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South China Sea : Platform for prosperity or arena for altercation?

Nazery Khalid^{*}

ABSTRACT

The South China Sea provides a critical passage to a significant volume of global seaborne trade and a lifeline for East Asian economies which depend on energy imports from the Middle East. The Sea also features stunning mega biodiversity and rich fishing ground and is believed to contain prolific deposits of hydrocarbon energy resources. Several nations in the region are involved in overlapping territorial claims in the Sea. Some claimants have defended their interests in a vigorous manner which have led to conflicts and in the Sea. It is feared that if not managed and settled amicably, these claims may turn the Sea into a flashpoint that will threaten regional prosperity and stability. This paper highlights the economic and strategic importance of this strategic body of water as a prelude to discussing the overlapping claims by several nations on parts of the sea. It warns against overzealous acts by nations to stake their claims that may pose a threat to security, stability and prosperity in the region and may invite the presence of outside powers keen to capitalize on such situation. It strongly advocates using trade and economic development as a common denominators to foster cooperation among the nations as a way to ease tension arising from their claims in the sea. The paper recommends several policy options – including introducing a binding Code of Conduct, exploring joint exploration and increasing cooperation in areas such as navigation safety and resource management – towards making the Sea a platform of prosperity for its littoral nations.

Key words : South China Sea, maritime trade, overlapping territorial claims

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Air yang tenang jangan disangka tiada buaya
Do not think still waters contain no crocodiles
 (Malay proverb)

1. Strategic Sea, essential area

The importance of South China Sea (SCS) as a Sea line of communication (SLOC)¹ is well documented. This great Sea stretches from the west coast of Singapore in South East Asia to Taiwan PRC in the Far East (Figure 1). It contains over 200 islands, many of which are submerged islets, rocks and reefs which are unsuitable for human habitation.²



Source : <http://upload.wikimedia.org/wikipedia/commons/5/53/SouthChinaSea.png>

Figure 1. Map of South China Sea

¹ The concept of Sea lane of communication describes a sealane which facilitates significant volume of trade and is heavily used by merchant vessels. Such a sealane also has high strategic values from a military point of view, and contains chokepoints that can lead to its closure in the event of incidents such as collision, pollution and attack on ships.

² Anon (Mar. 2008) *South China Sea : Background*. <http://74.125.153.132/search?q=cache:dzk497f64sMJ:www.eia.doe.gov/emeu/cabs/schina.html+south+china+sea+area&cd=3&hl=en&ct=clnk&gl=my> (Last accessed on 23 Oct. 2009)

The Sea has a stunning amount of biodiversity and marine resources, including huge sources of hydrocarbon energy, fisheries and approximately 30% of the world's coral reefs.³ Providing the shortest route between the Pacific and Indian Oceans, SCS is a virtual maritime superhighway that acts as a conduit to facilitate trade between China and India, and between East Asia / South East Asia (SEA) and the Middle East since ancient times to this day.

Straddling over one of the busiest maritime areas in the oceans, SCS acts as a conduit to East-West trade. It facilitates the transportation of much the oil from the Middle East to resource-hungry countries in the Far East - namely China, Japan, Taiwan PRC and South Korea - from mainly the Middle East and increasingly from South America and Africa. They also import raw materials and commodities such as gas, coal and primary commodities from South Asia, South East Asia and Australia. All kinds of goods produced by these Asian economic powerhouses are also exported to their trading partners via this pivotal body of water. The Sea also facilitates intra-regional trade of SEA. Further underlining its importance, it is estimated that SCS facilitates the movement of over half of the world's oil tanker traffic and over half of its merchant vessels (by tonnage) annually.⁴

Along the coasts of SCS are among some of the world's biggest and busiest container ports such as Singapore, Hong Kong and Kaohsiung ports. SCS borders countries such as China, Taiwan PRC, Thailand, Malaysia, Singapore, Indonesia, Brunei and Philippines ; which contribute significantly to the rise of global maritime trade.

The massive importance and calm appearance of SCS belies the simmering tension arising from overlapping territorial claims and counterclaims in the region. The long history of strife in the region has left a legacy of disputes and tension that can potentially threaten peace in the region. It unwittingly provides a stage for powerful nations to flex their muscles and display power projection. Analysts have expressed worries that the Sea will become a battleground among military powers intend to exert their supremacy and protect their stakes. On the basis of a recent announcement by a certain regional naval power to increase patrols in disputed areas to fortify its claims, there is validity in those concerns.⁵

The situation - coupled with unflinching positions taken by nations to protect their interests, the outright dismissal of the claims of others, and the distorted interpretation of international laws - gives rise to anxiety among less powerful claimant nations.⁶ If the tension be left to simmer, it could come to boiling point and pose a serious threat to stability in the Sea and its surrounding areas. It could also lead to intervention of outside powers which are always sniffing out for any opportunity to play a role in this region.

3 Anon (2009) *The South China Sea*. <http://community.middlebury.edu/~scs/intro.html> (Last accessed on 23 Oct. 2009)

4 *Ibid*.

5 Anon (17 Apr. 2009) *China to increase naval power*. <http://news.bbc.co.uk/2/hi/8003515.stm> (Last accessed on 26 Oct. 2009)

6 *Ibid*. China was reported to describe the claims by other nations on oil-rich parts of the South China Sea where it also has interest as "unfounded territorial claims".

2. South China Sea as a trade sealane

The SCS approximately occupies an area of 648,000 square miles⁷ and features some of the world's most strategic energy shipping routes that serve much of the maritime trade between East Asia and South Asia, Persian Gulf, Africa, Europe and the Americas. A glance at the map of the SCS region reveals why the region's islands and peninsula are wedged between the Pacific Ocean to the east and the Indian Ocean to the west, while its north-south maritime path links Australia and New Zealand to the vibrant East Asian economic region. Due to the littoral nature of most nations in the SCS vicinity, much of intra-regional trade depends on the shipping lanes in SCS, as does much of the trade between nations in the region and the rest of the world. Put it simply, maritime trade among the SCS region and many other economic regions would not thrive without the safe passage of SCS.

Merchant shipping (by tonnage) in SCS mainly features the transportation of raw materials to East Asian countries, but the share of containerized cargo shipment is fast increasing. The region contains some of the world's leading trading nations, including China (including Taiwan PRC and Hong Kong SAR), Japan and South Korea which export all kinds of manufactured goods to the rest of the world and also import a variety of raw materials to feed their huge population and booming economy.⁸ The outsourcing phenomenon has generated intense manufacturing and assembly activities of a stunning range of products in the SCS region which offer lower costs of production compared to more economically advanced regions. This, coupled with the rapid industrialization of countries in the SCS region, has catalyzed the growth in container trade in the region to dizzying levels.

It is therefore not surprising that SCS figures prominently in the world maritime trade equation by way of the region's contribution to the world's merchant fleet (Table 1). The impressive growth of the economies of the region has boosted the merchant fleet capacity of regional nations in their pursuit of expanding their trade volumes and to increase their national merchant shipping tonnage to support their growing trade.

The SCS region's commanding share of global merchant shipping underlines its importance as a major seaborne trade and shipping center. Where the center of gravity in maritime trade and merchant shipping was once in the west, it has now shifted to the east, partly as a result of the rapid industrialization and stunning economic growth of countries in the SCS region. Booming global trade prior to the current global recession,

7 Burgess, P. (2003) The politics of the South China Sea : Territoriality and international law. Security Dialogue, 34(1). <http://www.southchinesea.org/docs/Burgess,%20Politics%20of%20the%20South%20China%20Sea-Territoriality%20and%20.pdf> (Last accessed on 12 Nov. 2009)

8 According to United Nations Conference on Trade and Development (UNCTAD), those 'Big Four' nations in terms of the size of economy contributed 19.4% to global trade (by value) in 2008. See UNCTAD (2008) *Review of Maritime Transport 2008*, p.68. UNCTAD, Geneva.

pro-business policies, rapid expansion of trade and maritime infrastructures, globalization and liberalization contributed to the explosive growth of seaborne trade in the SCS region and the littoral economies in the SCS region in the last decade.

Table 1. Merchant fleet capacity of selected South China Sea nations as of 1 January 2009

Country	Total fleet capacity (mil. DWT)	Total as a percentage of world total
China	92.799	8.40
Hong Kong SAR	33.723	3.05
Singapore	28.229	2.70
Taiwan PRC	29.803	2.55
Malaysia	11.559	1.05
Indonesia	7.021	0.64
Vietnam	5.568	0.50
Thailand	4.127	0.37
World Total	1,104.959	19.26

Source : UNCTAD (2009)

The various phases of economic growth in the region - namely the growth of Japan and South Korea after World War II, the emergence of Singapore and Hong Kong as major trading shipping hubs, and the rise of the 'Asian tigers' such as Malaysia and Thailand – all coincided with the rapid growth of their shipping sectors and merchant tonnage to support their growing trades. The rise of China as an economic superpower has significantly spurred seaborne trade and the growth of the maritime sector in the SCS and its vicinity. Many nations in the SCS region have become increasingly aware of the need to attain self-sufficiency in shipping as a means to enhance their trade competitiveness. The developing nations among them are also mindful of the need to attract foreign direct investment (FDI) to boost economic growth, and to reduce their reliance on ships made at foreign shipyards and maritime services provided by foreign companies.

The SCS region forms a lion's share of the world demand for bulk items, and played a major part in pushing freight rates for bulk carriers to record highs in 2008.⁹ Shipment of dry bulk items namely coals and iron ore from Australia and Brazil, and grains heading to energy hungry, rapidly developing and populous East Asian nations, fueled the growth of bulk shipping prior to the global recession. Growing demand from the region's nations for dry bulk goods such as grains to feed their growing population, and break bulk items such as iron ore and coal to support their rapid industrialization and construction

⁹ The Baltic Dry Index, the benchmark index that tracks the performance of the shipping bulk trade, touched an all-time high level of 11,793 points on 20 May 2008.

works, has resulted in the corresponding growth of tonnage in the bulk segment. Trade liberalization, growth of maritime and trade infrastructures, rising consumer demand and the trend of multinational companies (MNCs) to outsource their activities to many countries in this region have combined to catalyze the growth in container trade, throughput and shipping in the area. As for general cargo, huge demand from the SCS region for items such as refrigerated cargos and specialized cargos, and the increasing popularity of cruise in the SCS waters have contributed to the increase in tonnage of general cargo ships.

The ports and shipping sector in SCS has undergone rapid expansion as the volumes of bilateral trade of regional countries, intra-regional trade and the region's trade with its other economic regions continues to expand at an impressive rate. Several SCS region's countries have emerged among the world's leading maritime nations, thanks to their growing merchant fleet and port throughput, and their increasing trade volumes with their major trading partners. The number of ship calls in regional ports, many of which carry intra-regional trade, has increased substantially over the years.

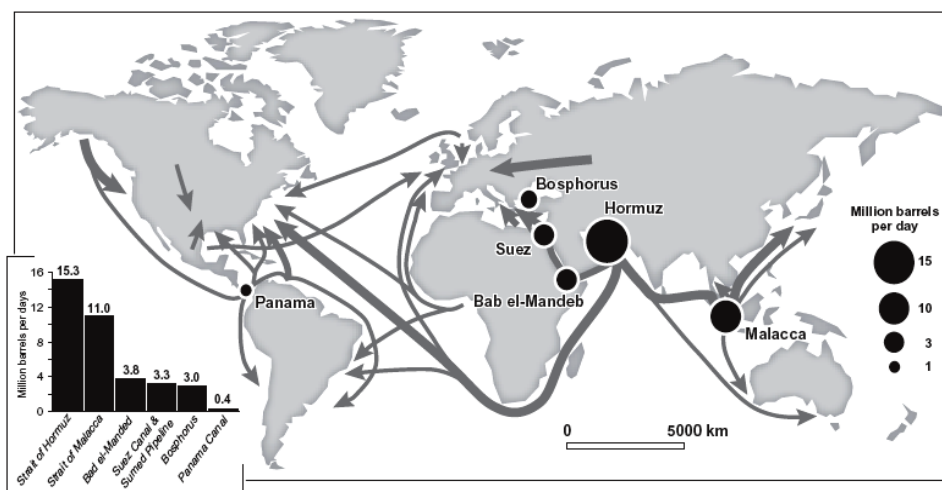
Growing intra-regional trade and the promotion of trade and transport initiatives within the SCS region such as the Asia Pacific Economic Council (APEC), ASEAN Free Trade Area (AFTA) and Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA) platform have had a significant impact on the growth of maritime trade and the development of maritime infrastructures in the region. Significant investments have been put into the maritime sector in the SCS region to facilitate the trade of its littoral nations; not surprising given the geographical features, trade composition and economic characteristics of the SCS region's nations.

The tremendous growth of ports and shipping activities in the region over the years underlines the value of the maritime sector to the region's socio-economic well-being. Ports, shipping and the maritime ancillary services are recognized as essential facilitators of the region's trade, hence crucial to its economic prosperity and the wellbeing of its people. Although the growth in maritime trade and shipping sector in the SCS region was halted by the global credit crunch and economic downturn, there should be no doubt that trade volumes and demand for shipping trade will rebound once the financial markets recover and the world economy is back on track. With an estimated 80% of the world's trade being carried by seaborne transport,¹⁰ and the SCS region commanding a major slice of the global trade, the long term perspective for maritime trade and the shipping sector in the area should be promising.

10 UNCTAD (2008) p.16.

3. South China Sea as a key energy sealane

Various literature reviewed suggest that a third of the world's oil trade passes through SCS.¹¹ Figure 2 highlights the importance of the Straits as a key energy route and chokepoint for the flow of crude oil between the Gulf and the economies in East Asia, which passes through SCS.



Source : Straits, passages and chokepoints : A maritime geostrategy of petroleum distribution
http://people.hofstra.edu/faculty/Jean-paul_Rodrigue/downloads/CGQ_strategicoil.pdf (30 Oct. 2009)

Figure 2. World shipping routes of crude oil

The emergence of China as an economic power has resulted in huge demand for oil and gas to power its booming economic growth and to cater to growing ownership of passenger vehicles. The world's populous nation is already its second largest consumer of oil and the third largest net importer of the 'black gold' after the US and Japan.¹² Such is China's rapacious appetite for these goods that it has resorted to importing them from places as far away as Africa and Latin America to ensure adequate supply and to lessen its dependency on oil traditionally obtained from the Middle East. Due to this, East Asia has emerged as a key center for the unloading of crude oil, a fact reflected by the heavy tanker traffic in SCS.¹³

¹¹ Burgess (2003)

¹² Anon (13 Oct. 2009) *China energy profile*. http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=CH (Last accessed on 23 Oct. 2009)

¹³ According to UNCTAD, developing Southern and Eastern Asia accounts for 424.8 million tons of unloading of tanker cargo, which reflects the region's growing energy requirements and developing intra-regional South-South trade.

Although SCS is an energy rich sea, much of the region's energy needs come from imported sources, especially from Middle Eastern and African countries and energy resources-rich SCS nations such as Malaysia and Indonesia. An estimated 80% of the crude oil used by China, Japan, Korea and Taiwan passes through SCS.¹⁴ The SCS provides the main route for much of these oil imports, especially from the Gulf, to be transported to those countries. As the region's energy demands grow to match its growing population, industrialization and robust economic growth, its reliance on imported oil is set to increase. It is expected that demand for oil from East Asia will grow 2.7%, annually from 14.8 million barrels per day (mmbpd) to 29.8 mmbpd by 2030, with China accounting for half of this demand.¹⁵ This will further enhance the importance and strategic value of SCS as an energy sealane in facilitating the transportation of the region's energy needs.

4. An unwitting chessboard for strategic calculations

Where there was once one giant land mass in the region aeons ago, there are now continents and nations. With them came borders that restrict movements and multiple interests that put countries at loggerheads. Powerful nations of the day sought to conquer other nations to expand their territories and to gain access to natural resources and riches not available in their own countries.

The quest for territories and conflicts over boundaries are not exclusive to terra firma. Countries extend their border claims to the maritime realm as a means of power projection and to exert their superiority. Only conceptually the seas appear as an expanse unbroken by borders and checkpoints which figure prominently on land. Truth is, the seas provide an equally dramatic stage for nations to stake sovereign claims over areas, as does the land. In pursuit of their national interests, countries set aside goodwill and diplomacy, and even respect for the needs and concerns of others. It is sad to lament that the ancient saying '*the land divides but the Sea unites*' remains more of a romantic ideal than a statement of fact.

Few maritime areas in the world provide a potentially explosive backdrop for nations pursuing their maritime interests than the SCS. This sprawling maritime area is increasingly commanding keen international attention for being an unwitting chessboard in the contest of grandmasters. Its historical background and strategic, political and economic importance combine to attract the interest of many countries. Providing an extremely

14 Anon (2008) *Country analysis brief: South China Sea*. http://www.eia.doe.gov/cabs/South_China_Sea/Background.html (Last accessed on 17 Nov. 2009)

15 Oil gas resources and terminals in South China Sea (9 May 2006) *In Oil & Gas Articles*. <http://www.oilgasarticles.com/articles/474/1/Oil-Gas-Resources-and-Shipping-Terminals-in-South-China-Sea/Page1.html> (Last accessed on 5 Nov. 2009)

strategic location from an economic and military viewpoint, and hosting a prolific amount of hydrocarbon energy riches, it is no wonder that parts of the SCS have become the subject of intense claims and counterclaims by a number of nations. There are also competing security priorities in the Sea that contribute to the rising of the temperature there and threatening the balance of power in the region.¹⁶

Over the years, several events and territorial claims that underscore the tension in the SCS have occurred. Some resulted in full blown deadly affairs between navies, while some continue to simmer to the extent that many analysts fear that it would not be long before they come to a head. It is feared that the presence of warships in SCS by nations adamant to protect their interests will result in the militarization of the waters. This, combined with excessive claims, unflinching positions, aggressive military posturing, and long history of animosity among some of the claimants make for a potentially combustible cocktail that may trigger serious conflicts in the SCS.

The use of different names by different countries for SCS and its islands underscore the sharply divergent views, positions and interests in the sea. Although known worldwide by its English name, SCS is officially called *Bien Dong* (East Sea) in Vietnam, while the Philippines refers to the part of SCS in its territorial seas as *Dagat Luzon* (Luzon Sea). Even the islands in the SCS are known by different names by different nations. The disputed islands of Senkaku, so called by Japan, are known as Diaoyu to China.

Despite the fact that almost all the littoral nations in the SCS are parties to the United Nations Convention on the Law of the Sea (UNCLOS) 1982, they have not been able to use the convention to resolve ownership disputes in the sea. The guidelines outlined in UNCLOS regarding the status of islands, continental shelves, Exclusive Economic Zones (EEZ), enclosed seas, and territorial limits call for countries with overlapping claims over them to resolve their disputes based on good faith and negotiation.¹⁷ Sadly, this call is not always observed in among parties with territorial claims in SCS. Some have even resorted to taking actions that have resulted in casualties and have stoked tension in the sea.

Several military clashes involving nations claiming parts of the SCS in the waters in the between the 1970s to the 1990s are listed in Table 2.¹⁸ They serve as a grim reminder of how vulnerable the Sea is to quarrels that can undermine good relations among the

16 For a succinct analysis on the military interests in the South China Sea, see Rosenberg, D. (13 Apr. 2005), *Dire straits : Competing security priorities in the South China Sea*. *Japan Focus*. <http://japanfocus.org/-David-Rosenberg/1773> (Last accessed on 12 Nov. 2009)

17 Article 279 (Obligation to settle disputes by peaceful means) in Part XV on Settlement of Disputes (Section 1 – General Provisions) of UNCLOS states that “States Parties shall settle any dispute between them concerning the interpretation or application of this Convention by peaceful means in accordance of Article 2, paragraph 3, of the Charter of the United Nations and, to this end, shall seek a solution by the means indicated in Article 3, paragraph 2, of the Charter”. See Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs (1983), *The Law of the Sea*, Hampshire, Palgrave Macmillan, United Kingdom, p.129.

18 Anon (2009) *Military clashes in South China Seas*. <http://www.globalsecurity.org/military/world/war/spratly-clash.htm> (Last accessed on 3 Nov. 2009)

region's nations and pose a serious threat to regional security and unity. Tension in the Sea may be anathema to the smooth flow of international seaborne trade and socio-economic development in the region. Anything but a peaceful SCS is not desirable not only to the region's nations which depend heavily on the Sea as a conduit to their trade and economic growth, but to the international community that depends on smooth passage of merchant ships to facilitate much of global trade.

