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Decision Strategies for Boosting Maritime Economy in Malaysia Due to the Opening of Northern Sea Route

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ABSTRACT

The opening of Northern Sea Route (NSR) as an alternative route for transporting cargoes between Far East and Europe seems highly acceptable by shipping companies due to the great saving in fuel consumption, bunker cost, operating cost, emissions and journey time. It has been proved that the foreign ship calling statistics at Malaysian main ports (Port Klang, Port of Tanjung Pelepas and Johor Port) have significantly reduced for the last three years that leads to the possibility of losing the profit margin. This situation will affect the maritime activities in Malacca Straits and the Malaysian economy as a whole. In order to strengthen the maritime economy, decision strategies are required for enhancing the port development and maritime activities in Malaysia. Therefore, the main objective of this study is to propose a comprehensive maritime economy framework using a business analytics method. This method enables to deal with uncertainty of changes in the shipping activity at Malacca Strait. The findings are comprehensive maritime economic frameworks and five strategies have been recommended as possible solution to the studied issue. Such findings can be used by the maritime players' decision makers (corporate and government sectors) for boosting maritime economy in Malaysia.

1. Introduction

Today cargoes transported between Far East and Europe is using the navigation via Suez Canal. Due to the higher volume of ships, it creates a congestion problem and the total time (waiting time + canal crossing time) spends at this area is longer compared to the past 10-15 years. Now, shipping companies have another alternative route so called "Northern Sea Route (NSR)" for transporting cargoes between Europe and Far East regions, and vice versa.

This route has actively operated since ten years ago due to the global climate change that leads to the ice blocks have been melted (Northern Sea Route Information Office, 2013). The total ship demand for crossing the NSR has increased every year.

This situation rises to the issue of the ship traffic volume crossing Malacca Straits is slight decreased respectively. It has been proven that the foreign ships calling statistics at Port Klang has reduced from 15,914 vessels in 2011 to 15,306 vessels in 2012, 14,139 vessels in 2013 and 13,377 vessels in 2014. The similar business pattern goes to other two main ports which are Johor Port and Port of Tanjung Pelepas. The ships calling statistics for 2015 was reduced respectively due to high demand of using the NSR.

Meanwhile, due to the uncertain global issues (global economic recession, increase in bunker fuel price, environmental factor, safety and decrease in cargoes market demand, etc.) faced by shipping companies recently, they are now looking for another alternative solution that can be used for transporting cargoes from Europe to Far East regions taking into consideration a number of elements, such as energy saving, cost saving, environmental friendly, saving in journey time and shorter distance. In addition, the shipping route via Suez Canal is no

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longer suitable for some shipping companies due to the high waiting and crossing times. The size of such a canal is not wide enough for two ships to pass side by side, and then a number of bays have been developed where ships have to wait for others to pass the canal (Suez Canal Service, 2013). In this case, ships spend a number of hours at the waiting area while waiting to be served for crossing the Suez Canal. To pass through the canal, it takes around 11 to 16 hours depending on the vessel speed used and the water level at the canal. As a normal practice, ships are required to travel at a low speed in order to prevent erosion of the canal's bank by the ship's wave. As a fact, the waiting time at the waiting area is approximately 3 to 6 hours due to a single ship can be accommodated at the canal in one times. Thus, the number of hours to pass through the canal is around 14 to 22 hours.

The available alternative solution that can be used for assisting shipping companies is by changing the current route practice from the navigation via Suez Canal to Northern Sea Route (NSR). NSR has been introduced as a one of the supply lines for transporting oil and gas to the Russia's northern area since the 1970s (Ragner, 2008). According to (Drent, 1993), over the past eight decades the ice-infested sea route along the Russian Arctic coast has been steadily developed. However, the number of vessels navigated using this route was very small due to the geographical reason (e.g. ice block). During the Soviet era, the Russian Arctic Ocean was in practical terms closed to foreign shipping. This all changed in 1991, when the Soviet Union formally opened up the NSR to foreign vessels. During the years when the NSR was inaccessible to outsiders, huge progress in ice-breaking technology has been made, and the trend of global warming has accelerated, justifying a new thorough investigation into the commercial merits of the NSR (Ragner, 2000).

