.

Regarding to the environmental aspect, the pollution from ships' emission along the straits will be reduced. There is also potential for local marine habitat and ecosystem to begin to recover. However, the reduction of pollution in the Straits of Malacca will be replaced by the increase of pollutions in the Northern part of Malaysia such as in Penang and Langkawi Island and also in the East Coast located in the Tok Bali Port. There are possibilities that new species of marine life will be introduced to the surrounding area of the canal because of exchange of sea water used for ballast or cooling. Several cases had been reported regarding to oil pollution from ships, either because of collision, intentional or unintentional dumping of oil. Oil pollution will result in loss of income for fishermen who depend on the Northern and Eastern sea area of Peninsular Malaysia as their primary fishing spots. Besides that, several research has been done to confirm that waves generated from high shipping activities can contribute to coastal erosion. According to Khazanah Nasional (2011), coastal erosion in Tanjung Piai was estimated between 7 to 11 metres a year. Malaysia needs to increase its military presences in the Northern part of the Peninsular. The Southern part of Thailand is well known for its separatist violence and ethno-religious conflicts that could disrupt Malaysia's stability if the violence escalates. It is a part of legal action to protect Malaysia's sovereignty. Regarding to the partnership with main container operators, several information regarding security can be exchanged to increase further the operation awareness in ports and on board those vessels. The summary of the PESTEL analysis is as per Table 3.

Table 3: Summary of the PESTEL Analysis

| | |
|---|---|
| Political | 1. Malaysia and Thailand will have more Memorandum of Understanding related to maritime industry.<br>2. Revise their existing relationship with other countries as the focus of trading will change location. |
| Economic | 1. Establish several partnerships with main container operators to ensure these ports are sustainable.<br>2. Penang Port will most likely be a new hub for Malaysia.<br>3. Tok Bali Port can be developed as a bunker fuel supplier to all vessels, especially for vessels passing through the Kra Canal.<br>4. The negative impact to Malaysian economy is that, main ports are expected to see a reduction in trading activities. |
| Social | 1. The improvement in social lifestyle for people residing in the northern part of Peninsular |

| | |
|---|---|
| | Malaysia are expected to change.<br>2. The downside of the canal project to Malaysia's maritime activities is the increase in unemployment rate.<br>3. Logistics and supply chain companies may reduce and downsize their operations and move to the Northern part of Malaysia. |
| Technology | 1. Penang Port will see a technological upgrade in its port to increase its efficiency in operations.<br>2. Penang Port can also apply the green port technology to further attract investors. |
| Environment | 1. The pollution form ships' emission along the straits will be reduced.<br>2. The potential for local marine habitat and ecosystem to begin to recover.<br>3. Increase of pollutions in the Northern part of Malaysia such as in Penang and Langkawi Island and also in the East Coast located in the Tok Bali Port.<br>4. Oil pollution will result in loss of income for fishermen.<br>5. Waves generated from high shipping activities can contribute to coastal erosion. |
| Legal | 1. Malaysia needs to increase its military presences in the Northern part of the Peninsular.<br>2. The Southern part of Thailand is well known for its separatist violence and ethno-religious conflicts that could disrupt Malaysia's.<br>3. Several information regarding security can be exchanged to increase further the operation awareness in ports and on board those vessels. |

## CONCLUSIONS

The plan to develop the Kra Canal is logical in order to reduce the voyage time for the ship operators. Regarding to operating cost, further research needs to be conducted to determine on the toll charges imposed on the ships' operators. The Kra Canal is one of the methods for China to dominate the world economy by providing fund for development to her partners. However, some researchers have argued that several projects related to China's Belt and Road Initiative have either been cancelled or delayed. The nearest example to the Kra Canal is the Nicaragua Canal, which is estimated to cost around USD 50 billion. Until today, the project agreed in 2013 is reported to be at a standstill. Huge investment is required to support this mega project, which if materialised could result in changes on the choice of routes for vessels and also the development of new deep water ports.

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