Table 2. Military clashes in the South China Sea in the 1970s-1990s

Date	Countries involved	Military action
1976	China, Vietnam	Chinese seized Paracel Islands from Vietnam
1988	China, Vietnam	Chinese and Vietnamese navies clashed at Johnson Reef in the Spratly Islands. Several Vietnamese boats were sunk and over 70 sailors killed.
1992	China, Vietnam	Vietnam accused China of drilling for oil in Vietnamese waters in the Gulf of Tonkin, and accused China of landing troops on DaLucReef. China seized almost 20 Vietnamese cargo ships transporting goods from Hong Kong from June-September.
1994	China, Vietnam	China and Vietnam have naval confrontations within Vietnam's internationally recognized territorial waters over oil exploration blocks 133, 134, and 135. China claimed the area as part of its Wan Bei-21 (WAB-21) block.
1995	China, Philippines	China occupied Philippines-claimed Mischief Reef. Philippines military evicted the Chinese and destroyed Chinese markers.
1995	Taiwan, Vietnam	Taiwanese artillery fired on Vietnamese supply ship.
1996	China, Philippines	Three Chinese vessels engaged in a 90-minute gun battle with a Philippines Navy gunboat near Campones Island.
1997	China, Philippines	Philippines Navy ordered a Chinese speedboat and two fishing boats to leave Scarborough Shoal. Philippines fishermen removed Chinese markers and raise their flag. China sent three warships to survey Philippine-occupied Panata and Kota Islands.
1998	China, Philippines	Philippines Navy arrested Chinese fishermen off Scarborough Shoal.
1998	Philippines, Vietnam	Vietnamese soldiers fired on a Philippines fishing boat near Tennent (Pigeon) Reef.

Source : Global Security. <http://www.globalsecurity.org/military/world/war/spratly-clash.htm>(3 Nov. 2009)

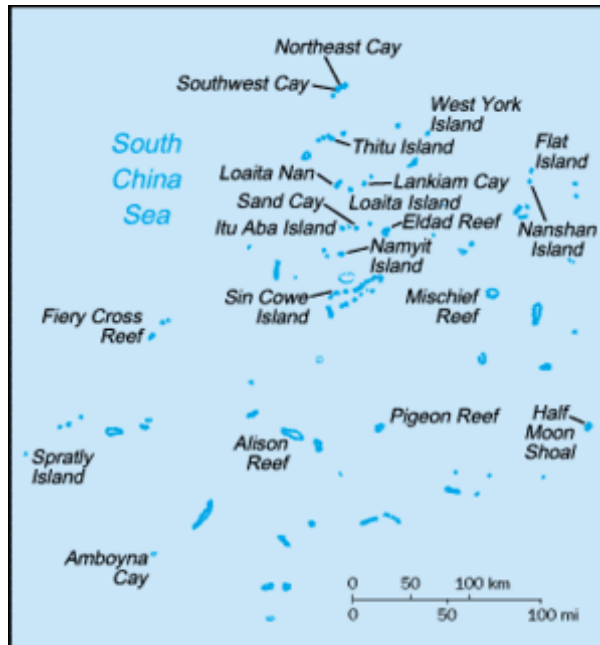
Serious concerns have been raised by analysts and observers that if these situations are not addressed, SCS could become a potential flashpoint. Pronouncements of commitment by claimants to resolve the territorial disputes in the Sea have not allayed fears of the outbreak of conflict in the sea. Recent developments such as the move by the Philippines in February 2009 to declare parts of South China Sea as its territory,¹⁹ and the tense

19 In 2009, the Philippines Government declared a bill 2009 claiming an area covering more than 50 islets, shoals, and reefs known by China as Nansha Islands and known by the Philippines as Kalayaan Island Group. The signing of the bill and the ensuing strong protestation by China presented a serious challenge for Manila and Beijing to adhere to the Declaration of the Conduct of Parties in the South China Sea signed by ASEAN and China in 2002.

confrontation between five Chinese vessels and a US Navy ship, *Impeccable*²⁰ in March 2009 provide a stark reminder of how edgy things can be in the sea.

5. Spratlys : Islands of indignation?

Of the ongoing disputes in the SCS, few are as hotly contested as the one over Spratlys Islands (Figure 3). This archipelago hosts most of the islands in the SCS, also known as the South China Sea Islands. Despite the remoteness of its location and the largely uninhabitable features of its islands and reefs, Spratlys is a monumentally important area not only for its natural resources and biodiversity riches but for its location along one of the busiest shipping routes and its immense geo-political and geo-strategic value.



Source : http://naijapinoy.files.wordpress.com/2008/03/300px-spratly_islands.png

Figure 3. Map of Spratlys Islands

20 Depending on whose side of the story, the *Impeccable* either 'provoked' the incident or was 'harassed' by the Chinese vessel. See McDonald, M. (10 Mar. 2009). US Navy provoked South China Sea incident, says China. *New York Times*. <http://www.nytimes.com/2009/03/10/world/asia/10iht-navy.4.20740316.html> (Last accessed on 11 Nov. 2009) See also De Luce, D. (10 Mar. 2009). Chinese ships 'harassed' USNS Impeccable in South China Sea'. *Agence France-Presse*. <http://www.news.com.au/story/0,27574,25164890-401,00.html> (Last accessed on 11 Nov. 2009)

The cagey geo-political and geo-strategic situation in this monumentally important maritime area requires the parties involved to exercise maximum restraint, diplomatic maturity, close cooperation and extreme care to avoid the already tense situation from coming to blows. It is a matter of concern that certain countries exert their claims in a sweeping and vigorous manner, to the point of not hesitating to take unilateral military actions and even use deadly force and claiming entire areas that overlap with virtually the claims of all other countries in the region. It is also unsettling that certain claimants have a somewhat skewed interpretation of the United Nations Convention on the Law of the Seas (UNCLOS) in staking their claims in the SCS and upholding their positions vis a vis their claims. It would not be in the interest of nations in the region, and in fact other nations which depend on peace and stability and freedom of navigation in the SCS region, for any types and levels of conflict to occur in these waters.

Figure 4 shows the claims over the islands and reefs in the Spratlys by several countries. Some make their claims based on their respective EEZ, some on historical grounds which are arcane in nature, while others are propelled by their geo-strategic interests and their intention to lay claim on the rich hydrocarbon and fisheries riches in the areas.²¹ The clouded situation is evident by the names given to the islands and maritime features in SCS in various languages by the claimants.²² Although the claims are largely made using legal arguments, they stand on various interpretations of UNCLOS which can appear doubtful and exaggerated at best and convoluted and erroneous at worst. All the same, they provide a concoction that could potentially brew into serious conflicts if not handled judiciously.

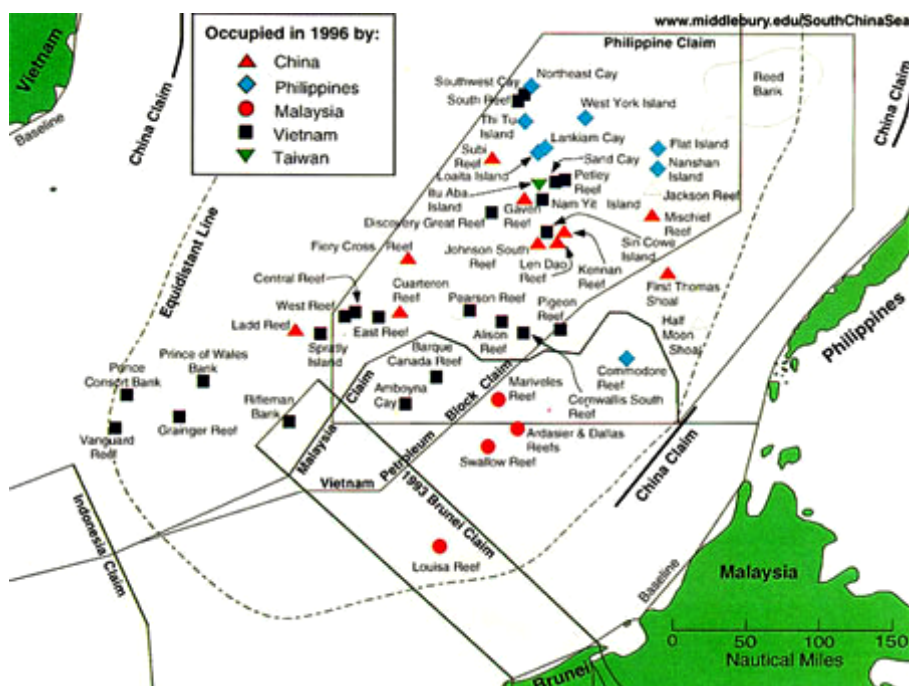
The situation in SCS is undoubtedly worrying, no thanks to the overlapping territorial claims over Spratlys, and aggressive posturing and potentially provocative initiatives in the surrounding waters.²³ Maritime scholars and analysts are not confident that clashes will not break out in SCS when disputing parties come at loggerheads with one another.²⁴ They fear that the tension, if left unchecked, could escalate into full-blown military confrontation.

21 China, for example, believes that the Spratlys form an integral part of its sovereign territory based on discovery made during the Han Dynasty in 2BC. For further reading on this subject, see, among others, Jianming, S. (1996). Territorial aspects of the South China Sea Island disputes. In Nordquist, M. H. and J. N. Moore(eds.) (1998) *Security flashpoints : Oil, islands, sea access and military confrontation*, Martinus Nijhoff Publishers, Hague, Netherlands, p.139-218. See also Jianming, S. (2002) China's sovereignty over the South China Sea Islands : A historical Perspective. *Chinese Journal of International Law* 2002(1) . pp.94-157.

22 Dzurek, D. J. (1996) *The Spratly Islands : Who's on first?*, Maritime Briefing 2(1), International Boundaries Research Unit, Durham, p.4-6.

23 Schofield, C.H. (2009) Dangerous ground : A geopolitical overview of the South China Sea. In: Bateman, S. and R. Emmers (eds), *The South China Sea : Towards a cooperative management regime*, p.8-11. Routledge, London, UK.; Hancox, D. and V. Prescott (1997) *Secret hydrographic surveys in the Spratly Islands* Maritime Institute of Malaysia, Kuala Lumpur, p.2.

24 Schofeld, C. and I. Storey (2009) *The South China Sea disputes : Increasing stakes and rising tension*, The Jamestown Foundation, Washington D.C., p.5.



Source : <http://www.pcij.org/blog/wp-content/uploads/2008/03/spratlys-claims.jpg> (4 Nov. 2009)

Figure 4. Claimants of Spratlys Islands

Nevertheless, it is heartening to note the efforts of several nations to resolve disputes and overlapping territorial claims in the SCS in a peaceful and amicable manner. For example, Malaysia and Thailand have set up a Joint Development Authority (JDA) to jointly develop gas fields in an area in the Gulf of Thailand where both nations have interest.²⁵ Malaysia and Singapore also settled their dispute over Pulau Batu Puteh or Pedra Branca, a cluster of maritime features bordering the Strait of Johore in Malaysia and Strait of Singapore, at the International Court of Justice (ICJ). ASEAN members have also engaged in confidence building measures via platforms such as the ASEAN Regional Forum and Shangri-La Dialogue involving Defense Ministers of member nations to promote peace, stability and prosperity in the region's seas. Indonesia hosted a series of unofficial conferences in the 1990s to discuss territorial disputes in the SCS with the objective of getting the parties involved to find amicable multilateral solutions to the issue. Member states of ASEAN and China have agreed to a set of conduct known as the Declaration on the Conduct of Parties in the South China Sea (DoC) in 2002 to ensure that disputes

²⁵ The Malaysia-Thailand Joint Development Area encompasses a 7,250 sq. km. area of overlapping continental shelf claimed by both Malaysia and Thailand. It is located in the lower part of the Gulf of Thailand near the South China Sea. See the Malaysia- Thailand Joint Authority website at <http://www.mtja.org/whatisjda.php> for information on the joint development between the two ASEAN neighbours.

are settled through diplomatic channels and not escalate into armed conflicts.²⁶

Even more encouraging is the fact that claimants who have in the past engaged in deadly confrontations in the Sea have managed to engage in a diplomatic manner. For example, China has made good progress in its bilateral talks with Japan, South Korea and Vietnam on managing common fisheries resources in the SCS via joint fisheries management and conservation efforts.²⁷ There is no doubting that some of the efforts have not yielded much result but the examples given are a step in the right direction to build confidence among the parties with interests in the Sea that could act as a buffer against hostility among them. It provides a glimmer of hope that nations will exercise restraint in SCS and work towards peaceful solutions of long-standing problems among them arising from their claims and from protecting their interests in the sea.

6. Promoting maritime trade as a pillar for prosperity in South China Sea

Despite its stature as a pivotal maritime trade lane, the stark reality is the SCS faces a plethora of challenges that will test its ability to facilitate international trade in a safe, secure and smooth manner. The tension stoked among claimants may seriously undermine the free flow of international merchant shipping in the waters and may have an adverse impact on the socio-economic prosperity and stability in the region and beyond.

There is therefore a strong argument to focus on trade as a pillar on which to build and promote prosperity in SCS and its vicinity. This approach presents the best chance for nations involved in claiming territorial claims in the waters to come together and set aside their historical, political and strategic differences and work on a common platform. Given that nearly all the countries in the region depend on trade to boost their economic growth, they should direct their attention on enhancing trade among them and between them and their trading partners. Efforts should be spent on using SCS as a vector for economic growth instead of an avenue for altercation.

The growing economic interdependency among nations in the SCS area demands them to stay on their toes to reap the opportunities and overcome the challenges presented by the ever-changing tides in regional and global maritime trade. As trade barriers are dismantled and the business environment becomes more liberalized, SCS regional countries will no longer be able to retain the old way of thinking and conducting trade. More than

26 The text of the declaration can be viewed at the ASEAN website at <http://www.aseansec.org/13163.htm>

27 Rosenberg, D. (30 Jun. 2005). Managing the resources of the China Seas: China's bilateral fisheries agreements with Japan, South Korea, and Vietnam. *Japan Focus*. <http://japanfocus.org/-David-Rosenberg/1789> (Last accessed on 12 Nov. 2009)

ever, they need to cooperate to enhance trade among them and to boost the attraction and competitiveness of the region to attract more trade and investments in the region.

The unmistakable trend of free trade agreements in the SCS region demands that previously closed doors are opened to enable greater trade and economic integration across the region.²⁸ This will result in greater level of competition for the regional nation and among maritime industry players to attract and handle more trade. When seen in this context, it should dawn upon the parties which are at loggerheads in SCS of the need to work out, if not set aside, their differences and close ranks to achieve common objectives of attaining peace, prosperity and stability. SCS can be a conduit for prosperity instead of a lightning rod for instability, if the littoral nations so wish.

The establishment of regional initiatives such as AFTA and APEC, and the success of bilateral free trade agreements among the SCS region's nations stand testimony to the practicality and workability of achieving the lofty ideal of creating a peaceful and prosperous SCS area.²⁹ There is no reason why nations which can work together to generate more trade and facilitate economic integration among them cannot resolve their disputes at Sea in an equally amicable fashion.

To this end, the construct of a common platform to promote cooperation among the regional nations would be most helpful. Such a platform can act as a catalyst for them to work together and rally behind a familiar, mutually agreeable cause as a prelude to creating peace and stability in the sea.

That common platform could well be trade – the elixir of the SCS region. Promoting trade is easily a common objective around which the nations along the Sea can rally and work together to promote. By cooperating on the premise of enhancing trade in the region and among them, they will find a common denominator to direct their efforts on something productive rather than destructive, something that can unify them rather than split them apart.

To this end, nations in the SCS region could engage in capacity building measures to promote greater trade among them and facilitate the movement of more trade in SCS. This could include taking the following actions :

28 For example, South East Asia, a region within SCS, has made much progress in promoting trade and economic integration among its members. In pursuit of Asian Economic Community's objectives, ASEAN leaders have agreed to focus on i) accelerating the integration process in 11 priority sectors by 2010 ; ii) removing barriers to the free flow of goods, services and skilled labor and freer flow of capital by 2010 ; iii) putting in place all the essential elements or conditions for ASEAN to function as a single market and production base ; and iv) pursuing strong external economic relations and terms of trade with Dialogue Partners through the establishment of Free Trade Areas (FTAs) and Closer Economic Partnerships (CEPs)

29 For a discussion on the impact of trade liberalization on regional economy, see Khalid, N. (2007) *AFTA initiatives on trade and transport : implications for Malaysia's maritime sector*. MIMA, Kuala Lumpur, Malaysia (unpublished). Available at <http://www.mima.gov.my/images/stories/ResearchCentres/MEI/Research/nazery%20-%20afta%20initiatives%20on%20trade%20and%20transport%20-%20implications%20for%20malaysias%20maritime%20sector.pdf>

- Setting up a South China Sea Economic and Trade Cooperation Council to promote greater trade and economic cooperation among the SCS region.

- Developing common strategies to enhance the capacity and competitiveness in areas such as ports, shipping and shipbuilding / ship repairing to cater to more trade, meet demand for maritime trade related services, and withstand more intense competition from other economic regions.

- Sharing in providing infrastructures for navigation safety to ensure that merchant shipping can traverse the Sea in the safest manner.

- Putting in place anti pollution and environmental protection measures to face any eventuality of accidents that may pose a threat to the Sea and its environment.

- Conducting joint scientific exploration and research in areas of common interests, especially those rich with resources and biodiversity.

- Conducting joint exploration to find hydrocarbon sources and setting up Joint Development Authorities in disputed areas which are rich in energy resources to commercialize them through a fair and equitable arrangement.

- Entering into agreements to manage fisheries resources together, as done by China and Japan, and ensuring that the sea's riches are harnessed in a sustainable and environmentally friendly manner.

- Abiding at all times the principles of international law and observing international conventions and diplomatic norms to avoid conflicts and to find peaceful resolutions to conflicts.

- Working together in a bilateral or multilateral manner to patrol the Sea to deter piracy, smuggling and terrorism.

- Promoting eco and marine tourism in suitable areas such as diving, cruise and sailing.

To face the new dynamics and realities of a more liberalized trade environment, it is essential that institutional support is put in place to facilitate efforts to enhance the SCS region's comparative advantage over other economic regions. This could be achieved on a platform of strong cooperation and coordination among nations and agencies in the SCS region in planning, implementing and monitoring of policies affecting trade and transport.³⁰ A strong institutional platform provides a solid base on which cooperation in efforts to improve trade and trade transport performance can be carried out. This would

go a long way towards averting confrontations and conflicts arising from geo-strategic interests.

The maritime sector has played an instrumental role in galvanizing trade and economic growth in the SCS region. The growth of ports, shipping services, shipyards and other maritime ancillary has helped nations in the region to foster closer trade and economic ties with one another and with their trading partners elsewhere.³¹ Further investments into the maritime sector to procure assets, build infrastructures, expand capacity, develop human capital and enhance productivity and service levels will contribute to regional trade and economic growth. This will only be good for a region which generally advocates open trade and will enhance its standing as a business- and investment-friendly region and a major maritime trade area. It will also inculcate a sense of common objective among SCS nations to use the Sea to attain socio-economic prosperity together instead of engaging each other in an adversarial manner.

7. Some policy proposals towards promoting peace in SCS

The tense situation in SCS provides a stark indication that measures in place to avoid and manage conflict in the SEA have not been effective. Despite efforts by regional players to engage in discussions to quell tension among them arising from overlapping claims in the SEA - such as the dialogues between ASEAN and China - the situation in the SCS is far from ideal. Even the DoC between ASEAN and China has not resulted in any significant cooperation between them and in advancing peace and stability in the region.³² In the same vein, the push towards promoting a more formal Code of Conduct in SCS has not borne any tangible result. This is evident in China's insistence of addressing territorial claims in SCS on a bilateral platform instead of treating them as a multilateral issue, and its rather forceful display of power in the Sea.³³

30 The example of ASEAN in promoting greater intra-regional trade by dismantling trade and technical barriers among them is worth emulating. Analysts have suggested that many positive lessons can be learned from the ASEAN experience in formulating regional grouping in other economic regions. In what can be seen as an endorsement of AFTA's successful implementation, it has even been suggested that world leaders should look at the ASEAN model of economic integration under AFTA to revitalize the stalled World Trade Organization WTO negotiations in the Doha Round in 2006.; Mandelson, P. (23 Aug. 2006), Free trade pacts are no substitute for Doha. *New Straits Times*.

31 Kreinin, M., T. Lowinger and A. Lal (1998) Determinants of inter-Asian direct investment flows. In: Dunning, J. (ed.) (1998) *Globalization, trade and foreign direct investment*, Elsevier, Oxford, UK, p.197.; Poon, J. (2003) Trade networks in South East Asia and emerging patterns. In: Chia, L.S (ed.) *South East Asia transformed: A geography of change*, ISEAS, Singapore, p.385.

32 Schofeld, C. and I. Storey (Nov. 2009), pp.24-27.

33 A speech by Singapore's Minister Mentor, detailed the naval build-up by China which is geared towards developing blue-water capability to sustain operations and presence in a far away theater. The text of the speech,

Several policy options are worthy of consideration to ease simmering tension in the SCS and to tangle the complex strategic dynamics therein. For a start, nations involved in claims should take it upon themselves to adopt a more flexible and less belligerent posture in the Sea. It certainly would not be helpful for the promotion of peace and prosperity in the Sea for the actors to act aggressively and assuming a hard-line stance in staking their claims. Countries deemed to be projecting power in the Sea in a way that creates anxiety to others would do well to assuage the apprehension through diplomatic or other means. The path of peaceful resolution through diplomatic channels should be exhaustively explored and preferred over the road that leads to the raising of tension in the Sea.