As a result, the total number of ships sailed via the NSR has been significantly increased (Weathernews Inc.'s Global Ice Center, 2014). For instance, 71 vessels have sailed via such a route in 2013 compared to 46 in 2012 and 41 in 2011 (Table 1) (Pettersen, 2012). Liquid products were the largest cargo group, about 99 vessels from 2011 to 2014 (Pettersen, 2012). The second largest cargo group was other vessels, which was about 65 vessels, followed by the general cargo type of around 32 vessels (Pettersen, 2012). The demand of using this passage is expected to increase for the next 5 to 10 years due to the high global warming that leads to the ice block melting at the Arctic area.

Table 1: Total number of vessel navigated at Northern Sea Route from 2011 to 2014

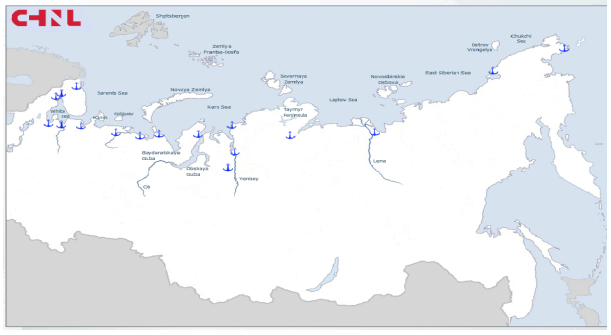
Type of Cargo	2011	2012	2013	2014	Total
Liquid	15	26	31	27	99
Bulk	3	6	4	1	14
LNG	0	0	1	0	1
General Cargo	4	0	13	15	32
Others	19	14	22	10	65
Total	41	46	71	53	211

Source:(Northern Sea Route Information Office, 2013)

According to Weathernews Inc.'s Global Ice Center, in their annual report 2014, ice in the Northeast Passage began to melt away starting in late May, and the NSR is fully opened from August 21 to October 1. The NSR has been commercialised in 2005 when the passage was fully opened for the first time, followed by first commercial voyage in 2009.

Figure 1 shows the total number of port that has been registered alongside Northern Passage are: 1) Murmansk Port, 2) Kandalaksha Port, 3) Vitino Port, 4) Onega Port, 5) Arkhangelsk Port, 6) Mezen Port, 7) Naryan-Mar Port, 8) Varandey Port, 9) Amderma Port, 10) Dikson Port , 11) Dudinka Port, 12) Igarka Port, 13) Khatanga Port, 14) Tiksi Port, 15) Pevek Port and 16) Provideniya Port (Northern Sea Route Information Office, 2013). Each port has their own specialisation and facilities to handle different kind of vessels. The increase in applications to transit through NSR is a good indication of the commercial shipping industries' eagerness to reduce operating costs by sailing through NSR as a better route.

Figure 1: Total number of port alongside Northern Passage



Source: (Northern Sea Route Information Office, 2013)

Figure 2: The Northeast Passage (Abdul Rahman et al., 2014)

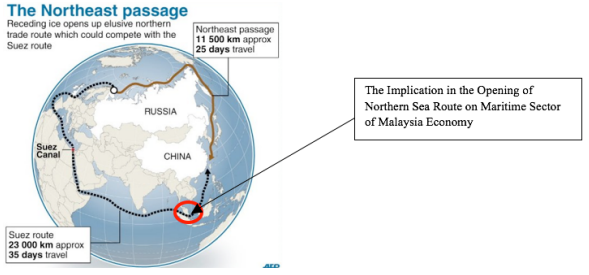


Figure 2 shows the comparison between the navigation via Suez Canal and Northern Sea Route in term of distance in kilometre (*km*) and total journey time in day. In term of distance perspective, the navigation via Northern Sea Route is 11,500 *km* or 50% shorter than the navigation via Suez Canal. By using the same vessel speed for both navigation routes, the travel time between Far East and Europe via Northern Sea Route is just 25 days which saves 10 days compared to the navigation via Suez Canal (35 days). The philosophy applied in the shipping industry is reduction in route distance will automatically reduce the total travel time (subject to vessel speed used) between port of origin and port of destination. By saving a number of days in travel time, ultimately the total fuel consumption, bunker fuel