Nations involved in overlapping claims in the SCS should consider jointly developing maritime areas in the Sea which are believed to be rich with untapped resources. There are several example of successful joint developments of disputes areas that disputing nations in SCS can take heed from. This avenue should be exhaustively explored as it would bring mutual benefit to the parties concerned and would be conducive to promoting economic development and creating stability in the region. The proposals by several scholars on a model for cooperation in SCS could provide useful reference in developing a workable joint development model in the Sea.³⁴

It is felt that ASEAN should play a more assertive role in engaging China and other powers in the SCS and also to provide a calming influence in disputes in the Sea among their member nations. The failure of the DoC to prevent tension between ASEAN and China in SCS, and the unilateral action of the Philippines in passing the Archipelagic Baseline bill that lays claim to disputed territories in SCS, underscore the need for a more assured ASEAN to respond to the situation in the Sea. While not suggesting ASEAN to ignore the precious relations it enjoys with China, the time has come for the association to be more assertive in its dealing with Beijing in matters pertaining to disputes and claims in SCS. ASEAN must start upping the ante from current position of not giving high priority to engage China in SCS in its agenda.³⁵ It must forge a common, unified position in engaging China lest it runs the risk of China continuing to engage ASEAN members bilaterally in disputes in SCS.

It is not in the interest for the littoral nations in the SCS region to see the area to be continuously fraught with tension and weighed down by complex strategic interplays by multiple actors. ASEAN's failure to engage China in SCS would inevitable

delivered at the US-ASEAN Business Council's 25th Anniversary Gala Dinner on 27 Oct. 2009.

http://www.news.gov.sg/public/sgpc/en/media_releases/agencies/mica/speech/S-20091027-1.html

34 Keyuan, Z. (2006) Joint development in the South China Sea : A new approach, *International Journal of Marine and Coastal Law* 21(1):83-109, p.84.

35 Ho, S. (22 Oct. 2009) Beijing: South China Sea territorial disputes not on ASEAN agenda. <http://www.voanews.com/english/2009-10-21-voa20.cfm> (Last accessed 1 Nov. 2009) ; Anon. (22 Oct. 2009) We want good ties, says China. *The Straits Times*.

result in outside powers entering the fray to counter the growing power of the Middle Kingdom in the Sea. This would only make an already complex theater even more complicated, and would not be conducive to promoting peace, prosperity and stability in the Sea and its region.

8. Conclusions : Managing conflict, maintaining prosperity

Since time immemorial, SCS has provided the stage for maritime trade and movements of people that significantly shaped the socio-political, cultural, economic and strategic landscape in the regions surrounding the Sea. Being a Sea that sits along a key trade lane and borders many countries, the multifunctional role of the SCS as a strategic sealane, a facilitator of economic growth and a provider of resources and livelihood is paramount.

On account of these, it is crucial to preserve safety, security and prosperity in the Sea not only from an economic perspective but also from an environmental point of view. The situation in SCS should never be allowed to degenerate and the Sea should not be turned into theater of conflict that will threaten the economic interests of the littoral nations and the international community. It should also not be subjected to rapacious exploitation that will deplete its resources and degrade its environment, which is already under the strain from intense human activities³⁶ A full blown military confrontation in the Sea would only result in the intervention by outside powers keen to capitalize on such situation in the name of creating ‘balance of power’ in the region.

It is therefore crucial that the conflicts arising from the overlapping claims in SCS settled in an amicable way. To this end, all diplomatic channels must be exhausted and nations must close ranks and work hard to ensure that disputes do not become overblown to full scale conflicts. It would not serve anyone’s interest to have a South China Sea that is wrought by conflict and is heavily militarized. This would hamper trade flow in its crucial shipping lanes and would cause adverse effect to the livelihood of people, not to mention of the threat that it would be to the vulnerable environment of the Sea. In the same token, other maritime security threats such as pollution, illegal fishing, piracy, smuggling and even terrorism must also be addressed and contained to ensure that the Sea is meets the needs of its littoral states and is kept open and safe for international use.

While initiatives such as the establishment of DoC in the South China Sea and collaboration among nations to manage fisheries resources are laudable, much more needs

36 UNEP/GEF’s *Reversing environmental degradation trends in the South China Sea and Gulf of Thailand* project website at : <http://www.unepscs.org>

to be done to promote cooperation and understanding among littoral nations of the Sea to ensure that conflicts are avoided and prosperity therein preserved. In this regard, trade and economic interests are powerful motivators for nations in the SCS, which share a common objective to enhance trade to attain socio-economic prosperity, to promote cooperation rather than create confrontation.

It should dawn upon the littoral nations of SCS, that the trade and economic interdependence among them is crucial for their economic wellbeing and survival. They simply must not let their differences get the better of their judgment. In the waters of SCS lies their shared destiny. The onus is on them to use the mighty Sea as a platform for prosperity instead of turning it into an arena for altercation.

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Industrial competitiveness analysis among major aquaculture products and farming types in Korea

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ABSTRACT

In Korea, aquaculture production has drastically increased since the 1990s, and the total aquaculture output has been exceeding that of adjacent waters fisheries since 2006. The aquaculture industry has increased in importance since it creates jobs and production for Korean fisheries.

This study aims to examine industrial competitiveness among the Korean aquaculture products and farming types using the competitiveness indices, composed of assessment factors like management capabilities of Korean aquaculture producers, infrastructure and distribution, and processing capacities. Assessing different species with the indices will help understand the relative competitiveness of each species and establish more appropriate policies. This research is comprised of surveys, questionnaires, and interviews with specialists on major aquaculture species produced in Korea.

In conclusion, future aquaculture policies should be concentrated on highly competitive species such as finfish, abalone, and laver, which are expected to advance globalization of Korean aquaculture. It is also necessary to reflect the competitiveness assessment result on the policies.

Key words : aquaculture, competitiveness analysis

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1. Introduction

The world's aquaculture industry has developed at a remarkable speed. Due to the decrease or stagnation of fish resources in many parts of the ocean, aquaculture products had become the major supply source of fishery products in the world market. In addition, with rapid development of aquaculture techniques since the 1990s, production capacity of aquaculture industry has drastically expanded. The aquaculture industry is significantly growing not only in advanced countries where aquaculture techniques and management systems are already available, but also in countries where employment and income-creating industries are still immature.

Unlike capture fisheries, the aquaculture industry is a suitable type of business for strategic industrialization in many countries because it's not a target to rigid resource restrictions and mass production is possible. However, excessive cultivation will face restrictions by the market function of "supply and demand" rather than the natural resources. Of course, the spread of environmental contamination following the expansion of aquaculture is likely to cause the productivity decline, which is another restrictive factor to be considered.

In Korea, aquaculture production has drastically increased since the 1990s and the total aquaculture output has been exceeding that of adjacent waters fisheries since 2006, becoming an important industry in Korea fisheries industry. The aquaculture industry has also created many jobs and contributed for the income of aquaculture households. With regard to the species, aquaculture was first initiated with seaweed and shellfish, but it has recently been expanding to finfish aquaculture which requires high technology. On the other hand, since business conditions such as production technology and demand structures are so diversified, it is not easy to select relatively advantageous species in the market. In other words, from the fishermen's point of view, scientific information is valuable for overcoming market restriction factors.

Thus, this research aims to suggest competitiveness indices, composed of assessment factors like management capabilities of Korea aquaculture producers, infrastructure and distribution, and processing capacities. Assessing different species with the indices will help understand the relative competitiveness of each species and the need to establish more appropriate policies. The research is comprised of surveys, data collection, and interviews with specialists on major aquaculture species produced in Korea.

2. Theoretical approach

2.1 Concept of industrial competitiveness

As market principles and globalization become dominant, the concept of competitiveness is more often raised as an important idea. Originally, competition has been conceptualized as a dynamic meaning in the market aspect,¹ while competitiveness is usually defined in aspects of nation, industry, firm, and commodity, according to the subject or category of the concept it is used in.²

First, the comparative advantages among commodities in specific local and overseas markets could be defined as commodity competitiveness, which can be revealed through commercial factors such as price (cost) and non-price (quality) competitiveness of the commodity. Such commercial competitiveness can easily be assessed by means of Revealed Comparative Advantage (RCA), which is structured with clear definitions of the concerned commodity.

“Firm competitiveness” is a concept designating the capabilities of the concerned enterprise, which can be assessed by diversification strategies such as multi-commodity production, market share or its increase rate, profitability, technological level, marketing capabilities, and ownership structure.

However, when we deal with concepts like national competitiveness or industrial competitiveness, the criteria is so vague that it is difficult to make an assessment. The idea of “national competitiveness” is defined in broad terms by focusing on trade balance, increasing rate of productivity, and infrastructure status for economic activities of a nation (McCorriston and Sheldon, 1994). In other words, “national competitiveness” as “a general capability of a nation to upgrade the competitiveness of business and industry” is compared nationally by measuring various factors that comprise the concept. Nevertheless, there are indications that it is too fictional to define widely conceptualized competitiveness as an index.³

Competitiveness of the aquaculture industry can be approached with the concept of industrial competitiveness. Industrial competitiveness can be defined as general capabilities of the corresponding industry, and in order to assess industrial competitiveness, it is necessary to measure with competitive component factors. In fact, the Micro Industrial Competitiveness Index (MICI) defined by the World Economic Forum (WEF) originated from M. Porter’s concept of industrial competitiveness.⁴

1 Refer to Carlton and Perloff (2000) pp.6-10, 56-61.

2 Refer to Trail and Silva (1996) pp.151-166.

3 Refer to the research by Krugman (1994)

4 Porter (2004) suggests microscopic competitiveness as part of national competitiveness index, when his concept of “industrial competitiveness” is used.

2.2 Assessment methods of industrial competitiveness

To assess industrial competitiveness at the “industry” level, it is necessary to pay attention to the relationship between the decisive factors of industrial production capacities and the indices of industrial performance. Namely, measurement methods of industrial competitiveness can be divided into measuring the sources of competitiveness by assessing the decisive factors of industrial production capacities, and measuring the performance of competitiveness by assessing the industrial earning rate and growth rate.

According to Porter’s Diamond model, which aims to explain the overall decisive factors behind industrial productivity, the overall competitiveness level of a certain industry is decided by i) its productivity factor conditions, ii) relationship with related and supporting industries, iii) the demand conditions, and iv) the internal business conditions such as strategy, structure, and rivalry of the firm.

The MICI Model of the WEF is a very inclusive and precise model for measuring industrial competitiveness. Since 1979, WEF has annually released reports on “national competitiveness,” which is measured and assessed by two indices : the macro Growth Competitiveness Index (GCI) and the MICI.

The National Competitiveness Index of the International Management Development (IMD), another well-known organization for assessing national competitiveness, utilizes total 314 items to assess four sectors of national competitiveness, which includes i) the performance of economic operation, ii) the efficiency of government, iii) the efficiency of business, and iv) the development level of infra-structure (IMD, 2005). In fact, out of these four sectors, the business efficiency and the development level of infra-structure mostly overlap with “industrial competitiveness” factors.

2.3 Industrial competitiveness assessment cases for aquaculture

2.3.1 Competitiveness of salmon aquaculture industry in Canada

In the aquaculture industry, foreign countries have already positively adopted Porter’s industrial competitiveness assessment method. First, in order to assess industrial competitiveness of major salmon aquaculture industry at the British Columbia areas in the Pacific coast, Canadian government broke down Porter’s competitiveness assessment factors and compared the major aquaculture regions.⁵

The research used questionnaires covering the following items for competitiveness assessment of the corresponding salmon aquaculture industry :

- Governmental restrictions and related expenses for obtaining new licenses

⁵ Refer to Price Waterhouse Coopers (2003)

- Restrictions of the local government on the aquaculture waters
- Restrictions and taxation policies of the federal government
- Availability of financial resources and expenses thereof
- R&D basis
- Availability of human resources

To assess aquaculture industry competitiveness in Pacific coast, the same questionnaires were done about aquaculture industry of New Brunswick (Raritan River coast, east of New Jersey, US), Norway, Chile, United Kingdom and other such regions and made regional and national comparisons. According to the analysis results, the salmon aquaculture industry in the coast of British Columbia has more costly structure than other major international salmon aquaculture sites. It was inferred that the reasons were small sized businesses, insufficient circulation and distribution systems, and continuing recessive characteristics of the aquaculture species.

2.3.2 Competitiveness of fisheries industry in Norway and Iceland

The fisheries bureau of Norway and Iceland positively adopted and compared the assessment methods of Porter and WEF · IMD for assessing the industrial competitiveness of their overall fisheries industry.⁶ The research was composed of six subordinate indices including macroscopic and microscopic sectors, and for assessment of the subordinate indices respectively, total 139 items were assessed. The six subordinate indices of fisheries industry competitiveness are as listed :

- Fisheries management index
- Macroeconomic management and governmental index
- Infrastructure and environment index
- Business operation capability index
- Aqua-processor index
- Marketing index

In particular, the research considered the fisheries as one of the global food industry with active international trade. Accordingly, it is noticeable that competitiveness of the fisheries industry was generally comprised of resources and fishing activities, domestic processing and export, and deep sea fisheries and foreign processing.

2.3.3 Competitiveness of fisheries industry in Korea

Hong *et al.* (2006) made comparison between Korean domestic industries by dividing

⁶ Refer to FCI Team (2005)

aquaculture industry into coastal, offshore, and aquaculture, and adopting Porter's analysis method on fisheries, agriculture, livestock industry, and food and beverage manufacturing industry. They also created the following three sector indices from macroscopic and microscopic viewpoints, and established total 39 items to assess each index.

- Macroscopic factors and governmental roles
 - Employment-related regulations and practices
 - Producer supporting systems of government
 - Governmental leadership
- Infrastructure and industrial environment
 - Human education level
 - Information-oriented level
 - Circulation environment
 - Financial support systems
 - Management practices
- Capabilities of producers
 - Producer restrictions
 - Potential capabilities of producers
 - Capabilities of processors
 - Marketing basis

According to the analysis results of the research, the competitiveness of food and beverages manufacturing was very advanced while that of fisheries was slightly higher than agriculture. Within fisheries, it was competitive in the order of offshore fisheries, aquaculture, and coastal fisheries. However, this result is insufficient since status assessment of the resources, the basis of fisheries, was not reflected. In regard to the aquaculture, producer restrictions were not so disadvantageous compared with other businesses that it was inferred to be a very suitable business in the market economy out of all fisheries industries.

3. Empirical analysis

3.1 Empirical models

The method of competitiveness analysis by species used in this research was developed by the research of Hong *et al.* (2006) using means of species segmentation. Analysis categories are similar to the competitiveness analysis of Canadian salmon aquaculture industry. However, it is different in that the Canadian salmon aquaculture industry is in

the form of incorporated business, and that the Canadian case did a comparative analysis with salmon aquaculture industries of other countries.

However, while the Norway and Iceland model (2005) was designed to compare competitiveness of aquacultures in the two countries, this research aims to compare industrial competitiveness by domestic aquaculture species due to limited data. Subsequently, an empirical analysis model was constructed by utilizing the competitiveness performance factor analysis, which uses quantified indices and Porter's competitiveness source factor analysis. Accordingly, the competitiveness indices (C_k) by species (k) are subordinate indices (G_i) such as production management system, infrastructure and environment, and the producer's management capabilities. These subordinate indices were structured with assessment factors by group (F_{ij}), which affected the respective corresponding index.

$$C_k = \sum_i a_i G_i$$

where $\sum_i a_i = 1$ (total weights of each subordinate index is 1)

$$G_i = \sum_j \beta_{ij} F_{ij} \text{ (weighted mean of assessment factors in each group)}$$

$$\sum_j \beta_{ij} = \alpha_i \text{ (weight of assessment factors of each subordinate index)}$$

3.1.1 Production management system

Production management system of aquaculture is more important than that of other industries in that aquaculture start with governmental licenses on the public waters. Government is obliged to manage the waters, a common property, so that it could harmoniously be utilized and developed in various ways. The management includes aquaculture licenses, aquaculture environments, safety of aquaculture products. "Management" could also include governmental support to the aquaculture such as national-level research and development program and aquaculture outlook program. The following are the assessment items reflected in the indices of production management systems.

- Assess how well willful secession from licensed areas, illegal aquaculture, and such aquaculture licenses are managed.
 - Measure the degree of excessive facilities and willful secession from licensed areas for specific species perceivable by the satellite picture data.
- Assess how well the aquaculture environment is managed.
 - Check how effective the governmental management of aquaculture environment (such as the clean-up operations of fishing ground) is.

- Check how well the aquaculture sites are cleaned as regulated in the fishery management act.
- Assess how well safety of aquaculture products is managed. This includes management of fishery medicines and chemicals.
- Assess how well aquaculture technologies are developed and propagated by the government.
- Assess governmental efforts to supply market information on aquaculture products through aquaculture outlook program.

3.1.2 Infrastructure and environment

Infrastructure and environment that form the basis of aquaculture can be viewed in two ways. First is the bio-geographical condition for aquaculture. Since live organisms are the objects of aquaculture, physical environment or ecological characteristics are considered as key factors for competitiveness of the business. The representative factors include the contamination level of aquaculture sites, environmental carrying capacities, and sensitivity of aquaculture species on environmental changes or contamination. A geographical condition of the aquaculture location is also included. For example, the competitiveness of the fishery varies depending on whether the aquaculture site is located in the basin or in the open sea, or on how frequently natural disasters occur.

Second is the macroscopic management environment of aquaculture, such as the supply and demand situation of the market, import and export trends, and future market prospects. The supply condition of quality seeds and food can also be included as a major assessment index. This research deals with the seeds supply of all species but the matter of food supply for finfish and abalones was excluded.⁷

- Assess the physical environment of aquaculture such as aquaculture sites and characteristics of the species. Detailed items are as follows :
 - How much is the site contaminated?
 - How sensitive is the product to environmental changes or contamination?
 - What is the environmental carrying capacity of the sites?
 - How exposed is the site to disasters?
 - What are other operational advantages and disadvantages of site location?
- Assess the market environment of aquaculture products and production factors. Detailed items are as listed :
 - How excessive or insufficient is the product amount or the production facilities?

⁷ For abalones, due to difficulties for food supply per area, it was dealt as part of the operational performance of the management capabilities in this research. In other words, operational performance was good in the areas of easy food supply.

- How much will the future demand increase or decrease?
- How can sufficient quality seeds be secured?

3.1.3 Management capabilities

If these production management systems and infrastructure and environments are macroscopic factors for measuring competitiveness, the producer's capabilities are microscopic factors. It can be measured in two ways. The first method is by measuring the achievements of operational activity performances. The operational achievements could be assessed using general operational analysis indices like capital-asset ratio, profit-loss ratio, activity ratio, and debt-equity ratio. In this research, after considering data availability, earning rate was set up as standard criteria with the productivity, which could be the core performance of operational activities. Out of various earning rates, this research uses the ratio of net profit to net sales. Productivity is usually the value-added production rate against input labor or input capital, but since it is difficult to measure input labor, input capital, and value-added production, this research uses proxy index as the ratio of net profit against the size of the operational aquaculture site. At the same time, other factors including the present industrial competitiveness recognized by the producer and the price elasticity of supply, which is the adjustment rate of product amount or production facilities to changes of the market price, could also be used as indirect indices of the performance reflecting the current operational status.

Another method is to measure the potential with current operational activities. This is the source of competitiveness. One example is research and development activities of the business entity. Unlike the government level research and development as mentioned in the index of production management systems, it refers to business or industry level activities to raise competitiveness in order to maximize profit. The next is marketing endeavors to sell product at a stable, high price. Even if the product quality is excellent, competitiveness of the corresponding aquaculture could vary depending on the effort made on distribution and sales. It could be further extended to the point that the competitiveness level may vary according to how tight and stable the cooperation between pure production sector and related forward and backward industries of aquaculture such as the distribution system.

On the other hand, reliance on governmental support is also presented as an index for indirect measurement of competitiveness sources. So far, government has supported aquaculture industry as an alternative to shrinking catch fisheries. Moreover, various policies have been adopted to reduce operational risks of small businesses that are easily exposed to disasters or excessive production. Consequently, the aquaculture industry is heavily reliant on the government. This tendency could become a damaging factor to the competitiveness of aquaculture industry in the long run. Therefore, measuring the reliance on governmental support can be an index for competitiveness as well.

- Assess the factors related to producer's operational performance. Detailed items are as follows :
 - What is the profit (net profit per net sales)?
 - What is the productivity (the net profit per unit area)?
 - What is the competitiveness level recognized by the fishermen?
 - What is the price elasticity (the price sensitivity) of supply?
- Assess the factors of the producer management potential. Detailed items are as listed :
 - How active is the research and development?
 - How active is the marketing effort?
 - How stable is the cooperation with related forward and backward industries?
 - How reliant is the business?

Table 1. Assessment factors and methods of competitiveness index

Assessment element		Assessment method
Production management systems (7 items)		
Production management of aquaculture	Cultivation license management (illegal fisheries, etc.)	Survey
	Relocation of licensed area, excessive facility ratio	Data collection
	Environmental management of aquaculture sites	Survey
	Fishery cleaning system	Survey
	Sanitation-safety management (fishery chemicals, etc.)	Survey
Aquaculture fishery support	Development & spread of aquaculture technologies	Survey
	Provision of market information	Survey
Infrastructure and environments (8 items)		
Bio-geographical conditions	Contamination level of aquaculture sites	Survey
	Environmental sensitivity of aquaculture organisms	Survey
	Environmental carrying capacities of aquaculture sites	Research
	Disaster occurrence frequency & damage to fishery sites	Data collection
	Other location-specific conditions of aquaculture sites	Survey
Macroscopic operational environments	Amount of excess of product and facilities Future demand prospects Supply of qualified eggs or seeds	Survey Research Survey

Assessment element		Assessment method
Management capabilities (8 items)		
Operational outcome	Profits (the ratio of net profit to net sales)	Data collection
	Productivity (the ratio of net profit to the size of farm site)	Data collection
	Competitiveness level recognized by farm managers	Survey
	Price elasticity of supply (price sensitivity)	Survey
Management potential	Research & development activities	Survey
	Marketing efforts	Survey
	Cooperation between aquaculture and related industries	Survey
	Non-reliance level on governmental supports	Survey
Total 23 items		Survey 17 Research 2 Data collection 4

3.2. Data and methods

Each index for competitiveness analysis is yielded from the results of questionnaire surveys, related researches, and data collections and investigations. As indicated in (Table 1), out of 23 detailed items, there are 17 surveys, 2 researches, and 4 data collections ; surveys are used the most. This is because existing statistics and data on Korean aquaculture is very limited, and instead the researchers had to quantify what is recognized by the fishermen on each item. This could be pointed out as the limit of this research, but could also be a method to better show the realities of the site, especially under the unsatisfactory accuracy of the statistics.

The questionnaire surveys were performed by species on 17 items from February to March, 2007 to 521 farmers of major sites. Related research include two existing ones : Research on Demand and Supply Status and Prospects, and Research on Environmental Carrying Capacity Assessment of Fishery Sites by the former Ministry of Maritime and Fisheries (2008). The data collection and investigation are comprised of other related statistics or our own investigation. From our own investigation, there are four items that include the ratio of willful recession from licensed areas and excessive facilities, obtained by analyzing the satellite observation data of the Fisheries Outlook Center ; disaster frequency and damage to the aquaculture sites, obtained by analyzing the administration data of related cities, countries, and areas ; and the profit and productivity obtained from the operational surveys of Aquaculture. The operational status survey by aquaculture by species was carried out from March to April, 2007, to 123 fishermen of major aquaculture sites by species.

To calculate competitiveness indices with the collected data, it was ranked, weighted

for add-up, and assessed out of 100 points. In order to avoid the value of each item from affecting the average values of all the species were adjusted to be the median. Consequently, after competitiveness index value becomes 50 points adding up the adjusted value of each item.

Finally the weight per index referred to the research by Hong *et al.* (2006), and production management systems, infrastructure and environment, and management capabilities were each set up as 20%, 30%, and 50% in this research.

3.3 Results

3.3.1 Assessment results by major species

According to the results measured by the models and data introduced in the above, the most competitive species for Korean aquaculture was abalone followed by warty sea squirt (*styela clava*), and cockle. On the other hand, competitiveness of oyster, ark shell, and sea squirt were lower than the total average, and the finfish, scallop, lavers, sea mustard, and kelp (sea tangle) were close to the average.

Abalone is a recently developed species and its produce has drastically increased, but is still at a growing level. It was best assessed for competitiveness due to high earnings and bright future demand prospects. Warty sea squirt is also high in the rank because it has better earnings than other species, and because there is more demand than supply. Cockle was classified as a highly competitive species despite dim demand prospects due to high earnings.

Table 2. Competitiveness analysis results per species

Species	Total	Competitiveness index			Remarks
		Production management systems	Infrastructure and environments	Management capabilities	
Finfish	52.0	11.3	15.7	25.1	Cage culture
Oysters	45.3	13.3	13.4	18.5	Hanging culture
Abalone	61.5	10.0	17.6	33.9	Cage culture
Cockles	54.5	9.8	14.3	30.4	Sowing culture
Scallops	52.0	9.7	16.8	25.5	Hanging culture
Ark shells	41.5	9.4	13.3	18.8	Sowing culture
Warty sea squirt	54.8	8.1	15.1	31.6	Hanging culture
Sea squirt	45.0	9.1	13.8	22.1	Hanging culture
Laver ¹⁾	52.9	10.7	15.5	26.7	Seaweeds
Sea mustard ¹⁾	53.4	7.6	16.2	29.5	Seaweeds
Kelp(Sea tangle) ¹⁾	49.3	7.0	17.3	25.0	Seaweeds
Total (mean)	50.0	10.0	15.0	25.0	

Notes : ¹⁾ the assessment is concentrated in Wando county

On the other hand, oyster, ark shell, and sea squirt were classified as not so competitive species due to overcrowded aquaculture cultivation, frequent occurrence of massive unexplained death, obsolete aquaculture facilities, and environmental changes. In particular, oyster aquaculture has been suffering from declining exports and over production, and sea squirt production has declined due to a tissue softening disease while imports from Japan increased, resulting in low earning.

Finfish has been showing average level of competitiveness due to ever worsening competition with imported Chinese products, and worries of excessive production. The seaweed such as laver, sea mustard, and kelp are traditional aquaculture species and did not suggest any disappointing factors in competitiveness. Scallop was also assessed to be in the average level as they are recovering from difficulties due to sharp increase of massive death in the past.

3.3.2 Competitiveness comparison by culture type

The 11 species can be classified into four types of production methods : cage culture type for finfish and abalone ; hanging culture type for oyster, scallop, warty sea squirt and sea squirt ; sowing culture for cockle, and ark shell ; and seaweed culture for laver, sea mustard, and kelp. The following is the comparisons of competitiveness assessment results by culture type :

3.3.2.1 Cage culture

Finfish and abalone are different species, but they are common in that the food need to be supplied, and that the cage construction on the sea is quite costly. However, compared with finfish, abalone aquaculture started recently and is in the growing stage with sufficient potential for further growth, whereas finfish aquaculture is in the mature stage with no growing demand and even needs to compete with imported products. It can easily be confirmed through the competitiveness analysis results : finfish was somewhat superior in production management system, but a bit behind in the infrastructure and environment, while abalone was firmly superior in management capabilities. In spite of rapid production increases, the fact that there is newly created demand in line with price declines, potential to the abalone consuming countries like China, and active marketing efforts by the producers, all support the management capabilities of abalone.

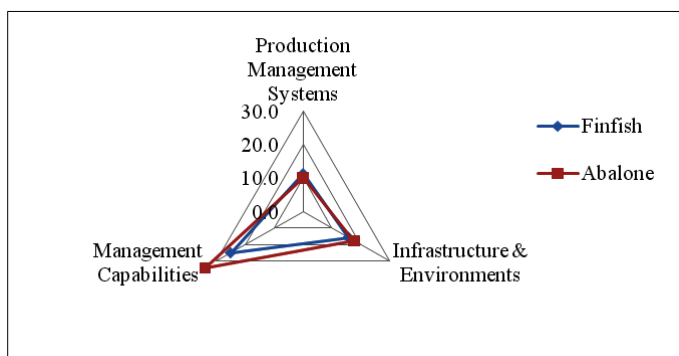


Figure 1. Competitiveness comparisons of cage culture species

3.3.2.2 Hanging culture (Shellfish and etc.)

The hanging culture type is for aquaculture of shellfish, other aquatic animals, and even seaweed. This research, excluding seaweed such as sea mustard and kelp, compares and analyses oysters, scallops, warty sea squirt, and sea squirt. According to the results of competitiveness analysis, competitiveness of warty sea squirt and scallop are above the average level, while oyster and sea squirt were below average. Oyster was the best in production management systems, but was poor in other categories, and sea squirt also ranked low in all categories. As for warty sea squirt, there was an increase of massive death in recent years in line with the marine environment changes due to various development projects, and complaints have been raised about the production management systems. As a result, it ranked the lowest in competitiveness of the production management system, but surpassed all three species in management capabilities, where the weight is high. Scallops, which have less production than demand, is assessed as excellent in the infrastructure and environment index.

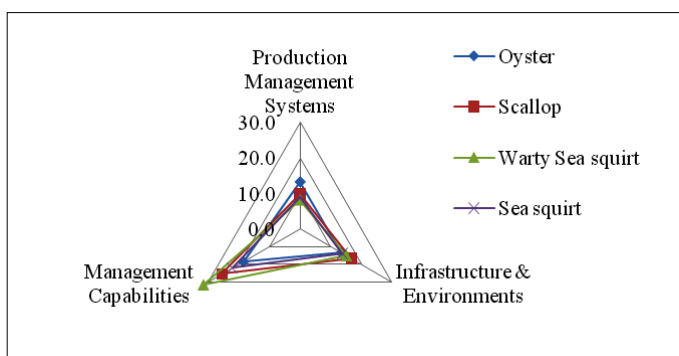


Figure 2. Competitiveness comparisons of hanging culture species

3.3.2.3 Sowing Culture

Among sowing culture species, the competitiveness level of cockle and ark shell were contrastive. There were not much difference in the production management systems, and the infrastructure and environment, but in management capabilities, cockle had far higher earnings than ark shell, due to better survival rate. The reason behind low earnings, which led to the reduction of management capabilities, is because over crowded culture let to low survival rate, and ark shell is sensitive to the environment to begin with.

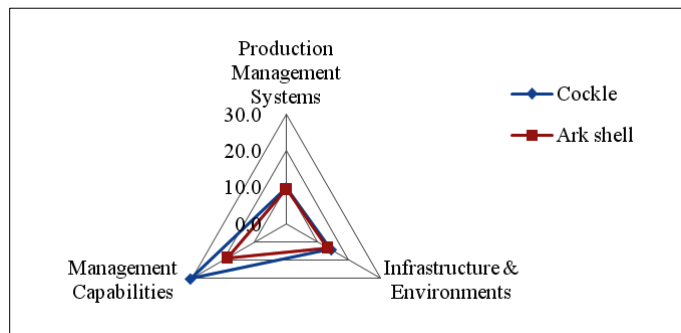


Figure 3. Competitiveness comparisons of sowing culture species

3.3.2.4 Seaweed

Whereas, sea mustard and kelp are cultivated through a hanging culture system, laver is cultivated through floating culture or pillar culture method. The culture methods are different, but they can still be compared in one category of seaweed. Competitiveness level of the three species are all similar and above average. Laver was strong in the production management systems, kelp was in the infrastructure and environment, and sea mustard was in the management capabilities. However, because more weight was placed in the management capabilities, the results in management capabilities ended up deciding the total rank of competitiveness.

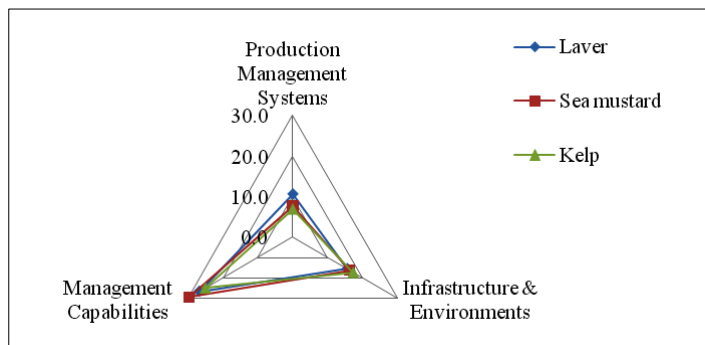


Figure 4. Competitiveness comparisons of seaweed species

4. Policy implications

Based on the research, the following policy implications can be derived : first, the future development potential of aquaculture industry is likely to be found in the species with a relatively high competitiveness because any nurturing and supporting policies for species with relatively low competitiveness will end up as a waste of money and time. Therefore, future aquaculture policies should be concentrated on developing the human and material resources to let the species with highly superior competitiveness lead the aquaculture industry. Finfish, abalone, and laver are estimated to have very high potential.

Second, even if the competitiveness indices are assessed to be at a similar level, it is desirable to reflect the characteristics of subordinate indices when promoting policies by species because all subordinate indices may contribute differently to the competitiveness of each species. For example, among hanging culture species, warty sea squirt was assessed relatively higher than the others in management capabilities, however, in production management systems, oysters were better than warty sea squirt. Therefore, future policies by species for the aquaculture industry should focus on reinforcing production management systems for warty sea squirt and the management capabilities for oysters.

Third, it is necessary to understand relatively weak or strong points for each assessment factors among the subordinate indices and positively reflect them on the policies. For instance, if survey shows very poor results in sanitation management level, cleaning status of aquaculture site and illegal license management practices, the policies by species must promote policies to supplement them. It is the same for infrastructure and environment and management capabilities as well.

Fourth, it is very important to assess the potential for future development as well as current operational performance of the producer's management capabilities. In particular, possibilities of cooperation and synergy creation with aquaculture related-businesses are considered as one of the key factors for successful management. Therefore, future aquaculture policies should aim at maximizing the synergy effects by dividing the roles with other surrounding industries.

Fifth, although it was not suggested in this research, these competitiveness indices can be sorted out according to producing district of the species. Thus, the results of competitiveness assessment by species and by district should be used as a basis for promoting characterization and specialization of aquaculture species by district.

Finally, globalization of Korean aquaculture can be advanced by promoting species with high competitiveness. In this regard, the government should set up and push forward positive overseas expansion policies for these highly competitive species. For example, the government should establish a comprehensive overseas expansion programs for species of which mass production is feasible and for overseas expansion market demand is predicted.

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Short-term perspective strategy for recent challenges in the Korean port industry

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ABSTRACT

Changes in the port industry at home and abroad demand a new paradigm of port development. Ports have moved from forward approach to backward approach to do multi-functions and create remarkable added value by connecting the hinter land logistics complex. Under these circumstances, it is necessary to diversify the standard determining port development. The port operating market has been rearranged from seller's market to user's market. Therefore, increasing productivity and securing price competitiveness for the operators are prerequisites for dealing with the challenges

The current issue for Korea faces is opening the door to a new market by investing in various sectors of the target country. Measures on selecting sites and running pilot programs are needed to advanced into the overseas market. A new business model using EDCF (Economic Development Cooperation Fund) and ODA (Official Development Assistance) as a way to enter into new markets in foreign port development should be identified. Building environment-friendly ports emitting low greenhouse gas is emerged as a key issues including renewable energy and modal shift. Green growth also highlights the importance of developing 'resource recycling ports'

Key words : hinter land logistics parks, seller's market, user's market, renewable energy, modal shift, Green growth, resource recycling ports

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1. Introduction

With rapid changes in macro-environment surrounding Korean, the port industry undergoes continuous changes at home and abroad. The world economic downturn triggered by the financial crisis of 2008 attributed to dramatic decline in cargo volume and has become a biggest challenge to the Korean port industry. Furthermore global efforts to reduce greenhouse gas emission and environmental pollution put much stress on the necessity to secure the next growth engine by making environmentally friendly ports. Recognition on role and function of ports has been changed over times. They become a leisure complex and the center of value-added economic activities and provide reasons for ports to develop harmonized with cities.

The trend in larger vessels, started in the late 1990's, has been widely spread at a rapid pace. It took only 10 years that the size of vessels enlarged from 8,000 TEU to 12,000 or 13,000 TEU. The trend results in fewer ports of call and intensifies competition among hub ports across the world. It is expected that the trend would continue for the time being as larger vessels need less required capital per TEU and fuel costs.

With relocation of manufacturing companies to overseas and diversified industrial structure, growth rate of export/import cargo has been slowed. Recently, China's increasing investment in building and improving port facilities further puts brake on the growth of transshipment cargo in Korea. Against this backdrop, fierce competition among domestic freight terminals and some unused logistic facilities are pointed out as problems to be dealt with. Increased unloading productivity, newly opened minor ports across the nation and Busan new port are likely to intensify the competition. However, local governments' demand for developing further ports in their regions has continued. There are concerns that handing over the management rights of 16 trade ports to local government would cause conflict between market economy and political interests over port development.

In this paper, changes in the port industry at home and abroad are examined and issues emerging with them are analyzed. Policy priorities to respond these changes are examined in short term perspective.

2. Changes in circumstances at home and abroad

2.1 *Changes in circumstances abroad*

2.1.1 Decrease in cargo volume caused by the global economic recession

Sub-prime mortgage crisis of the US, center of the world economy, in the late half of 2008 led to the financial crisis, causing the global economic recession. The world average economic growth was around 5 percent until it dropped to 3 percent in 2008. The growth of global trade volume, pushed up by rapid development of BRICs (the fast growing developing economies of Brazil, Russia, India, and China) decreased from an annual 7.3 percent in 2007 before the financial crisis to 2.9 percent in 2008. Gloomy economic forecast are expected in 2009 due to the aftermath of the financial crisis. The world economic growth and trade volume growth are projected at negative 1.1 percent and negative 11.9 percent respectively in the coming year, which is the largest drop since the Great Depression in 1930's.

However, slowdown in international trade volume growth was predicted even before the global economic recession hit the world. There are various reasons behind the grim forecast. First, globalization and regionalization of the world economy have great impact on companies' management plans. Put it simple, global manufacturing network and outsourcing initially promoted trade through vertical integration in production. But local production of key parts may lead to decline in captive cargo of each country.¹

Second, continued slower economic growth of advanced countries constrains spending. As a result, rapid trade volume growth of emerging countries including BRICs, which highly depend on export to them, would lose speed in the long term.

Third, the world economic recession triggered by the financial crisis undermines the global potential economic growth. That makes nations strictly regulate the financial and exchange markets to prevent a future economic crisis from occurring as the economic cycle has shorten than before and boost domestic demand to reduce their dependence on export. All of reasons above mentioned would put more pressure on international trade and investment, resulting in diminishing global potential economic growth.

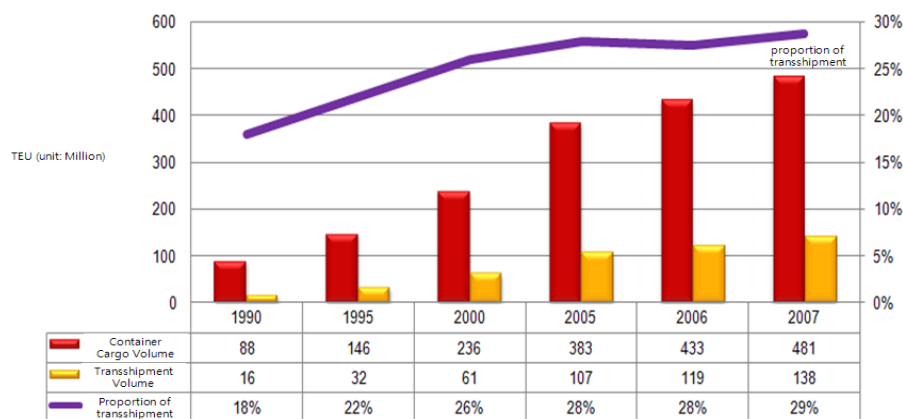
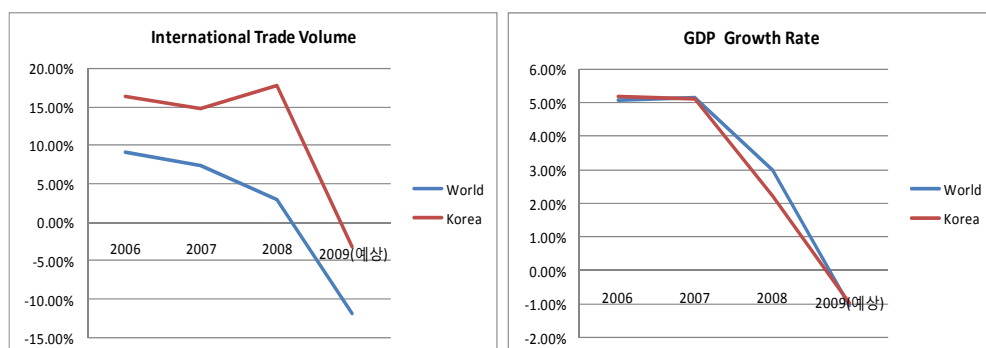
¹ Samsung Electronics is a case in point. It is projected to sell over 250 million handsets across the world this year. But only 18 percent of them are manufactured in Korea. If small companies supplying parts to Samsung do not sharpen their competitiveness, they would be replaced by local manufacturers, leading to decline in captive cargo.