cost and vessel operating cost will be reduced. Consequently, the amount of emissions produced by ships will definitely be reduced. Finally, the shipping companies' profit margin will dramatically increase without any argument. Therefore, this unprecedented scenario may affect the related operations and businesses of the Malaysian Ports and ultimately will give huge impacts to the maritime economy.

(Abdul Rahman et al., 2014) have discussed in details the implication in the opening of the Northern Sea Route on maritime sector of Malaysian economy by using PESTEL analysis. After identifying the PESTEL implications, this paper will further study to propose a number of strategies for boosting the maritime economy as possible solutions for sustainably port development and maritime activities in Malaysia. Therefore, the objective of this paper is to propose a number of strategies for boosting the maritime economy as possible solutions for sustainably port development and maritime activities in Malaysia.

2. Method

Business analytics (BA) refers to the skills, technologies, practices for continuous iterative exploration and investigation of past business performance to gain insight and drive business planning (Beller and Alan, 2009). Business analytics focused on developing new insights and understanding of business performance based on data and statistical methods. Business analytics make extensive use of statistical analysis, including explanatory and predictive modelling (Galit and Otto, 2007) and fact-based management to drive decision making. Analytics may be used as input for human decisions or may drive fully automated decisions. This analytics method has been widely used in the development of enterprise resource planning (ERP) systems, data warehouses, and a large number of other software tools and processes (Davenport and Harris, 2007).

There are four types of analytics in this method as follows:

- Decisive analytics: support human decisions with visual analytics the user models to reflect reasoning (Barlett, 2013).
- Descriptive analytics: Gain insight from historical data with reporting, scorecards, clustering, etc.
- Predictive analytics (predictive modelling using statistical and machine learning technique).
- Prescriptive analytics recommend decisions using optimization, simulation etc.

According to (Davenport and Harris, 2007) that businesses can optimise a distinct business capability via analytics and thus better compete. They identify these characteristics of an organization that are apt to compete on analytics:

- One or more senior executives who strongly advocate fact-based making decision and, specifically, analytics.
- Widespread use of not only descriptive statistics, but also predictive modelling and complex optimization techniques.
- Substantial use of analytics across multiple business functions or processes.
- Movement towards an enterprise level approach to manage analytical tools, data, and organizational skills and capabilities.

In this study, both decisive and descriptive analytics will be used in order to answer the research objective as described in Section 1.

3. Data and Finding

3.1. The Changes of the Malacca Strait Shipping Activity Affects the Malaysian Economy

Figure 3: Malaysia Port alongside Malacca Straits

Source: Port Link Peninsular Malaysia, 2014

Figure 3 illustrates five ports of Malaysia that located alongside Malacca Straits 1) Penang Port, 2) Northport, 3) Westport, 4) Tanjung Pelepas Port (PTP) and 5) Johor Port. Port Klang (Northport and Westport) is the main gate to Malaysia that acts as a main port (Port Link Peninsular Malaysia, 2014). The port has trade connections with over 120 countries and deals with more than 500 ports around the world. It is an ideal geographical location where it is the first port of calling for ships on the eastbound leg and the last port of calling on the westbound leg of the Far East-Europe trade. Port Klang has performed well to handle a total tonnage of 200,278,901 freight weight tonnes (fwt) in 2014 (Port Klang Authority, 2014). To conduct further analysis, 10 maritime industrial experts (from Malaysian Ports and Shipping Companies) have been interviewed to understand their opinions on the issues being discussed. All respondents have agreed that the changes of the Straits of Malacca shipping activity will affect the maritime contribution and economy in positive and negative ways. Ultimately, this scenario leads to the implication to the Malaysia economy and society development. Some of the industrial experts' opinions are listed as follows:

a. Shipping companies already knew the advantages of using this alternative route. This route is still new so the statistic of using this route is low but we can predict the pattern. Maybe for next 10 years, the total vessel carrying liquid product will increase from 99 vessels to 6000 vessels annually.