Table 1. Changes in international trade volume and economic growth rate

(Unit : %)

Growth rate		2006	2007	2008	2009(projection)
World	Trade volume	9.10	7.33	2.95	-11.89
	Economic growth	5.09	5.17	3.00	-1.06

Source : IMF (2009) World Economic Outlook, Statistics from Korea International Trade Association
Revised economic outlook of KDI, 2009.9.8



Source : INFORMA, Containerization International Yearbook (of each year)

Figure 1. Global container throughput and transshipment cargo volume 1990~2007

2.1.2 Intensified competition among ports in Northeast Asia

Posting rapid economic growth, Northeast Asia emerged as a key area and currently accounts for over 30 percent of the global container cargo volume. Now, Korea, China and Japan fiercely compete each other to become a hub port of the region and attract more vessels. CY Yearbook said that 6 out of the world top 10 ports are located in Northeast Asia, including Shanghai, Hongkong and Shenzhen based on cargo throughput in 2008. Busan port ranked third in 2000 and inched down to 5 in 2005. In the years to come, it would be closely followed by both Ningbo and Qingdao in China.

Competition among ports in the region became full-fledged after Shanghai's New Yangshan Port opened on December, 2005. The first and second-phase construction of Yangshan Deep Water Port was finished and it is equipped with 9 berth with total designed capacity of 4.2 million TEUs of containers annually. The Chinese government plans to turn the Yangshan port into the world first largest container port by 2010 when its construction plan to build additional 7 berths with capacity of handling 7 million TEUs will have been finished. It shows great confidence that the country's ever-increasing cargo volume would drive growth of the port.

Table 2. Container throughput of world top 10 ports

(Unit : 10,000 TEU)

Ranking	1990		2000		2003		2005		2008	
	Port	Cargo Volume	Port	Cargo Volume	Port	Cargo Volume	Port	Cargo Volume	Port	Cargo Volume
1	Singapore	522	Hong Kong	1,810	Hong Kong	2,045	Singapore	2,319	Singapore	2,992
2	Hong Kong	510	Singapore	1,704	Singapore	1,841	Hong Kong	2,260	Shanghai	2,798
3	Rotterdam	367	Busan	754	Shanghai	1,128	Shanghai	1,808	Hong Kong	2,425
4	Kaohsiung	350	Kaohsiung	743	Shenzhen	1,065	Shenzhen	1,620	Shenzhen	2,141
5	Kobe	260	Rotterdam	628	Busan	1,041	Busan	1,184	Busan	1,343
6	LA	259	Shanghai	561	Kaohsiung	884	Kaohsiung	947	Dubai	1,183
7	Busan	235	LA	488	LA	718	Rotterdam	925	Ningbo	1,123
8	Hamburg	197	LB	460	Rotterdam	711	Hamburg	809	GwangZou	1,100
9	New York, New Jersey	187	Hamburg	425	Hamburg	614	Dubai	762	Rotterdam	1,080
10	Keelung	183	Antwerp	408	Dubai	545	LA	749	Qingdao	1,032

Source : INFORMA, Containerization International Yearbook (of each year)

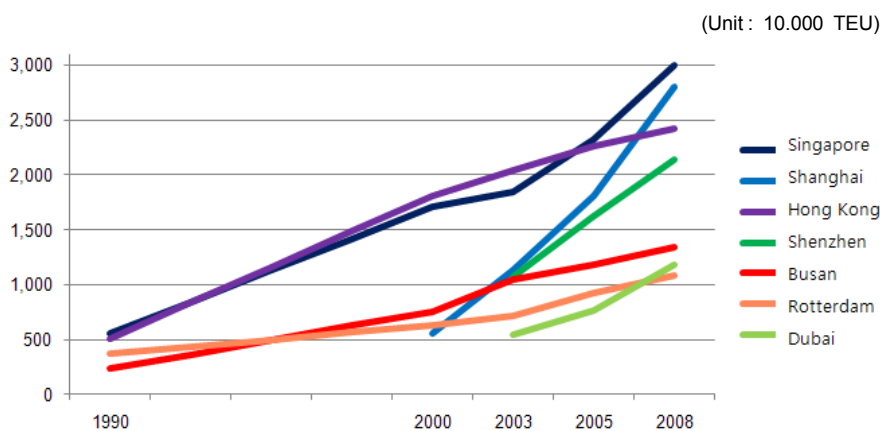


Figure 2. Changes in container shipment of major ports

As competition to become a hub port has become intensified in Northeast Asia, the importance of Japanese ports has been reduced. Japan dominated the world in terms of the port industry before China became part of the world economy in 1990's. Furthermore, no major ports, in Kobe, Osaka, and Tokyo, ranked on the world top 20 container ports list. There are various reasons for reduced role of Japanese ports : relatively high port charges : decline in domestic cargo volume, caused by moving manufacturing to low cost overseas. Now Japan attempts to regain its lost fame of the world hub port based on its super hub port project. The main object of the project is to deal with high costs and low productivity issues.

2.1.3 Worsening polarization in economic growth

There were so-called NICs, referring to Asia's tigers, Korea, Hongkong, Taiwan, and Singapore in the past. The NICs posted dramatic economic growth rate in 1960's to 1970's and represented the emerging markets. Those have grown enough to join the ranks of the advanced countries.

Later, BRICs (Brazil, Russia, India, and China) replaced those old day emerging markets. BRICs was an acronym created by Goldman Sachs in 2003 to describe the 4 largest growing economies, which had phases of good economic performance through the 1990's.²

BRICs have been the center of international trade growth and economic powerhouses. They have great potential to become a key player in the world economy based on strong domestic demand, large territory, huge population and abundant natural resources. BRICs are home to more than 40 percent of the world population, over 2.7

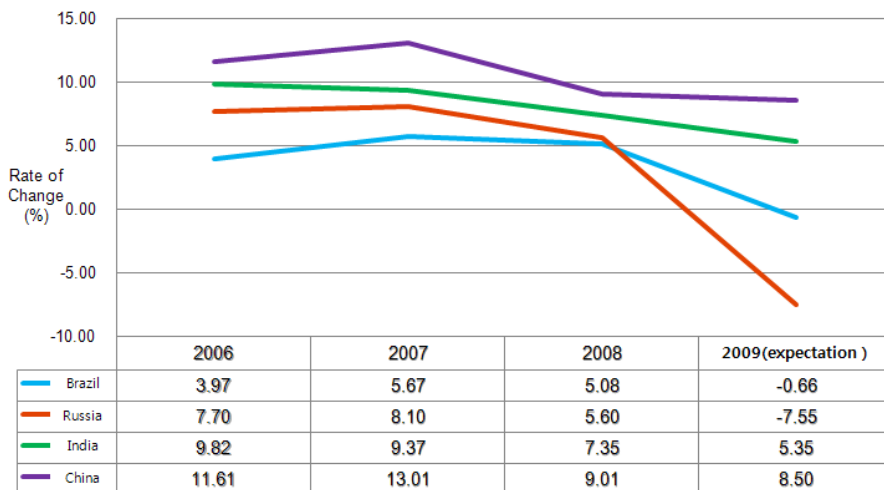
² Some say that an increasingly confident Indonesia may well replace Russia in the club of emerging superstars and the BRICs could become the BICIs.

billion. It means that their potential domestic demands are very impressive. In practice, demand and purchasing power of BRICs has increased at a neck break speed. Continued brisk export and foreign investment also support their economic growth.

Before global economic crisis in 2007, China and India recorded around 10 percent of economic growth, Russia (8%) and Brazil (5%), respectively. Due to the aftermath of the financial crisis, their economic growth little slowed down in 2008, but still record relatively high growth rates compared to others.

Many economists paint optimistic picture on their growth in 2009 when the impact of the economic crisis would spread across the world. China is expected to post economic growth of 8 percent and India (5%) while other nations record negative growth. China overtook the US in terms of GDP and become the largest economy in the world. That is the reason the world pays more attention to China. Although Brazil and Russia emerged as key players in the global economy, none of two countries could rival China and India when it comes to the size of the economy.

Under the current recession, BRICs with impressive growth rate play a crucial role in leading economic recovery and revitalizing international trade. As powerhouse of the world economy, BRICs will have a great deal of weight on it.



Source : IMF (2009) World Economic Outlook

Figure 3. Changes in GDP growth rate of BRICs

2.1.4 Trend in larger and larger vessels

The trend in larger vessels results in fewer ports able to handle these vessels and intense competition among pivot ports to attract more vessels. Numerous research found that the trend, starting in the late 1990's, is rapidly spread and becomes a phenomenon. While it took 10 years that the size of vessels enlarged from 8,000 TEU to 12,000 or 13,000 TEU. A study says that the larger the size of vessels is the less capital costs (depreciation expenses, interests, costs of maintenance and repair, interest premium) and fuel expenses are. Yet, constraints to the trend in larger vessel are ship structural design, engine and cavitation, depth of quay and new Panama Canal.

2.2 *Changes in circumstances at home*

2.2.1 Sluggish in total cargo volume handling in domestic ports

Economic recession directly has impact on export/import cargo. Highly diversified industrial structure and relocation of manufacturing companies to overseas result in sluggish cargo movement. Slowdown in international trade affects domestic cargo movement. Container cargo volume grew by 9.9 percent in 2007, but it is expected to drop by 2.2 percent the next year. In 2009 when the aftermath of the global economic crisis widely spread, cargo movement recorded negative growth (annual growth rate of domestic cargo movement was 5.3 percent for the latest 5 years). Facility expansion of port in North China attributes to slow growth of transshipment container in Korea. Transshipment cargo movement accounts for around 35 percent in total modal freight transport and the growth of it stagnates. As the world economy is recovering at a faster pace than expected and the Korean is boosting its economy with various stimulus package, there is high expectation that decrease in total cargo volume handling in local ports will slowdown quarterly. From 2010 when the Korean economy is predicted to record positive growth, cargo volume would increase again to a certain level before the economic turbulence hit the nation.

Each port shows different level of decline in cargo volume. Incheon Port, mainly handles cargo bound to China, distinctively showed stiff decline. Given that China rebounds from the global economic recession and is on the right track in terms of economy, cargo volume handling in Incheon Port will pick up in the near future. Yet the port would take at least 1 to 2 years to fully recover.

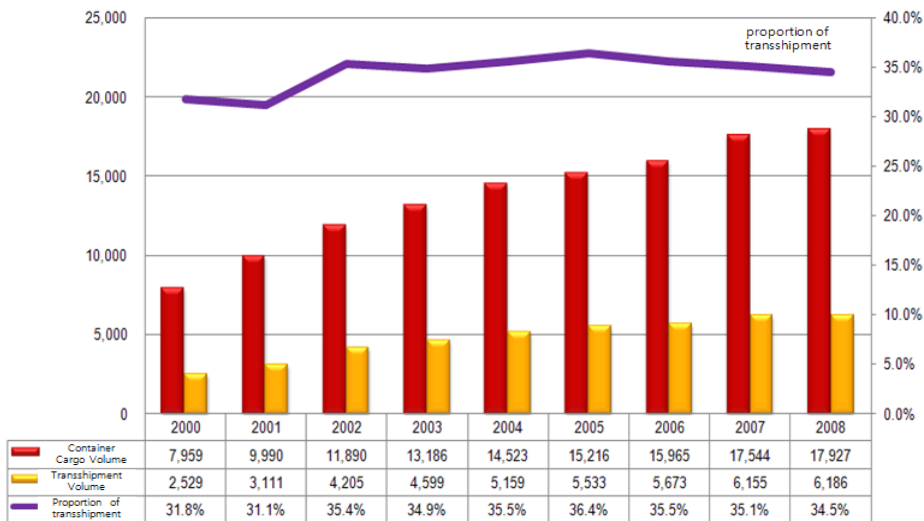


Figure 4. Changes in domestic container cargo volume and transshipment (2000-2008)

2.2.2 Expansion of supply on port facilities

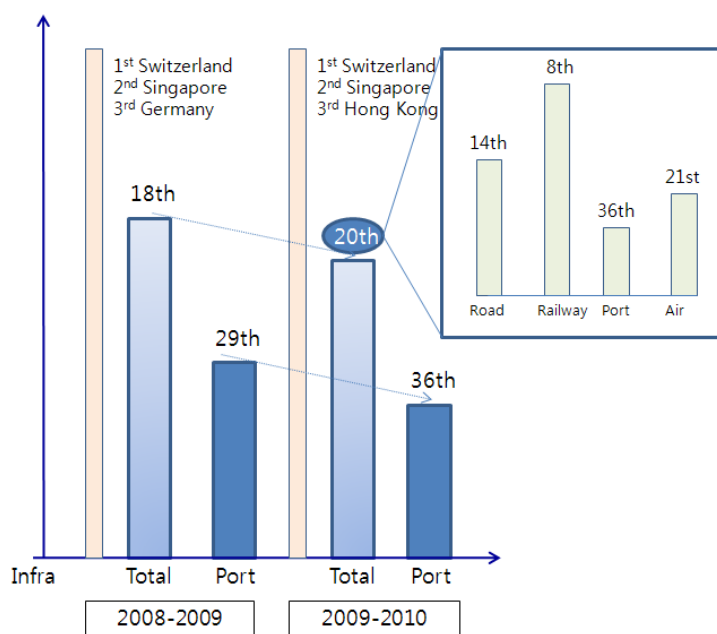
While demand for port facilities has declined, supply of port facilities has continuously increased in Korea. That raises concerns because the increasing number of newly opened ports at the time of economy slowdown could lead to supply and demand imbalances among ports. Expanding port facilities not only in pivot ports like New Busan Port and Gwangyang Port but in regional ones brings about fierce competition to attract cargo and has negative impact on themselves. For example, New Busan Port and Busan North Port compete each other and down port charges one after another to attract more cargo. In addition, some regional ports are being unused or being converted for another purpose.

Some argue that intensified competition among ports is only to put much burden on shipping lines, port operating companies and port logistics companies. The Korean government well recognizes the current situation. It now implements various measures such as exemption of port charges, tax break and rent reduction so that it supports them, but many companies are on the brink of going bankrupt.

- In 2009, Pohang New Port open (4 berths handling 20,000 TEU)
- In 2009, Ulsan New Port open (6 berths with 20,000 to 30,000 TEU)
- In 2009, Busan New Port, Complete the first phase of its second-stage construction plan (3 berths with 50,000 TEU)
- In 2010, Busan New Port, Complete the second phase and Open the quay (3 berths with 50,000 TEU)

2.2.3 Low efficiency of logistics infrastructure

According to a report of 2009 World Economic Forum, Korea's port competitiveness³ ranked 36, down 7 notches from the previous year. Korea relatively recorded good scores in the general infrastructure competitiveness, it downed 2 notches over the past year to 18th place. In port competitiveness, Singapore and Hongkong ranked second and third respectively, which have lots of implications to Korea. Korea is far behind than its rivals in LPI (Logistics Performance Index), released by the United Nation. Singapore led the rankings of the LPI report 2007, followed by Netherlands and German. Among the Asia-Pacific countries were Japan (6th), Hong Kong (8th), Taiwan (21st), South Korea (25th), and China (30th). The result clearly reveals that Korea has to go a long way to catch up its competitors even it is little ahead of China.



Source : World Economic Forum (2009)

Figure 5. Infrastructure rankings of Korea

³ Global competitiveness rankings are calculated from both publicly available data and the Executive Opinion Survey. Executives of companies are requested to answer questions about business environment of a country where they do business. Therefore, the report on ranking should be used as a reference rather than overacting to the results.

Table 3. LPIs of major countries

	General Classification	LPI	Customs Clearance	Infrastructure	Interantioanl Transport	Cargo Capacity	Logistics Tracking	Domestic Transportation Costs	Just-in-time
Singapore	1	4.19	3.9	4.27	4.04	4.21	4.25	2.7	4.53
Netherlands	2	4.18	3.99	4.29	4.05	4.25	4.14	2.65	4.38
Germany	3	4.1	3.88	4.19	3.91	4.21	4.12	2.34	4.33
Japan	6	4.02	3.79	4.11	3.77	4.12	4.08	2.02	4.34
Hong Kong	8	4	3.84	4.06	3.78	3.99	4.06	2.66	4.33
UK	9	3.99	3.74	4.05	3.85	4.02	4.1	2.21	4.25
USA	14	3.84	3.52	4.07	3.58	3.85	4.01	2.2	4.11
UAE	20	3.73	3.52	3.8	3.68	3.67	3.61	2.8	4.12
Taiwan	21	3.64	3.25	3.62	3.65	3.58	3.6	3.1	4.18
Italy	22	3.58	3.19	3.52	3.57	3.63	3.66	2.39	3.93
Korea	25	3.52	3.22	3.44	3.44	3.63	3.56	2.73	3.86
Malaysia	27	3.48	3.36	3.33	3.36	3.4	3.51	3.13	3.95
China	30	3.32	2.99	3.2	3.31	3.4	3.37	2.97	3.68


Source : World Bank (2008) LPI

2.2.4 Changes in port governance

Revised Port Law, announced on June 9, 2009, will give more authority on development, management and operation of Foreign trade and coastal ports to local government. Under the original Port Law, the central government was in charge of management and development of trade ports as well as coastal ports while local governments only had responsibility of managing coastal ones. But the revised law classifies trade ports into two groups- national ports and local ports, and gives appropriately developing and managing authority to central and local governments. Under the revised Port Law, local governments have most authorities for ports except the designate right. As designate right is about setting out and amending Port Master Plan, the central government keeps it.

Table 4. Changes in port governance

Port governance 2009				
Classification	Policy planning	Port development	Port management	Terminal operation
Trade port	Central government (National port policy committee)	Central government and private (Quasi-governmental organization, Act on private participation in infrastructure)	Central government and private (Quasi-governmental organization, Act on private participation in infrastructure)	Private
Costal port	Central government	Central government	Local government	Private



Port governance after 2010				
Classification	Policy planning	Port development	Port management	Terminal operation
Trade port	Central government (Subcommittee of national port policy committee)	Central government (National port) Local government (Local port) Public corporation (Complex) Private	Central/Local Government National port policy committee	Private
Costal port	Central government	Local government	Local government	Private

Transfer of management rights from central government to local ones means paradigm shift in port development and management. Simply put, local governments make decisions on related issues. But the paradigm shift has positive and negative effect at the same time, so numerous measures and proactive plans must be closely reviewed.

Table 5. Projected effect by transfer of management rights

Positive effect	Negative effect
<ul style="list-style-type: none"> Promote local governments' capacity by giving more authority on port planning and management Establish port planning and management system customized to the local needs Promote procedural democracy by increase local residents' participation in the process of polish making and implementation Vitalize the local economy 	<ul style="list-style-type: none"> Reckless development resulted from excessive demand on port development Expand local governments' fiscal deficit Possible conflict between central and local governments over port development and management rights Weakening competitiveness of port and undermining efficiency of port policy due to lack of management and too much emphasized port development

3. Challenges

3.1 Demand on new paradigm of port development

Changes in the port industry at home and abroad demand a new paradigm of port development. In the past, ports were only recognized as a mean of transport freight and auxiliary of industrial production activities. So it was ports prime task that was loading and unloading cargo for transport. The volume of cargo determined demand for port development.

Ports do multi-functions as storage and warehouse, multi-modal transport center, shopping center and create remarkable added value by connecting the hinter land logistics complex. Ports have moved from forward approach to backward approach to this end. Under the circumstances, it is not appropriate that demand on cargo volume is the only one standard of determining maintenance of port facilities. For example, in a case of a port which handles not much container cargo volume but has potential to create much added value, the port has enough importance to be kept. As far as ports in Korea concerned, volume of added value that ports create is much less than their competitors in foreign countries largely because the role of port is mainly confined to handling container cargo. It is necessary at this point to generate much added value by connecting the hinter land logistics complex with port development. But that doesn't ignore a Trigger Rule, a system on forecasting port cargo volume and distribution and introduced to prevent oversupply. The Trigger Rule should be strictly applied to while applying various standard beside cargo volume to ports with potential of creating added value. The main purpose of diversifying standards is to establish necessary port facilities in time.

3.2 Enhancing efficiency of port operating system

The port operating market has been rearranged from seller's market to user's market. Therefore, competition among ports to attract container cargo would be intensified, which may result in charge cuts for a time being. In this situation, quay operators should pursue 'a nimble penny'- small profits and quick returns in order to keep their business afloat. Creating added value is one way to keep their business running, though, no one should be sure that all profits generated by added value would go to the operators.

Key challenges are increasing productivity and securing price competitiveness for the operators. These are prerequisites for dealing with the challenges : port facilities large enough to accommodate large vessels : one stop service: advanced operating system : and effective labor supply system. In addition, more larger size quay operating companies should be created to go through the current hardship. Small-sized ones have difficulties in promoting

competitiveness and only rival each other for a small piece of pie. Competing is only to cut the charges and leave smaller profits. The Korean government needs to provide support and make efforts to help small operators merge on a voluntary basis while impose barriers to new operators.