b. If this trend continues, this definitely will give impact on all ports, and Malaysia export and import activities alongside Malacca Straits because the total number of vessels through Malacca Straits will be reduced. Especially the major ports in Malaysia like Port Klang and PTP.
c. Port activities will be reduced such as the total number of transhipment, handling TEUs and consumption of space. The reduction of these activities indirectly affect demand for labour, government revenue as well as port revenue will decrease. Others associated business will be affected respectively, such as bunker supply, chandler services, stove ship, spared ship and transportation and haulage industries.
d. If the total transhipment at Port Klang reduces, port revenue may also reduce and directly affects Malaysian economy.
e. The total number of volume traffic navigating at Malacca Straits will affect the total number of ship calls at ports especially the major ports like Port Klang and PTP. These polar changes will affect port profit and directly affect Malaysian economy.

However, some experts have given the intensive opinions/ feedbacks concerning the issue discussed. The feedbacks are listed as follows:

a. The demand for liquid cargoes like chemical, oil has increased every year. This situation depends on the location of suppliers and buyers, for instance, China always consumes the liquid product from Middle East countries. Therefore, the use of NSR as the alternative route does not change anything.
b. This study did not reflex any significant requirement because it depends on the supply of the commodities. The cargoes from Europe to Far East do make sense and the new route is applicable because of travel time saving but company transporting cargoes from Rotterdam to Malaysia, will still use current route.
c. This new route only gives advantage to people who get supply from Europe to Far East above the Artic Sea but from Europe to another country below Indian Ocean will still use current route through Suez Canal.
d. Shipping companies have their own choice to use this new route but this entire situation depends on the commodity and supply. If demand for cargoes around countries above Arctic Sea is less than countries below the Indian Ocean, this will not affect the Malaysian economy because definitely shipping companies will still use the current route.

From the experts' opinions, the opening of Northern Sea Route seems to affect the maritime activities and economy in Malaysia because of the total traffic volume navigating at Malacca Straits is expected to be reduced. The total number of calls at major ports like Port Klang (Westport and Northport) will also be decreased. This will directly give effects to the port and logistic operations and indirectly give effects to related businesses and other supporting industries such as, haulage companies, warehousing, supply chain and logistics activities, port activity, etc. However, it depends on the location of suppliers and buyers of commodities/cargoes.

These experts' arguments are strongly supported by the data of total foreign ships calling at Malaysian main ports, 2010-2014 (Table 2). The data includes almost all commercial types of foreign ships such as, containerships, general cargo ships, liquid tankers, dry bulk ships, and other ships. The total of foreign ships going and calling at Malaysian main ports for the period of 2010-2014 is 131,689 vessels. Obviously, the record shows that the number of foreign ships calling at the Malaysian main ports seems to be decreasing every year. Given Johor Port as an example, the foreign ships calling statistics at Johor Port has reduced from 4,408 vessels in 2011 to 3,823 vessels in 2012, 3,511 vessels in 2013 and 3,364 vessels in 2014. The similar business pattern goes to Klang port, Penang Port and Port of Tanjung Pelepas.

Figure 4: Foreign going ships calling by main ports in Malaysia

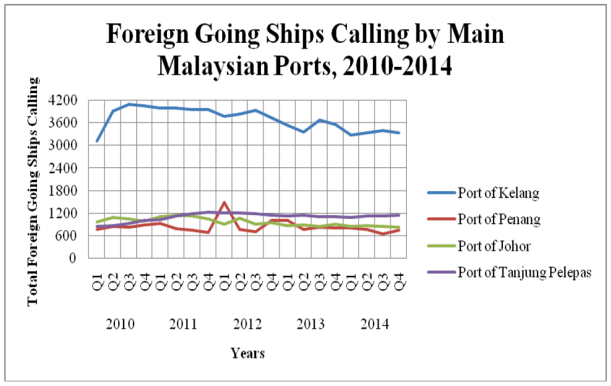


Figure 4 illustrates the foreign ships calling in the graph form. Obviously, the graph shows that the unstable and decrement of foreign ships calling at Malaysia. Ultimately, this situation has affected the port profit. The actual value of port profit is not possible to be studied because the Private and Confidential policy applied for all main ports. In this situation, the calculation will be made based on information in Table 2 and the tariff value of the selected ports. Taking Klang Port and the different type of ships calling between 2013 and 2014 as an example, the calculation shows as follows (Table 3):

Table 3 describes the cost calculation for different ships calling at Klang Port between 2013 and 2014. It shows that the different ship calling is -762, which means that the total number of foreign ships calling in 2014 was less than 2013. Based on the tariff information obtained from Northport, the charges paid by vessels are calculated. Overall, Klang port has lost about RM 8,489,820 in 2014 compared with 2013. This calculation is not taking into consideration of the charges paid by consignees or consignors, for instance, container tariff, storage charges, miscellaneous charges, conventional tariff, dry bulk cargo, liquid bulk, etc.. The information of these data are various and unable to calculate unless the exact information of the vessels are obtained. The total loss of Klang Port will dramatically be increased if considering all costs paid by both consignees and consignors.

The opening of NSR gives negative effects to port economy since foreign ships calling reduced that leads to the loss of port

Table 2: Type of ships calling for foreign going vessels by Malaysian main ports, 2010-2014

Ports	Years	Container		General Cargo	Liquid Tankers	Dry Bulk	Others	TOTAL
		Main Line	Feeder					
Kelang	2010	-	10,751	1,118	1,975	360	988	15,192
	2011	-	11,273	1,249	2,091	378	923	15,914
	2012	-	10,300	1,237	1,902	398	1,469	15,306
	2013	-	9,950	1,302	1,564	433	890	14,139
	2014	-	9,601	1,228	1,350	428	770	13,377
Penang	2010	-	-	796	796	163	1,543	3,298
	2011	-	-	683	882	176	1,387	3,128
	2012	-	-	632	873	200	2,257	3,962
	2013	-	1	680	847	210	1,645	3,383
	2014	-	1	583	824	193	1,358	2,959
Johor	2010	1,581	-	426	1,750	330	-	4,087
	2011	1,320	-	459	2,007	622	-	4,408
	2012	1,305	-	457	1,703	358	-	3,823
	2013	1,094	-	477	1,558	382	-	3,511
	2014	1,176	-	321	1,547	320	-	3,364
Tanjung Pelepas	2010	1,532	2,113	-	-	-	-	3,645
	2011	2,137	2,386	-	-	-	-	4,523
	2012	2,315	2,413	-	-	-	-	4,728
	2013	2,542	1,943	-	-	-	-	4,485
	2014	2,094	2,363	-	-	-	-	4,457
	TOTAL	17,096	63,095	11,648	21,669	4,951	13,230	**131,689**

Source: ASEAN of Ports Association, Malaysia, 2015

Table 3: Type of ships calling for foreign going vessels by Malaysian main ports, 2010-2014

Item/Cost	Container		General Cargo	Liquid Tankers	Dry Bulk	Others	TOTAL
	Main Line	Feeder (176m LOA)	(100m LOA)	(250m LOA)	(260m LOA)	(100m LOA)	
Different ships calling (2014 - 2013)	0	(349)	(74)	(214)	(5)	(120)	(762)
Passenger Handling Cargo (RM 10.00 per person + RM 1.00 per luggage)	-					(384,120)	(384,120)
Marine Tariff * (RM)	-	(2,931,600)	(222,000)	(2,824,800)	(72,000)	(360,000)	(6,410,400)
Pilotage Dues (RM 3.00 per meter LOA per movement)	-	(184,272)	(22,200)	(160,500)	(3,900)	(36,000)	(406,872)
Towage (RM 9.50 per meter LOA per tug movement)	-	(583,528)	(70,300)	(508,250)	(12,350)	(114,000)	(1,288,428)
TOTAL	-	3,699,400	314,500	3,493,550	88,250	894,120	(8,489,820)