3.3 Open the door to the port development market in foreign countries

It is little late for Korea to advance into the port development market overseas. For an instance, China and Japan, based on enormous foreign exchange reserve, have invested in Africa, Asia, and Latin America as forms of natural resources and SOC (Social Overhead Capital) development and food aids. Those help them to enter into the new markets. The current challenge for Korea faces is opening the door to a new market by investing in various sectors of the target market country. Investing first in potential market has significancies not only for Korea but also the beneficiaries ; for Korea, it can be a good way for the saturated port development market to develop inroads into overseas markets ; for beneficiaries, they can be passed on the know-hows Korea⁴ has been accumulated. In relation to it, Korean government searches a good way to enter into a new market connecting ODA(Official Development Plan) and GLN(Global Logistics Network) business.

3.4 Efforts to make ports eco-friendly

“Environment” will be the word of this year as the climate change convention is scheduled to be held this year. Under the Kyoto Protocol, global nonbinding climate-change agreements, took effect in 2005, Korea obtained developing country status and exempted from the obligation to cut greenhouse gas emissions. But from 2013, it lose the status. The Korean government set a goal of cutting greenhouse gas emissions to 4%⁵ below its 2005 level by 2020. The Korean government stated ‘Low Carbon, Green Growth’ as the center of the nation’s vision in 2008 and mapped out an action plan, ‘Comprehensive Plans on Combating Climate Change’. For the port sector, it conducted a policy study, titled ‘Building Eco-Friendly Ports’ in 2008 and established Green Port policy in 2009. With the government’s movement and policies, building environment-friendly ports emitting low greenhouse gas is emerged as a key issues including renewable energy and modal shift. Green growth highlights the importance of developing ‘resource recycling ports’ - they recycle and reuse waste as energy sources. The resource recycling port system has various advantages ; it is well suitable to Korea with less available land to store waste ;

4 Include various sectors, like planning, design, review on business feasibility, construction technology.

5 It is same amount to the plan, cutting greenhouse gas emissions by 30 percent by 2020 relative to the level of BAU (Business As Usual).

and it reduces environmental stress. Furthermore, the Korean government should pay more attention to coastal areas where more frequently suffers natural disasters because of extreme weather events and build safety structures to protect those areas.

4. Strategy for recent challenges in short term perspective

4.1 Make ports create demand and added value

4.1.1 Create a business complex in the logistics parks of international ports

The paper explores the reasons for creating business complex in the logistics parks of ports and strengthening ports role as hub of logistics as a short term measures to make them create more added value and demand. The Korean government well recognized the reasons and came up with “Comprehensive Plan for Development of Business Complex in the Logistics Parks of International Ports” in 2006. Under the plan, it builds total 8 business complexes with 8 million pyeong ($3.3058\text{m}^2 = 1\text{pyeong}$) by 2020. As of 2009, 45 consortiums applied to move into Busan New Port and Gwangyang Port. 10 businesses applied to relocate into Pyeongtaek · Dangjin Port at the first stage of constructing the logistics parks and there are now 13 businesses in the logistics parks of 4th quay Incheon Port.

However, from the perspective of invigorating port’s logistics parks area, ports should attract more companies and businesses. For Busan New Port and Gwangyang Port together, only 16 companies relocated to the complex and created a meager volume of container cargo.

Table 6. Comprehensive Plan for Development of Logistics Parks of International Ports 2006

(Unit: 1,000 m²)

Classification	2011 (Year)	2015	2020
Busan New Port	4,656 (1,408)	6,238 (1,887)	7,713 (2,333)
Gwangyang Port	2,760 (835)	3,689 (1,116)	4,960 (1,500)
Incheon Port	3,409 (1,031)	4,470 (1,352)	6,216 (1,880)
Pyeongtaek. Dangjin Port	1,319 (399)	2,595 (785)	4,455 (1,348)
Ulsan Port	839 (254)	1,092 (330)	1,451 (439)
Mokpo Port	518 (157)	734 (222)	1,049 (317)
Phohang Port	373 (113)	666 (202)	913 (276)
Masan Port	88 (27)	154 (47)	237 (72)
Total	13,962 (4,224)	19,638 (5,941)	26,994 (8,165)

Notes: Unit in () is 1,000 pyeong

Source: The Comprehensive plan for development of logistics parks of international ports 2006 by The Ministry of Maritime Affairs and Fishery

Business model of these companies in these logistics parks is weak to external risks because either they heavily depend on trade with China or Japan, or their revenue sources center on certain countries. Therefore revision of relevant laws and diversification of business model should be put on the front burner in order to facilitate companies to enter into new markets. Relevant laws were revised to allow manufacturers besides logistics companies to move into the logistics parks of international ports. To vitalize logistics parks, businesses and companies should understand necessities to move into the logistics parks first and have no inconvenience in carrying out business activities. To this end, various measures should be taken. They include revision in minimum amount of investment, expansion of employment for foreign workers, creation and publication of systematic standards of selecting enterprises into the logistics parks and one-stop administrative service. Current business model heavily depending on China or Japan should be broadened to the emerging markets like East Europe, Latin America, Southeast Asia, and India. The companies in the logistics parks should diversify business profile, focusing on items taking advantages of no or less tariffs, or the rule on the country of origin labeling, which is strictly imposed due to the acceleration of trade agreements like FTA with other nations.

4.1.2 Reinforce the role of ports as logistics hub

Korea has advantages for being a logistics hub as it imports most raw materials and energy and is located between China and Japan, world's largest consumers of raw materials and energy. Korea can create added values by becoming a hub of container and bulk freight transport of natural resources, pursue development of the financial sector and reduce risks domestic companies face at the same time. To fully take advantage of its location and to determine possibilities of being a logistics hub in Asia, Korea needs to analyze supply and demand of raw materials in Northeast Asia and main routes for freight transport like chemical product, grain and raw materials. Korea also reinforces its role as a logistics hub by integrating scattered London Metal Exchange (LME) warehouses in Busan, Gwangyang, Incheon, and so on.⁶ As the need arises, ports attract exchanges by connecting them with an exchange center.

Before ports take a firm root as a logistics hub, port clusters with international competitiveness should be built. Now the port cluster in Busan is regarded as a good example, though, lack of proximity, a defining characteristic of a cluster, is pointed out as a main reason of inefficiency. Without building a cluster, no port carries out its original role of loading and unloading freight. For development of ports, it is necessary to build a port cluster connecting with complexes back of ports, cities and industrial complex. To do that, 'comprehensive plan on logistics and industrial cluster' should be mapped out at a national

6 As of 2008, Korea handled 9 percent of world LME volume and 32 percent of Asia. Due to concerns over lengthy economic slump, mid-dealers are expected to buy materials in bulk.

level. If there are too many items in the plan to discuss and figure out, it would be a way to review feasibility by incorporating it into the current comprehensive plan on development of complex back of ports. The comprehensive plan should include the results of studies on feasibility of each port to build a cluster and on selection of candidate sites.

4.2 Establish advanced port operating system

4.2.1 Establish port governance system

From this year, development and management rights of 15 ports transfer to local governments. It is urgent to set up and utilize a management system about distribution of port development budget and evaluation of ports' performance. To this end, it is needed to conduct satisfaction measurements and quantitative assessments- cargo handling performance of a port, extent of non-operating facilities, management of statistics about port operation, and facility maintenance and repair of port under the local governments' authority every second year. Then the Port Policy Committee reviews the outcomes of the assessment and reflect them into policy. That is, budget support should be provided as a form of matching fund based on port performance and basic budget support mechanism.⁷ As mentioned above, newly established system should cover all the range of information systematically collected on port development and management including statistics related data and materials. Port administrative procedures also needs to be unified by drawing up an distributing guidelines centered on 43 mandate office work such as respective role of local government and the central government, scope of authority. A conflict management system also is need to be established to solve any conflict between the local and central government on ports. Port experts at the Port Policy Committee may participate in the process of setting up the conflict management system.

4.2.2 Improve the quay operation system

Appropriate size of terminal operators can be figured out based on research, covering possibilities of merge and close among businesses on the blink of shutting down, government incentives to them, merge and shut-down examples in foreign countries. Productivity and efficiency of port could be improved by designing and implementing measures for smooth labor supply and advancement of labor supply system. The most urgent task ports face is to intensify competitiveness port operation. Advanced technologies could boost the productivity. According to a study, improving soft ware system boosts productivity much more than hard ware. Upgrading the current operation system is feasible when various information technologies and advanced system are combined and necessary experts and

⁷ For example, provide financial support - marketing costs, port facilities charges reduction/exemption based on budget, size of developing structure and human resources for port development to vitalize ports.

technologies are secured. Therefore the government needs to establish and phase in ‘road map and action plan for technological development on the ports’, and ‘measures for securing and fostering experts in ports’.

4.2.3 Strengthen port security and safety system

It is an international trend in strengthening security at sea and airport since the September 11 terrorist attacks in 2001 and a bomb attack by al-Qaeda against the French oil tanker in 2002. To respond the trend, harbor master, massive research on it is under way, could be used further. Harbor master has independent authority on and is in charge of port safety in port. But, first of all, plans on adding port security facilities and equipment should be set. Along with that, safety standards to protect precious human lives and port property are needed to be established based on scientific studies on engineering about loading and unloading cargo.

4.3 Building environment-friendly ports

The Korean government set a goal of cutting greenhouse gas emissions to 4 percent below its 2005 level by 2020 in order to show its strong commitment to cut greenhouse gas emissions. Under the current frame work on climate change, Korea is classified into a developing group and exempted from the obligation to cut greenhouse gas emission. Korea has no its own calculation method about greenhouse gas emission, so it follows IPCC(Intergovernmental Panel on Climate Change) tools and guidelines on calculation.⁸ When Korea uses the IPCC calculation method, there is some disadvantage of making a mistake in calculation and the amount of its greenhouse gas emission might be exaggerated. Therefore the government must set its own calculation methods to evaluate greenhouse gas emission by ports and figure out ways to reduce greenhouse gas based on specific role of ports.

Table 7. Ways to cut greenhouse gas emission in ports

Classification		Ways to cut greenhouse gas emission
Ships	Ship operating within harbor limit	<ul style="list-style-type: none"> • Impose mandatory on use ultra-low-sulfur fuel for harbor craft • Improve engine of Harbor Craft • Lower speed of Harbor craft
	A ship at anchor	<ul style="list-style-type: none"> • Alternative Maritime Power(AMP) • Using clean energy when a ship at anchor
Unloading		<ul style="list-style-type: none"> • Modernize unloading equipment and Impose mandatory on use ultra-low-sulfur fuel • Shift to electricity unloading equipment
Yard		<ul style="list-style-type: none"> • Use hybrid yard tractor • Change outworn truck

⁸ When a nation draws a report on greenhouse gas emission, it must follow the guidelines IPCC (Intergovernmental Panel on Climate Change) for calculating the amount of gas emission.

Along with that, modal shift to coastal transport which emits only a quarter of greenhouse gas than road transport and shift to low carbon freight transport system can reduce greenhouse gas emission. Ports have geographical advantages in terms of harnessing wind, tidal and solar powers. The government needs to establish an action plan on using renewable energy generated in ports to take the advantages above mentioned. To build environment-friendly ports when it comes to effective ways of recycling and using waste, studies on technological and economical feasibility as well as selected locations and the scale of development must be conducted. Revision of related laws on selecting developing eco-friendly hub ports needs to be followed.

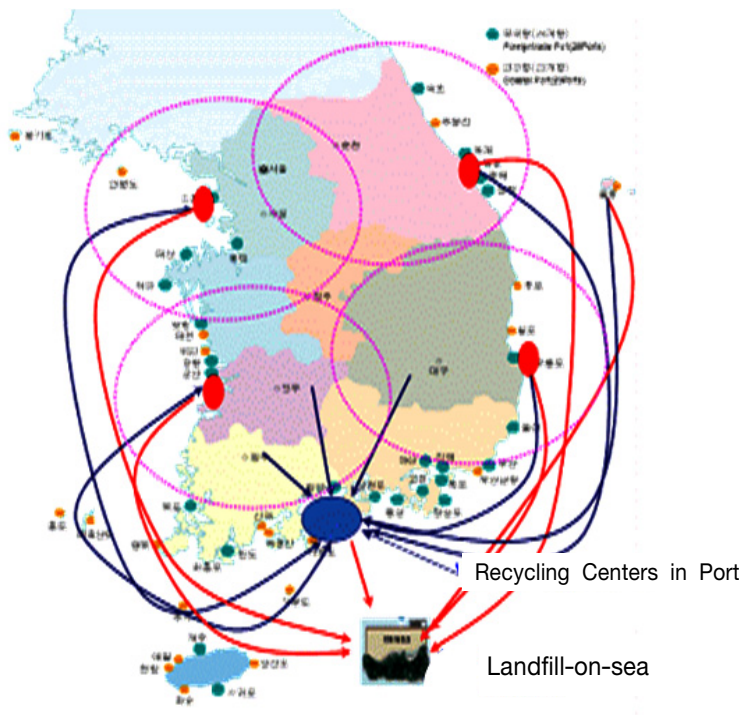


Figure 6. The concept of recycling port

4.4 Strengthen ports' international cooperation

Measures on selecting sites and running pilot programs are needed to advanced into the overseas market. A new business model using EDCF (Economic Development Cooperation Fund) and ODA (Official Development Assistance) as a way to enter into new markets in foreign port development should be identified. When businesses move into new markets, they should engage in numerous businesses like building an industrial complex

in the hinterland of port or securing natural resources in the target market. For businesses on building global port network, feasibility studies on selecting strategic locations should be conducted first and synergy effect could be generated by providing ODAs to the target markets. A task force team or committee needs to be set up for the purpose of improving business environment in order to encourage logistics companies to enlarge their size and helping them enter into new foreign markets. When Korean companies advance overseas, their brand represent themselves in the new market. Therefore, research on way to enhance ports' brand value should be conducted first. According to a study, Korea's national brand value is approximately 30 percent of its GDP.

5. Conclusions

In the paper, four policy directions were presented to respond to the changes in the international port industry. All the directions the policies presented mainly focus on the short term goals, at the same time, they are practical solutions to be applied to works at hands.

However, the 4 policies should be implemented with long term view considering their political feature. Then we could see ultimate effects of them.

First, one of the goals to create value-added ports for generating demand is to assist companies moving into the cluster, to increase freight cargo volume and to designate all area of port hinterlands as free trade zone. Furthermore, it is needed to implement coherent policies of establishing integrated transportation system and logistics network between countries for the purpose of reinforcing the function of port as logistics hub.

Second, satisfaction measurements and quantitative assessments should be kept carrying out on a continuous basis for establishing advanced management system of each port. For the development of port operating system, modification of related policies and introduction of advanced technologies are required to deal with conflict over rights to labor supply and boost productivity of port operation to keep up with advanced countries. When it comes to port security, all ports are needed to be fully equipped with security system in the long run and then establishing 'Port-Based Access Control Network' at a national level is required.

Third is creating eco-friendly ports to realize the goal of cutting green house gas emissions generated by ports. To achieve this, measures to develop a new intermodal transportation system and to power ports using tidal and wave forces are needed to be reviewed.

The last goal is promoting cooperation with other countries by establishing global port network. To realize the goal, at least dozens of overseas footholds should be secured. In addition, we have to make continuous efforts to create one or two large scale logistics companies through M&A and world-top-class port brand value in the long run.

In conclusion, the research was carried out to present the future directions which the Korean Port Policy should go, then find out short term strategies to help the policy be on the right direction to achieve all goals above mentioned in an effective manner.

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The positive externality of port calling

- A case study of Busan Container Port -

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ABSTRACT

This paper considers the problem of externality from additional port calling at New Port in Busan Container Port. This externality topic differs from the conventional literature on the externality of transportation, in that the latter focuses on environmental issues but the former deals with the problem of non-correspondence of cost-bearing subjects. Inter alia, this paper highlights that, owing to the big gap between the bargaining powers of involved economic agents (i.e. ocean-going companies and short-sea container shipping companies), the transaction cost would be too high to reach an agreement with mutual benefits and thus that the port authorities, especially Busan Port Authority among them, should implement the policy to subsidize the short-sea container shipping companies in order for the externality problem to be resolved. Furthermore, this paper shows the expected effects from the internalization of this externality.

Key words: externality, non-correspondence of cost-bearing subjects, short-sea container shipping

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1. Introduction¹

In 2008, Busan Container Port² handled about 13,000,000 TEUs and thus was ranked as the 5th global container port. However, owing to the effects of the global financial crisis in 2008, the cumulative throughput of Busan Container Port through July, 2009 was about 6,630,000 TEUs, which meant that there was a 17% reduction, compared to the same period of last year. Therefore, there has been more probability that some problem would be brought out in the near future by the fact that some port equipment and infrastructure should be idle. Furthermore, external factors for more competition among North-East container ports are now accelerating. For example, China has been investing a huge amount of money in their container ports in order to handle their cargoes directly and not allow them to be handled in a Korean hub port. Also, Japan has changed its port development policy from a decentralized local investment strategy to the centrally-organized strategy of bringing up so-called “Super Hub Ports”. Therefore, facing with this environmental change of port industry, Korea’s port authorities should develop a responding strategy to enhance the competitiveness of its container ports. In this paper, the authors will suggest a plausible strategy which could induce more transshipment container cargo by using (or internalizing) a positive externality from a ‘short-sea container shipping company’ (in hereafter ‘SSCS company’) calling at New Port in Busan Container Port.

Relating the problem of externality, there are two classic and seminal papers : Pigou (1920) and Coase (1960). As will be mentioned in section 4, the former advocated a famous measure for negative externality, called ‘Pigovian tax’ ; the latter is related with ‘Coase Theorem’. Coase (1960) deals with the social costs in devising and choosing between social arrangements, especially relating to negative externality. That is, it argues that we have to i) bear in mind that a change in the existing system which will lead to an improvement in some decisions may well lead to a worsening of others and furthermore ii) take into account the cost involved in operating the various social arrangement (whether it be the working of a market or of a government department), as well as the costs involved in moving to a new system.

Polinsky (1979) considers three different approaches to the externality problem : i) the property right approach, ii) the liability approach, and iii) the tax-subsidy approach (with marginal or lump-sum compensation). It also divides the information situation into the two cases, i) the government has full information and ii) the government has limited information. In order to solve the externality problem, Varian (1994) suggests a

1 This paper is a revised and updated version of the part of the research, Korea Shipowners’ Association (2009). Its main policy implications were also published as Ko, Byoung Wook (2009). whose journal is not a refereed one.

2 The official name of “New Port”, which is referred to in the paper, is Busan New Port. However, for simplicity, we call it as “New Port (in Busan Container Port)”.

compensation mechanism, which induces an efficient outcome and achieves desirable distributional goals. For the design of mechanism, he uses a two-stage game situation in which the subgame-perfect equilibria implement the desirable outcomes

This paper does not fully incorporate the implications of the above literature. While the full application of Coase (1960), Polinsky (1989) and Varian (1994) to the externality problem in the shipping industry is left as a topic for future research, this paper focuses on the case study of additional calling at New Port in Busan Container Port with positive externality.

However, there is another distinguished literature on externality. McKean (1958), Prest and Turvey (1965) and Price (2007) used the terminology, “pecuniary externality”, compared with the technological externality. The latter may exert physical, physiological and psychological influences on human well-being, so it should be included in the cost-benefit analysis for project evaluation. But the former stems from price movements. For example, when a road is constructed, the resulting rise in the price of nearby house is a kind of pecuniary externality. McKean (1958) said that a pecuniary externality should not be included in the cost-benefit analysis. Following this terminology, the externality, which will be treated in this paper, is classified as technological one because additional port calling affects the (physical) cost of other economic agents.

The organization of this paper is as follows. In section 2, the role of SSCS companies in Busan Container Port is summarized. Especially, the division of North Port and New Port is explained and the transshipment volume of SSCS companies will be shown. Section 3 will show two methods of handling transshipment cargoes from New Port to North Port and thus compare them in terms of incurred costs. The main difference of their cost structure is whether there are some significant (avoidable) fixed costs or not. Section 4 focuses on the reason why there is externality and how to tackle it. Then in section 5, the expected effects from the internalization of externality will be calculated based on some plausible assumptions. Finally, Section 6 concludes with the suggestion of future research topics.

2. Role of SSCS companies in Busan Container Port

2.1 Division of North Port and New Port in Busan Container Port

The history of container terminal in Busan Port commenced in 1978 as the Jasungdae container terminal opened.³ The construction of this terminal was financially supported by the government, which borrowed the fund of IBRD (International Bank for Reconstruction and Development, or called as World Bank). Since then, the Korea government established the Korea Container Terminal Authority in 1990, by which various sources of funds have been used for the construction of container terminals, especially in Busan Port. As the result of continuous efforts of Korea's port authorities, in late 2005, there were 33 berths only for container cargo and ships in Busan North Port. And in the same year, 2005, the three container berths of Busan New Port opened and since then 9 more container berths have been added. So, now in 2009, 12 container berths are being operated in Busan New Port. The throughput of Busan Port is as shown in the following table.