Source: ASEAN of Ports Association, Malaysia, 2015
Note:

I. Charges payable by vessels are only considered in this table.
II. The LOA of each vessel is an average value because the actual LOA would be various.
III. Total average passenger is 291 per passenger vessels and estimated that each person carries 1 luggage.

* Not exceeding 100 meters = RM 3,000

Exceeding 100 meters but not exceeding 140 meters = RM 4,200

Exceeding 140 meters but not exceeding 200 meters = RM 8,400

Exceeding 200 meters but not exceeding 250 meters = RM 13,200

Exceeding 250 meters but not exceeding 300 meters = RM 14,400

Exceeding 300 meters but not exceeding 350 meters = RM 16,800

Exceeding 350 meters = RM 18,500

profit. Ultimately, it gives effect to the maritime industrial contribution to the Malaysian economy as a whole. For example, if fewer ships call at Malaysian ports, then the probability of less cargo handling is high. And less cargo handle means that less income will be obtained by the ports. For the wider point of view, this situation also will affect the logistics companies

as fewer cargoes need to be transported from port to the destination and vice versa. As far as concerned, the logistics and supply chain industry will face the problem of shortage of cargoes transported; the company profit and business will highly be affected.

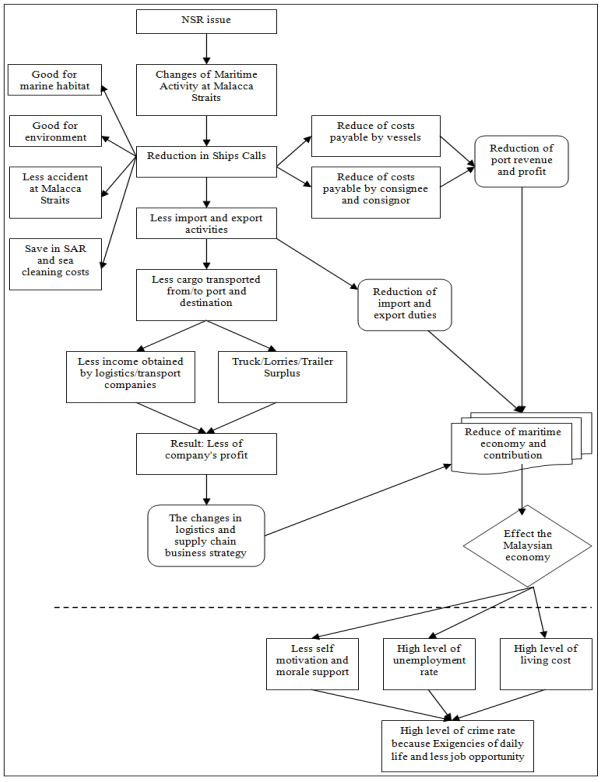
If this situation continues occur for about 5 to10 years or more than that, it rises to a question of what would be happened to the maritime sector in Malaysia, which could lead to the negative effect to the socio-economy of Malaysia. This is going to be a huge issue that requires an immediate action from not only government, but from all parties who directly or indirectly involve in this business, such as, port operators, port authority, shipping industry, logistics and supply chains companies, academia, etc.

3.2. A Proposed of a Comprehensive Maritime Economic Framework

Based on the finding in Section IV (1), a comprehensive maritime economic framework will be proposed in this section using a Business Analytics method as discussed in Section 2. The framework is for enhancing the port development and maritime activities contribution in Malaysia. Firstly, a risk framework has been proposed (Figure 5) that begins with the opening of NSR issue and effect to Malaysia economy. Obviously, the maritime activity at the Straits of Malacca will definitely change. As a result, the total number of foreign ships calling at main ports in Malaysia will reduce compared to the last five to ten years. There are two sides of effects, 1) positive effect and 2) negative effect. Roughly, there are four main positive effects, 1) good for marine habitat, 2) good for environment (less pollution), 3) possibly less accident at Malacca Strait (due to less congestion), and 4) government and ports can save costs in search and rescue (SAR) activity as well as sea cleaning activity due to the oil spill. Ultimately, good benefits go to the government and society because less emission or pollution leads to less medical problem to the society and perhaps the government will also benefit in terms of the money sense by providing less medicine and medical treatment.

The negative effects of the issue will be divided into three main elements. Firstly, the reduction of ships call will directly give impact to the port revenue and profit. Less ships call means that less incomes receive from the vessel operators, consignees and consignors due to fewer cargoes handled by the ports. Ultimately, the revenue and profit of the ports will be reduced. Secondly, less cargo handled means that less import and export activities in Malaysia ports. It leads to the reduction of import and export duties collection by the customs. Thirdly, less cargo handled by ports also will affect the haulage/transportation/logistics companies and supply chains activity in terms of surplus of truck/haulage/trailers that leads to less income obtained by the companies. After all, the business strategy of these companies will be changed from the current practise to the small size of company. These three negative effects will lead to the reduction of maritime economy and contribution in Malaysia and ultimately, give a huge effect to the Malaysian economy as a whole. Furthermore, this situation might influence the high living cost in Malaysia, high level of unemployment rate and less morale supports to people. Ultimately, social problem will happen to the generation.

Figure 5: A risk framework (Authors Illustration)



The risk framework has raised two questions on 1) how to increase the maritime economy and contribution in Malaysia, and 2) which parties are responsible for making drastic and immediate actions. After identifying the risk framework, the second model is called a decision framework (Figure 6) which has developed according to the issue discussed in Figure 5. The decision framework will discuss more on the way to increase or boost the maritime economy as a whole. There are nine elements in this part which are 1) design an excellent port development strategy with the purpose of attracting vessels to call, 2) increase relationship between port and city for boosting the logistics and supply chain activity and encouraging the goods production, 3) increase port finance for sustaining the port activity and development, 4) more key financial players are needed in enhancing the local and foreign direct investments, 5) boost local and international business trading through bilateral collaboration between Malaysia and other countries, 6) enhance the value-added services that benefit to ports, society and nation, 7) strengthen maritime industry by introducing a maritime expert team that involving practitioner, academia and international experts, 8) efficient government management strategy that allowed the ports to manage by themselves without involving other parties and 9) upgrade port infrastructure that can improve the port efficiency to the acceptance level with very

low cost.

Figure 6: A decision framework (Authors Illustration)

All nine elements have to be integrated and implemented together because all of them are interrelated. By enhancing one decision element, it will automatically give effect to the rest of the decision elements. Therefore, in order to strengthen and boost the maritime economy in Malaysia, all maritime players (port management/port authority, clients, competitors, public organization, private ports, logistics companies, shipping companies, government, regulators, etc.) have to actively take part in contributing ideas, opinions, and suggestions in the dynamic decision process. In addition, they have to take into consideration the shipment market factors, for instance,

1. Port services demand
2. Port services supply
3. Port tariffs and fees
4. Legal rules and regulations in decision making process.

Thirdly, five main strategies will be recommended as part of the proactive action in facing the possible changes on shipping activity at Malacca Strait as follows:

I. Malaysian port authorities will no longer be just regulators, administrators and landlords. They have to play a variety of roles, which include marketing, attracting investors, financial planning, business development and even customer relations.

II. In order to strengthen the maritime economy in Malaysia, the feeder service sector is one of the industries that can be enhanced and expended in providing services for transporting cargoes from Malaysia to Far East, Mediterranean, Oceania, and vice versa. By expanding the feeder service development, it makes cargo service more economical, efficient, cost-effective, less expensive, and reduces the service times to the end users.