Table 1. Throughput of Busan Port (2009.1~2009.9)

(Unit : TEU)

Classification \ Port	Total of Pusan Port	Busan North Port	Busan New Port
Total	8,675,185	6,814,530	1,860,655
Export + Import	4,768,710	3,823,667	945,043
Transshipment	3,906,475	2,990,863	915,612

Source : Busan Port Authority

2.2 Role of SSCS companies in Busan Container Port

Most of SSCS companies, which are calling at Busan Container Port, are operating within East-Asian service routes in Japan, China and South-east Asian countries.⁴ However, two of them are participating in Australian or the Mid-East service routes. On shorter routes as Japanese and Chinese routes, most of them deploy the container ships below the capacity of 1,000 TEUs. However, on the longer routes to South-East Asian countries, the Mid-East and Australia, they deploy the container ships above the capacity of 1,000 TEUs. End of 2008 service routes to-and-from Busan Container Port are summarized as follows.

³ In 2009, Jasungdae container terminal is called Hutchison Busan Container Terminal.

⁴ Based on the number of services, 95% are operated within this East-Asian region.

Table 2. Some statistics on services of SSCS companies calling at Busan Port

(As of the end of 2008)

Classification		Number of services	# of shipping companies	Number of ships to be deployed			
				A	B	C	D
South-East Asian routes	Weekly	8	3	6	13	0	5
	Biweekly	8	1	8	12	5	0
	Triweekly	0	0	0	0	0	0
Far-East Russian routes	Weekly	2	2	1	1	0	0
	Biweekly	0	0	0	0	0	0
	Triweekly	0	0	0	0	0	0
Japanese routes	Weekly	20	8	28	0	0	0
	Biweekly	18	6	23	0	0	0
	Triweekly	3	3	4	0	0	0
Chinese routes	Weekly	14	7	17	0	0	0
	Biweekly	3	2	1	3	0	0
	Triweekly	0	0	0	0	0	0
Mid-East routes	Biweekly	1	1	0	0	5	0
Australian routes	Weekly	1	1	0	5	0	0

Notes : A-below capacity of 1,000 TEU, B-1,000~2,000 TEU, C-2,000~3,000 TEU, D-above 3,000 TEU**Source :** Busan Port Authority

As of June, 2009, the share of Busan Container Port in national container throughput is about 75%. That is, in terms of cumulative throughput until June, 2009, the national container throughput is about 7,493,000 TEUs and that of Busan Container Port is about 5,613,000 TEUs. The transshipment cargo of Busan Container Port in the same period is about 2,539,000 TEUs. Its share is about 45%, which implies the importance of transshipment in Busan Container Port.

Table 3. Trends of container throughput - national and Busan Container Port

(Unit : 1,000 TEU)

Classification	National				Busan Port			
	Total	Transshipment			Total	Transshipment		
		Sub-total	In-T/S	Out-T/S		Sub-total	In-T/S	Out-T/S
2007	17,409	6,155	3,104	3,050	13,254	5,811	2,928	2,883
2008	17,791	6,185	3,111	3,974	13,445	5,807	2,916	2,891
2009 (~June)	7,493	2,689	1,364	1,324	5,613	2,539	1,282	1,256

Notes : Values below 1,000 are dropped out**Source :** SP-IDC

In the past 3 years, the share of 10 main SSCS companies in Busan Container Port was about 22%. In their total cargo, the share of transshipment has been also stable around 40%.

Table 4. Throughput of 10 main SSCS companies in Busan Container Port

(Unit : 1,000 TEU, %)

Classification		2007	2008	2009(~June)
Traffic of 10 companies	Import	901(6.8%)	883(6.6%)	368(6.6%)
	Export	839(6.3%)	831(6.2%)	360(6.4%)
	T/S	1,162(8.8%)	1,251(9.3%)	525(9.4%)
	Sub-total	2,903(21.9%)	2,966(22.1%)	1,254(22.3%)
Total of Busan Port		13,254(100.0%)	13,446(100.0%)	5,613(100.0%)

Notes : 1) () means its share in the total traffic of Busan Port

2) Values below 1,000 are dropped out

Source : Busan Port Authority

As of 2008, the traffic of Korea-China routes is about 2,430,000 TEUs. The share of the export/import cargo is 74% and that of transshipment is 26%. The west-bound cargo is 60% and the east-bound cargo 40%. As shown in the following table, in 2008, owing to the effects of the global financial crisis, the overall volume of Korea-China routes decreased. But, the traffic of the Korea-Shanghai route increased, mainly due to the increase of transshipment cargo. Because the decrease of east-bound cargo was larger than that of west-bound, the imbalance of east-bound cargo to west-bound cargo was lightened.

Table 5. Container cargo movement of Korea-China routes

(Unit : TEU, %)

Classification		Shanghai	Xingang	Dalian	Qingdao	Ningbo	Weihai	Yantai	Others	Total
West-bound	Local (CAGR)	193,720	103,671	44,554	109,364	71,093	36,926	35,770	140,544	735,642
		-0.06	-11.10	-5.80	-7.55	2.87	0.40	-2.62	0.95	-2.94
	Feeder (CAGR)	40,680	37,579	35,108	42,911	10,456	171	8,369	12,044	187,318
		78.44	-31.44	-6.53	31.38	-36.27	101.18	11.86	18.86	2.95
	Sub-total (CAGR)	234,400	141,250	79,662	152,275	81,549	37,097	44,139	152,588	922,960
East-bound		8.20	-17.61	-6.12	0.87	-4.64	0.63	-0.17	2.17	-1.80
	Local (CAGR)	233,711	127,297	84,805	201,726	57,485	67,674	48,612	253,609	1,074,919
		-2.10	-18.01	-10.49	-14.35	-18.70	-4.09	-4.32	1.58	-7.81
	Feeder (CAGR)	41,664	149,182	108,924	99,680	29,562	563	866	10,047	440,488
		50.17	-18.56	8.05	-5.49	-25.90	285.62	-17.68	10.31	-5.76
	Sub-total (CAGR)	275,375	276,479	193,729	301,406	87,047	68,237	49,478	263,656	1,515,407
		3.34	-18.31	-0.93	-11.61	-21.30	-3.50	-4.59	1.89	-7.22

Notes : 1) Others - Dafeng/Dandong/Fuzhou/Hunchun/Lianyungang/Nanjing/Nantong/Qinghuangdao/Quanzhou/Rizhao/Rongcheng/Shantou/Shidao/Wenzhou/Xiamen/Yingkou/Zhangjiagang

2) CAGR means compound annual growth rate

Source : Yellow Sea Liners Committee

In 2008, the traffic of the Korea-Japan routes, which were carried by the short-sea shipping companies, were 1,356,930 TEUs. The share of exports and imports is about 44% and that of transshipment is about 56%. The detailed traffic is summarized in the following table.

Table 6. Container cargo movement of Korea-Japan routes in 2008

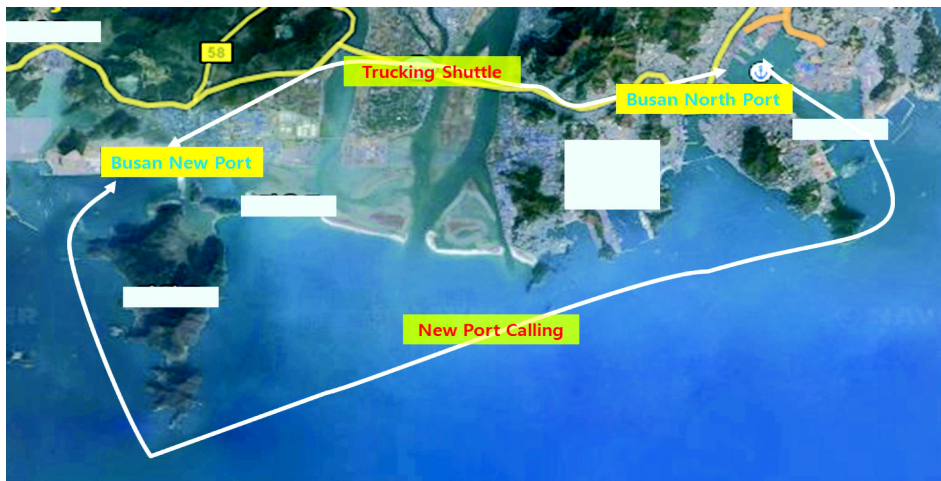
(Unit : TEU)

Classification	Local	Own T/S	Feeder T/S	Total
Export	319,336	261,098	179,667	760,101
Import	283,547	150,911	162,371	596,829
Total (CAGR)	602,883 (-2.6%)	412,009 (1.1%)	342,038 (-7.0%)	1,356,930 (-2.7%)

Notes : CAGR means compound annual growth rate**Source :** Korea Nearsea Freight Conference

3. Port calling versus trucking for transshipment : Implication of fixed costs

For handling transshipment from New Port to North Port, there are two methods. One method is moving the cargo by truck and the other is calling at New Port by sea, as shown in the following figure. The former is type 1 and the latter is type 2 in the remainder of this paper.

**Source :** Google**Figure 1.** Two types of handling transshipment cargoes

The two methods differ in the cost structure. The existence of fixed cost in the type 2 method allows the utilization of scale economy, which makes the type 2 method more attractive in terms of costs, given that the volume of transshipment is above the threshold level.

In the following argument, let the number of the container cargo be “ α ”. Furthermore, for simplicity of analysis, i) the loading and discharging of transshipment, ii) tallying, and iii) lashing costs would be dropped out in our following analyses.⁵ As a result, this paper analyzes the additional costs as the handled cargo increases, without the above three cost items.

For the type 1 method (trucking shuttle), the calculation of costs is very simple. The cost function is a simple linear function of the amount of shuttled cargo without any constant term, as the following equation.

$$\text{Cost function (type 1)} = (\alpha \times \text{TF}) \text{ won}$$

where TF means the trucking fee per one container box

However, the type 2 method (additionally calling at New Port) is more complicated than that of the type 1 method because there are some fixed cost items.⁶ The fixed cost items are as follows: i) Cost of chartering a containership, i.e. the time value of the ship, ii) berthing fee, iii) fuel cost, iv) line handling charge, v) tug fee, vi) pilot fee, vii) use cost of pilot ship. Among these items, except the cost of chartering the ship, all of these need to be considered whenever a containership enters into a port. So, the costs appear as a constant in the cost function. However, the time value of the ship (i.e. cost of chartering a ship) increases as the amount of handled cargo increases. The reason is that as the cargo amount increases, the dwelling time of the ship also increases because of the time required to load and discharge container boxes. As a result, the cost function of type 2 is as follows:

$$\text{Cost function (type 2)} = (\alpha \times \text{TVS/box}) + \text{BF} + \text{FC} + \text{LHC} + \text{TC} + \text{PF} + \text{CPS}$$

where TVS/box means the time value of the ship per one container box handled,

BF means the berthing fee per one calling,

FC means the fuel cost from additional sailing to New Port,

LHC means the line handling charge,

TC means the tug fee,

PF means the pilot fee,

CPS means the use cost of the pilot ship

Given the above cost function, we can assume the values of individual items and then calculate the cost. So, based on the interviews with the workers in Busan Container Port, this paper uses the following values⁷: TVS/box=6,417 won, BF=323,748 won,

⁵ These three costs are all included in both methods. So only for the comparison of cost structure, these costs can be dropped out.

⁶ However, the form of cost function also appears to be linear.

FC=1,700,000 won, LHC=200,000 won, TC=2,450,000 won, PF=3,314,373 won, CPS=838,420 won. The resulting cost function of type 2 is as follows :

$$\text{Cost function (type 2)} = [(\alpha \times 6,417) + 10,109,875] \text{ won.}^8$$

In the situation which is described in the above section, there is a threshold level of throughput which makes the type 2 method (additional New Port calling) more cost-effective than the type 1 method (trucking shuttle). The value of threshold level is calculated as 159 FEUs, which makes the cost function of type 1 equal to that of type 2.

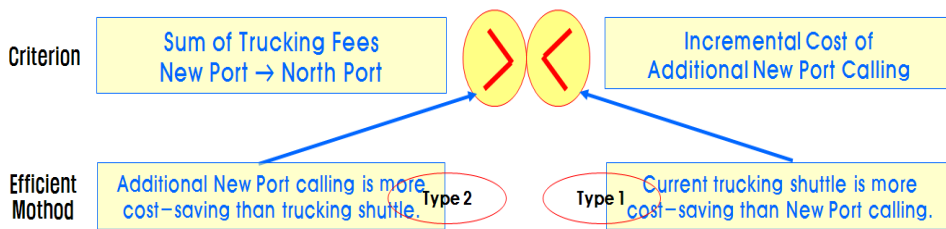


Figure 2. Comparison between the two types of handling transshipment

In this calculation, especially the fact should be emphasized that whenever there are more transshipments than the threshold level, there is an efficiency gain by utilizing the economy of scale from the existence of fixed costs. For example, for an additional transshipment exceeding the threshold, the type 2 method saves 63,583won, compared to the type 1 method.

4. Port calling with externality and policy recommendation

Mankiw (1998) defines the externality as follows :

(...) An externality is the impact of one person's actions on the well-being of a bystander. If the effect on the bystander is adverse, it is called a negative externality ; if it is beneficial, it is called a positive externality. In the presence of externalities, society's interest in a market outcome extends beyond the

7 The assumptions related with the containership are as follows : i) The ship size is 1,000 TEUs, ii) the charter cost per day is US\$7,000, iii) the exchange rate is 1,100 won/\$.

8 The term, $X = (\alpha \times 6,417)$, is calculated by solving the following equation.

$X = b \times (\text{wh/FEU}) \times e / 24$,

where b is the charter cost per day, wh/FEU is the spent time on handling one container box in the berth, e is the exchange rate.

well-being of buyers and sellers in the market ; it also includes the well-being of bystanders who are affected. Because buyers and sellers neglect the external effects of their actions when deciding how much to demand and supply, the market equilibrium is not efficient in the presence of externalities. (...) Externalities come in many varieties, as do the policy responses that try to deal with the market failure. (...)
(p. 200 in Mankiw (1998))

In the following paragraphs in Mankiw (1998), it says that there can be various solutions for the externality problems. These solutions would take the type of private solution or the type of government solution.⁹

Private solutions for the externality problem include i) moral codes and social sanctions, ii) charities, iii) integration of different types of business, iv) for the interested parties to enter into a contract. On considering the private solution, there is a well-known wisdom, which is called as Coase Theorem after economist Ronald Coase. This theorem says that if private parties can bargain without cost over the allocation of resources, they can solve the problem of externalities on their own. That is, whatever the initial distribution of rights, the interested parties can always reach a bargain in which everyone is better off and the outcome is efficient. However, occasionally bargaining does not work, even when a mutually beneficial agreement is possible. The famous cause of this failure is the existence of transaction costs, the cost that parties incur in the process of agreeing and following through on a bargain.

The government solution can be divided into two sub-types. One way is command-and-control policies which regulate the involved persons' behavior. The other one is market-based policies which provide incentives so that private decision-makers will choose to solve the problem on their own. For the command-and-control policies, the government sets environmental limitations on some economic activities by law, act, etc. For the market-based policies, government can internalize the externality by using taxation. The famous taxation solution for negative externality is Pigovian taxes, after economist Arthur Pigou (1887~1959), an early advocate of their use. Also, for the internalization of externality, government can use the implications of the Coase Theorem. For example, the government could issue pollution permits and then allow these permits to be traded among private parties. According to the Coase Theorem, private parties would bargain over these permits and the invisible hand of the market mechanism would appropriately price these permits so as to induce an efficient market outcome, which would achieve a socially desirable equilibrium.

There are some possible reasons why the SSCS companies call at New Port. One

⁹ The following two paragraphs are excerpted and summarized from Chapter 10. Externalities in Mankiw (1998). Other references textbook are Varian (1992) and Carlton, D. W. and J. M. Perloff (1994) among others.

reason is that there is enough local (export & import) cargo for the liner company to make profits on that calling, without feeder transshipment. Or another reason can be that there is enough feeder transshipment cargo for the calling to be profitable, without local cargo. In reality, the distribution of cargo between the local and transshipment lies at some point on the spectrum between the extreme cases.

However, if the SSCS company calls at New Port and handles the feeder transshipment cargo, which otherwise would be shuttled by truck, then there is a positive externality for the mother ship's company, which transfers the feeder transshipment cargo to-or-from the SSCS (feeder) company. The reason is as follows. The mother ship's company as an ocean-going liner collects the cargo which needs to be transshipped in Busan Container Port. When collecting this ocean-going cargo, the company receives the transportation fee including transshipment cost. So, most of the trucking shuttle costs incurred in the route from New Port to North Port are born by this ocean-going company. Therefore, for the SSCS company to additionally call at New Port and directly handle this transshipment cargo means saving the trucking shuttle costs of the ocean-going company. This situation shows the problem of non-correspondence of cost-bearing subjects, i.e. the problem of positive externality.

Facing the above externality problem, there should be some solution for the market outcome to be socially efficient. First, there is the possibility that the ocean-going company and the SSCS (feeder) company would reach an agreement, by which a portion of the ocean-going company's cost reductions from an additional calling at New Port would be transferred to the SSCS company. If this agreement appears spontaneously among market players, we can say that the Coase Theorem works in the reality of Busan Container Port. However, in the opinion of the authors, the probability of its occurrence is low. The reason is that since there is a big gap between the bargaining powers of the two economic agents (i.e. the ocean-going firm and SSCS firm), the transaction cost would be too large to reach a desirable agreement.¹⁰

If this gloomy scenario is realized, then what is a plausible solution? This paper suggests a subsidy for SSCS liners of port authorities, especially Busan Port Authority (hereafter, BPA), as the government solution. Here is the rationale for this subsidy: The BPA is responsible for Busan Port to be commercially competitive. If the above externality problem remains unsolved, then the additional callings at New Port will be below the optimal level of callings. This means that there will be some inefficiency in dealing with transshipment cargo in Busan Container Port¹¹ and thus it will also lose its competitiveness, compared

10 For a rigorous argument, it is necessary to identify the nature of the transaction cost and estimate the amount of existing transaction cost from the difference of bargaining power. Especially, when identifying the nature of transaction cost, the problem of strategic behavior would appear significantly. However, the authors leave this identification and estimation for future research.

11 When the following two conditions are satisfied, there can be no efficiency gain: i) SSS company calls at New Port only for handling feeder cargo and not for local cargo and ii) the ship handles the exact level

to competing Ports, e.g. Shanghai Port, Tokyo Port, etc. When additionally considering the effects of scale economy, the loss will become larger. BPA should be responsible for solving the above externality problem.

Then what can be practical options for BPA? This paper recommends that i) BPA should appoint some dedicated berths for SSCS liners (as a less progressive policy) or ii) BPA should support the SSCS liners' acquisition of dedicated terminals (as a more progressive policy) in Busan Container Port. In the next section, the expected effects of internalizing the externality will be calculated under some assumptions. These positive effects can be additional rationale for the subsidy policy as a proxy for the effects of either of the two recommendations.

5. Expected effects from the internalization of externality

In order to calculate the expected effects from the internalization of externality, there need to be some assumptions, especially for the volume of transshipment from New Port to North Port. For this calculation purpose, first we use the total container throughput of Busan Container Port in 2008, which was handled by SSCS companies, 1,251,537 TEUs, as an assumed total volume of SSCP companies. Second, we assume the ratio of the feeder transshipment (which is transferred from the mother ship to the feeder ship or vice versa) (the total volume is 45.2%.¹²). Finally, we assume that the distribution of transshipment cargo between New Port and North Port is 35.6 : 64.4.¹³ Based on these three assumptions, we calculate the cargo, which would be shuttled from New Port to North Port, as 201,387 TEUs.

As the volume, which the ship handles at New Port per one calling, differs, the cost incurred will also differ. So, for simplicity this paper considers two cases of 159-FEU handling (threshold case) and 210-FEU handling (case of handling over-threshold throughput).

First, for the calculation of cost reduction effects of the mother container ship's company,¹⁴ consider the extreme case that satisfies the following two above-mentioned conditions : i) the SSCS company calls at New Port only for handling feeder cargo and not for local cargo and ii) the ship handles the exact level of threshold throughput (e.g. 159 TEUs). In this case, for the assumed cargoes, 201,387 TEUs, the mother container ship's companies (i.e. ocean-going companies) save the trucking shuttle cost of 7,049 million won and the SSCS companies should bear these costs alone.¹⁵ But, in the real case which

of threshold throughput (e.g. 159 TEUs). In this case, there will be just the problem of non-correspondence of cost-bearing subjects. A concrete example of efficiency gain will be shown in the next section.

¹² This figure, 45.2%, is based on the traffic of the Korea-Japan route.

¹³ This ratio is from Jun, C.-Y. and J.-P. Lee (2007).

¹⁴ This effect analysis focuses on the case of just handling threshold throughput.

is likely to occur, the SSCS companies calling at New Port would bear a part of these costs for handling the feeder transshipment cargo because there would be a large amount of local cargo. That is, the New Port calling costs of 7,049 million won may spread between the feeder cargo and local cargo.