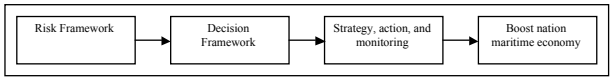
III. Malaysia has to expand the nation economy by developing any bilateral trade relation with global in order to attract and increase foreign direct investment (FDI). One of the latest examples is the development of Malaysia-China Kuantan Industrial Park (MCKIP). The park has boasted high value of industrial developments such as, steel mills, aluminum processing plant, edible oil processing plants and other high value industrial development. The establishment of MCIKP is an effort to further strengthen the economy and trade relations between Malaysia and China. It is also the best way to develop Malaysian ports to be hub ports in transitioning goods between countries.

IV. Enhance the value-added maritime services to attract the main shipping lines and other vessels to call at main Malaysian ports.

V. Strengthen the maritime industry and possible opportunity in every aspect for boosting the maritime economy and contribution to the nation as well as global.

Finally, these two frameworks (risk and decision frameworks) and the five strategies of maritime economy can be integrated as shown in Figure 7. An integration of the models, 1) risk frameworks, 2) decision framework, and 3) strategy, action and monitoring is expected to give a good prospect of increment in the maritime economy and contribution as a whole.

Figure 7: An integration of maritime economy framework (Authors Illustration)



4. Conclusion

This study concludes that the opening of Northern Sea Route as an alternative route for transporting cargoes from Far East and Europe will definitely change the pattern of shipping activity at Malacca Strait, that possibly affects the maritime and Malaysia economies in positive and negative ways. This analysis has suggested that in order to sustain and boost the on-going maritime businesses and economy, all players in maritime industry include port operators, shipping companies and policy makers need to work together and establish the five strategies planning that have recommended for beneficiating each member. In the long run, they should play various roles in their own field, which include marketing, attracting investors, financial planner and business developer. They must act as strategic partners to the terminal operators and work in performance to ensure their ports remain highly competitive. The contribution of this paper is to propose a comprehensive both risk and decision frameworks for boosting the maritime economy as possible solution in sustainably maritime activities in Malaysia.

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References

Abdul Rahman, N., Saharuddin, A., Rasdi, R., 2014. Effect of the northern sea route opening to malacca shipping activity at malacca straits. International Journal of e-Navigation and Maritime Economy Vol 1, pp 85 – 98.

ASEAN of Ports Association Malaysia, 2015. Type of ships calling by ports, malaysia.
URL: http://www.apamalaysia.com

Barlett, R., 2013. A practitioner's guide to business analytics: using data analysis tools to improve your organization's decision making and strategy. McGraw-Hill.

Beller, M., Alan, B., 2009. Next generation business analytics. Lightship Partners, LLC.

Davenport, T., Harris, J., 2007. Competing on analytics: the new science of winning. Boston, Mass., Harvard Business School Press.

Drent, J., 1993. The northern mariner/le marin du nord.

Galit, S., Otto, K., 2007. Predictive vs. explanatory modeling in is research. Conference on Information Systems and Technology, 3/11/2007, Seattle, WA.

Northern Sea Route Information Office, 2013. National snow and ice data center; cosco; lloyd's list.

Pettersen, T., 2012. 46 vessels through northern sea route. Barents observer News, November 23,.
URL: http://barentsobserver.com

Port Klang Authority, 2014. Annual report 2013.

Ragner, C., 2000. Northern sea route cargo flows and infrastructure – present state and future potential. FNI Report 13/2000.

Ragner, C., 2008. The northern sea route, norden association's year book.

Suez Canal Service, 2013. Suez canal service.
URL: www.suezcanal.gov.eg

Valsson, T., 2006. How the world will change - with global warming. Reykjavik: University of Iceland Press.

Weathernews Inc.'s Global Ice Center, 2014. Northern sea route transit applications hit record high in 2014.