Second, for the calculation of efficiency gain (or improvement),¹⁶ consider another extreme case that satisfies the following two conditions : i) SSCS company calls at New Port only for handling feeder cargo and not for local cargo and ii) the ship handles the over-threshold throughput (e.g. 210 TEUs). In this case, for the cargo exceeding 159 TEUs, there is the cost reduction from scale economy for one TEU, 63,583 won. So, the total of cost reductions for handling the assumed 201,387 TEUs is 1,555 million won. As a result, the ocean-going companies save the truck shuttling cost of 7,049 million won and the SSCS companies bear only 5,494 million won.

This section shows the effect of inducing T/S cargo when the reduced (shuttle) costs are used for reducing the cost of handling T/S cargo in Busan Container Port. For calculating the incremental effect of the reduction of cargo handling charge, we use the concept of price elasticity.¹⁷ First, we should know the value of price elasticity of T/S cargo. As shown in the below table, in general the value of price elasticity of container cargo may be assumed over 1. So, we assume that the price elasticity of T/S cargo in Busan Container Port is unitary, 1.

Table 7. Price elasticities of Northern European Ports

Ports	Elasticity
Hamburg	3.1
Bremen Ports	4.4
Rotterdam	1.5
Antwerp	4.1
Le Harve	1.1

Source : Haralambides, He (2002) p.328

Second, for using the price elasticity, we should know the change of handling charge for T/S cargo. As of the 1st quarter in 2009, the cost of discharging can be assumed to be 65,000 won/FEU, cost of loading 69,000 won/FEU, cost of trucking shuttle 70,000 won/FEU. Then, by using the T/S cargo from New Port to North Port, 201,387 TEUs, we can derive the price change in both cases that : i) 7,049 million won is used for reducing the cost of handling T/S cargo (Case 1) and ii) 1,555 million won is used for the same

¹⁵ In this case, the SSCS liners call at New Port 633 times per year.

¹⁶ This effect analysis focuses on the case of handling over-threshold throughput, e.g. 210 FEU/calling.

¹⁷ The price elasticity of demand is calculated by the formula,

$$\eta = \frac{\Delta Q}{Q_0} / \frac{\Delta P}{P_0}, \text{ where } \Delta Q = Q_1 - Q_0 \text{ and } \Delta P = P_1 - P_0.$$

purpose (Case 2). For Case 1, the price change is 34.3% and then the resulting incremental T/S cargo is 34,538 TEUs. For Case 2, because the price change is 7.6%, the increase of T/S cargo is 7,653 TEUs. Furthermore, if we calculate the increase of stevedoring companies' income from additionally handling this cargo, for Case 1, the income increase is 4.6 billion won and, for Case 2, the increase is 1.0 billion won.

6. Conclusions

To this point, we have considered the problem of externality (i.e. non-correspondence of cost-bearing subjects) from additional port calling at New Port. While there is a possibility that the Coase Theorem will work well so that there is no need of port authorities' intervention to solve externality, this paper highlights : i) that, owing to the large gap between the bargaining powers of involved economic agents (i.e. ocean-going companies and SSCS companies), the transaction cost would be too high to reach an agreement with mutual benefits and thus, ii) the port authorities, especially BPA, should implement the policy to subsidize the SSCS companies in order for the externality problem to be resolved. Furthermore, this paper shows the expected effects from the internalization of this externality.

However, in this paper there are some questions which are not tackled. Thus these will be future research topics, which can be summarized as follows : First, when implementing "Modal Shift Policy" in Korea,¹⁸ the scale economy from the fixed costs of shipping service supply, compared to the trucking service, has not fully considered. This aspect of research would yield fruitful policy options. Second, after identifying externality in the shipping industry as shown in this paper, there could be delicate policy options by using the implications of Coase (1960), Polinsky (1979), and Varian (1994). Third, when identifying the externality problem in the shipping industry, like the other sectors of the economy, there could be a problem associated with the transaction cost. Owing to this transaction cost, the market mechanism, implied by the Coase Theorem, would not function well so that the government intervention would need to be implemented. So, identifying the nature of the transaction cost and then estimating its amount can become an important policy and research topic.

As a final remark, the authors want to emphasize the importance of the existence of the externality problem in Busan Container Port. Only after perceiving the problem can the relevant remedying policy follow. If one of the recommended policies is implemented in the near future, the authors believe that Busan Container Port will have more competitiveness and continuously develop as a global container Hub Port.

18 The additional calling at New Port as an alternative to trucking shuttle can be considered as one of the modal shift policies.

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Report on combating Somali piracy

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ABSTRACT

This article first introduces the phenomenon of the Somali piracy and the challenges it poses to the world maritime order and safety. It then analyzes the complicated elements and causes which lead to this phenomenon. It elaborates on the efforts made by the community of states to combat the Somali piracy. It also points out the problems yet to be solved in the fighting against the Somali piracy. Finally it gives some suggestions on how to better combat the Somali piracy. It handles the issue of the Somali piracy from the different perspectives and it emphasizes the importance of international cooperation and the use of multi-measure in combating the Somali piracy.

Key words : Somali piracy, maritime order and safety, cooperation, warship

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1. Phenomenon of the Somali piracy and challenges it poses to world maritime order and safety

Seas cover about 71% of the surface of the Earth. Seas not only serve as bridge for world transportation but also provide many resources for mankind. With the globalization and fast development in marine scientific research and marine industries, mankind has never been so closely connected with seas than today. As a result of this, mankind faces a serious challenge in keeping maritime order and safety in the process of exploration and use of seas.

In the past several years, world maritime order and safety has been severely challenged by the Somali piracy. Nowadays the challenge posed by the Somali piracy to the world maritime order and safety becomes not lighter but more serious. As we know, piracy is an ancient crime accompanying the human maritime activity. Historical records show that piracy once became so serious in some areas of the world that it made human maritime activity heavily affected in those areas. Since the great geographical discovery and formation of world navigational network, piracy has been a global crime.¹ In modern times, marine areas, such as Caribbean Sea, the Malacca Straits, the Indian Ocean, seas off the coast of South Africa, have been repeatedly struck by large scale piracy.² But piracy in history can not be compared with current Somali piracy. The Somali piracy has been the focus of international community regarding world maritime order and safety.

The phenomenon of the Somali piracy can be summarized as follows. The Somali piracy is an organized crime. Experts say that the Somali piracy has become an “industry”. Inside the industry, there are persons who are responsible for piracy planning, persons who are responsible for executing of piracy plan, persons who are responsible for negotiation with shipowner and related parties after the targeted vessel has been hijacked, persons who are responsible for piracy financing, persons who are responsible for arms providing, persons who are responsible for information collecting, etc. The Somali pirates are well trained and well equipped. They are equipped with GPS, automatic arms, anti-tank rockets and modern satellite communication tools. They are more professional and more dangerous. They usually follow two patterns when taking attack.³ They either attack vessels on the high seas, sometimes at considerable distance from the coast, making use of “mother ships”; or they attack vessels in Somali territorial sea, sometimes under the watchful eyes of warships outside those waters. No matter which pattern they follow, they always drive the vessel to their nest after they have hijacked the targeted vessel.

1 Xu, D.-W. (2006) *Piracy*, Haerbing Publishing Press, p.81.

2 Churchill, R. R. and A. V. Love (1999) *The Law of the Sea*, Manchester University Press, p.209.

3 Refer to statement by Mr. Efthimios, E. Mitropoulos, Secretary-General of the International Maritime Organization at the United Nations Headquarters, New York, United States of America on 20 Nov. 2008.

The Somali pirates commit piracy in large scale and high frequency. According to relevant reports and statistics provided by International Maritime Organization, the number of reported Somali piracy attack in 2008 increased sharply. The number of piracy attack in the first quarter of 2008 in that marine area was 11, and the number rose to 23 in the second quarter and rocketed to 50 in the third quarter and 51 in the fourth quarter. The total number of the Somali piracy attack reached 135 in the year of 2008, with 44 ships having been hijacked by the Somali pirates and more than 600 seafarers having been kidnapped and held for ransom.⁴ In the year of 2008, the Somali piracy has caused 4 seafarers dead, 2 seafarers injured, and 14 seafarers lost.⁵ It is estimated that the total sum of ransom collected by the Somali pirates in the year of 2008 reaches USD 120,000,000.⁶ According to the reports and statistics provided by the Chinese Shipowners' Association, in the first 11 months of 2008, there were 1,265 Chinese vessels sailing through the Gulf of Aden and 83 vessels of them were disturbed in some degree by the Somali pirates. According to information provided by International Maritime Organization, the number of reported Somali piracy attack in the year of 2009 almost doubled the number in the year of 2008, rising to 217 with 47 vessels being hijacked.⁷

Some examples can show the escalating of the Somali piracy. On 25 September 2008, M/V Faina, a Ukraine cargo vessel, carrying 33 T-72 tanks and a large quantity of ammunition was hijacked by Somali pirates and the Somali pirates required a ransom of USD 35,000,000 for release of the vessel; On 15 November 2008, the Somali pirates hijacked the fully laden ULCC Sirius Star in the Indian Ocean some 450 nautical miles from the coast of Kenya⁸ and the Somali pirates required a ransom of USD 25,000,000 for the release of the tank; On 30 November 2008 the Somali pirates attacked a luxury liner. In the year of 2009, with more and more Somali piracy attacks being reported, the Somali pirates fired at escorting warships in some cases. Entering into the year of 2010, an abatement of Somali piracy has not been seen and, on the contrary, more evidence shows that the Somali pirates are becoming more aggressive, one evidence of which is that the number of vessels fired at by Somali pirates in 2009 rose to 114 compared with 39 in 2008,⁹ another evidence of which is that the Somali pirates began to use heavy weapon in attacking vessels.

The Somali piracy poses grave threat not only to the safety of life of seafarers and passengers but also to the normal function of marine activities. The shipping lane through the Gulf of Aden is of strategic importance and significance to international shipping

4 Refer to http://www.imo.org/home.asp?topic_id=1178 (Last accessed on 18 April 2010)

5 ICC International Maritime Bureau (2008) *Piracy and Armed Robbery against Ships Annual Report*.

6 Refer to <http://www.baike.baidu.com/view/2001823.htm>

7 Refer to Guangzhou Daily of 7 Mar. 2010, p.A10.

8 Refer to statement by Mr. Efthimios, E. Mitropoulos, Secretary-General of the International Maritime Organization at the United Nations Headquarters, New York, United States of America on 20 Nov. 2008.

9 Refer to information given by the International Maritime Organization.

and trade, both east and west of the Suez Canal, which is used by some 22,000 vessels annually, carrying around 8% of the world's trade, including more than 12% of the total volume of oil transported by sea, as well as raw materials and finished goods.¹⁰ If the security of this shipping lane can not be guaranteed, the flow of maritime transportation through this lane shall be forced to go through the Cape of Good Hope, which shall result in many negative results such as the extra mileage to run, an additional need for some 750 tonnes of fuel per ship, an additional volume of some 2,335 tonnes of CO₂ emitted from the additional fuel burnt, and finally an increase in freight rates. Diverting vessels around the Cape of Good Hope may not always make them safer, but the increasing cost of shipping and the time of transit can certainly drive up the price of manufactured goods and commodities. For the vessels still risk the shipping lane through the Gulf of Aden, in order to get insured by insurance company against the Somali piracy, the shipowners have no choice but to buy insurance and then they shall collect this fee from the cargo-owners.¹¹ Some shipowners pay for specialized escorting service as an alternative choice. All these together with the high fuel costs, the plummeting freight rates, and the containership surpluses make the global shipping industry especially vulnerable now. This situation further worsens the world economy which has been struck by world financial crisis.

The Somali piracy also poses potential threat to marine environment. Once the Somali pirates attack oil tank or chemical ship or gas vessel, this may result in environmental disaster.

In addition, the Somali pirates have set a bad example for others to follow. The large amount of ransom which the Somali pirates collected has attracted bad men to commit piracy in other marine areas, for instance, out-laws in West Africa have begun to follow the example of Somali pirate to attack and hijack the vessels sailing off the West African coast, and due to the influence of the success of the Somali pirates, number of attacks in the waters off the Horn of Africa doubled in 2008 compared with 2007.¹² In an era when terrorism spreads very fast, if pirates conspire with terrorists, the threat they shall pose to maritime order and safety shall be beyond our imagination.¹³

From above description, it can be concluded that the Somali piracy has become a phenomenon which deserves special attention. The Somali piracy has been escalating all the way, has severely threatened the maritime order and safety, and has done serious damages to the interests of international community of states as a whole. Consequently, international community of states has no choice but to study this phenomenon, find the causes and take effective measures against it.

10 Refer to information provided by the International Maritime Bureau.

11 Refer to CMA CGM press release at Aden Gulf Surcharge on 17 Dec. 2008.

12 Kraska, J. and B. Wilson (2009) Fighting Piracy. <http://www.armedforcesjournal.com/2009/02/3928962>

13 McLachlin, B. (2004) Legal Response to Threats of Maritime Terrorism. In : The 38th CMI Conference held in Vancouver, Jan. 2004.

2. Analysis of causes of Somali piracy

In order to take appropriate measures against the Somali piracy, the causes of the Somali piracy need first to be analyzed. We can not effectively stem and finally eradicate the Somali piracy if we can not find out the causes and elements which lead to this phenomenon. Then, what leads to the Somali piracy phenomenon? What makes the Somali piracy spread so fast? It is not easy to answer these questions because the Somali piracy phenomenon is very complicated. Generally speaking, at least the following elements should be considered in answering the above questions.

2.1 Political element

The Somali piracy phenomenon closely connects with the Somali political situation. Since the old central government of Somalia was overturned by anti-governmental forces in January of 1991, Somalia was put into anarchy. Civil war broke out and war lords occupied different areas of Somalia and competed with each another. This made it very difficult for common people of Somalia to make a living. In order to keep peace and restore social order in Somalia, the United Nations sent peace-keeping troops into Somalia, but at the end due to the attacks from the Somali war lords, the United Nations peace-keeping troops had to be pulled out of Somalia. This got the Somali political situation worse. At present, the Transitional Federal Government of Somalia can only control the capital city of Somalia and nearby district, and the large part of Somali territory was occupied by war lords. Because of the political disorder and civil war in Somalia, more and more Somali soldiers and militiamen are out of control, more and more fishermen and other common people become refugees, some of these men choose to combine together and rob the vessels sailing off the coast of Somalia.

2.2 Economic element

After the Somalia was put into anarchy, the Somali economic situation gets worse. More and more Somali civilians have been put into poverty. At the same time, some foreign vessels make use of the Somali disorder and go into the Somali exclusive economic zone to conduct illegal fishing and waste-dumping, and this further worsens the economic situation for the Somali fishermen and other people who depend on the marine resources. This leads to the conflict between foreign vessels and local people. Some Somali fishermen and militiamen begin to arrest those vessels and make money by requiring ransom. Because they make a lot of money from this activity, more and more Somali men are attracted to attack and arrest such foreign vessels, and gradually some of them even start to attack

and rob the vessels which do nothing wrong but sail off the coast of the Somalia. Nowadays, they attack and hijack any vessel which they can find and get ransom from. As a result of the large scale of piracy, some Somali villages and towns are booming. One expert from South Africa University once told reporters that the Somali pirates made a huge amount of money from the act of piracy and that they got USD 500,000 to 1,000,000 as ransom from every vessel they had hijacked.¹⁴ The huge amount of ransom stimulates them to continue or even enlarge their act of piracy and this attracts more persons to participate.

2.3 Social element

During the past 20 years, Somalia has been struck by war, drought, famine and disease. As a result of this, the social structure breaks up. The number of those who are homeless reaches 1.5 million, the average lifespan is only 46 years, and almost 1/4 of Somali children die before they are up to five years old. We can say that the Somali piracy phenomenon reflects the depth of Somali social crisis and despair. The feeling of despair drives the Somali people to the crime of piracy. After getting large amount of ransom from the hijacked vessels, in order to keep a good image and get support from local people, the Somali pirates do work of charity and often help those who are poor. The attitude of common Somali people towards the Somali pirates thus changes, in the eyes of some common Somali people, Somali pirates are not criminals but “heroes”. Because the Somali social value is distorted in regard to act of piracy, there is no social deterrence to Somail piracy.

2.4 Religious extremism element

There are many branches of Islamism in Somalia. It is believed by some experts that behind the Somali piracy there are influences from Islamic extremists. Some armed groups in Somalia commit crime of piracy and keep contact with Islamic extremists. One of such armed groups is called Al-Shabaab, which is listed by the United States as a group of terrorism.¹⁵ When the navy of the United States used force to rescue the American captain and killed some of the Somali pirates, the Somali Islamic extremists called these killed pirates as “soldiers of Islamic Holy War”. Some Islamic armed groups threatened to revenge for the killing. One such group which has close relation with Al-Qaida said that Somali pirates were protecting the Somali coast against the foreigners and they were the true followers of Allah.

¹⁴ The accurate average amount of ransom from every vessel hijacked by Somali pirates has no way to be clear as both the party that gets the ransom and the party that gives the ransom refuse to disclose related information.

¹⁵ Zhuang, W. (2008) An International Study on the Somali Piracy. *SMU Law Review*, p.403.

2.5 Geographical element

The Somalia boasts a coast line of 3,898 km in length of which 1,204 km is along the Gulf of Aden. Every year there are over 22,000 vessels sailing through the Gulf of Aden, therefore it is not difficult for the Somali pirates to find targeted vessels. As the Somalia is in anarchy, the Somali pirates can easily return to their nest after they have hijacked vessels, or they can move from one place to another to elude capture. The Somali pirates know the local geography very well and have made full use of this advantage in their act of piracy.

2.6 Military element

Due to the Somali civil war and the situation of anarchy, arms smuggling is rampant in Somalia and it is quite easy for the Somali pirates to get arms. Some Somali armed groups cooperate with the Somali pirates and provide arms for the latter. The Somali pirates also use some of the ransom to better equip themselves. Nowadays the Somali pirates employ speedboats, modern weapons and advanced communication equipment in their act of piracy. Sometimes they cheat escorting warships by disguising themselves as fisherman. Sometimes they trap the merchant vessels by pretending that they get into trouble and need help. Even though many states have sent warships to the Gulf of Aden and nearby marine area off the Somali coast to combat the Somali piracy, the Somali pirates can still manage to escape due to the fact that the warships can not cover the whole area. Another reason is that there lacks effective cooperation among the warships from different states. In addition, the Somali pirates also learn to coordinate their action and strengthen the cooperation among the different pirate groups in order to challenge the escorting warships. From military viewpoint, it seems that multi-national naval forces have not found the effective way to deal with the Somali pirates.

2.7 Cultural element

The worldwide spreading of books, movies and softwares about piracy has a negative effect on the war against piracy. Some of these works contain exaggerating information about adventure, wealth, violence and sex in describing piracy. This information may distort the social value and attitude of common people towards piracy, can easily stir up the feeling of young generation and mislead them to commit crime of piracy. Works of this kind provide spiritual soil for the flourishing of piracy.

2.8 *Regime element*

Finally we have to say that the current legal regime is not perfect in regard to combating piracy. Even though international community of states has passed some international conventions on piracy, there still exists much room for improvement in the definition of piracy, the jurisdiction over pirates, the punishment of pirates, and the cooperation between states and international organizations. Because of the defects in the national and international legal regimes in regard to piracy, pirates make use of these defects and escape punishment. One example can show the defects of current legal regime in regard to piracy. Some escorting warships have no choice but to release the arrested Somali pirates because the respective nations have no legal rules to prosecute and punish these Somali pirates. Therefore, it is of great significance to find out the defects existing in current legal regime and cure them.

3. Efforts made to combat the Somali piracy

After having analysed the causes and elements which lead to the Somali piracy phenomenon, states and international organizations have made efforts to combat the Somali piracy.

Firstly, states and international organizations have made full use of the international conventions which contain provisions of dealing with piracy. Here some of the main international conventions can be mentioned such as Geneva Convention on High Seas 1958, the United Nations Convention on the Law of the Sea 1982, the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation 1988, the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf 1988, etc. According to provisions of these conventions, some member states have made relevant national laws in order to specify the application of the conventions. It should be pointed out that these conventions mainly deal with piracy happening on the high seas or waters outside the jurisdiction of any state. The Somali pirates sometimes start attack within the Somali territorial sea, or they commit crime of piracy on the high seas and then flee into the Somali territorial sea to elude capture. So the above international conventions can not be fully applied in these situations.

In order to meet the gap between the restricted application of the above conventions and the need to combat the Somali piracy within the Somali territorial sea, the Security Council of the United Nations made relevant resolutions to solve this problem. The Security Council Resolution 1816 authorized naval forces entry into Somali territorial sea to pursue pirates. The resolution emphasized cooperation on prosecution by calling on states to collectively determine jurisdiction in the investigation and prosecution of persons who are

suspected of committing acts of piracy off the coast of Somalia. This resolution also encouraged states to increase and coordinate their efforts to deter acts of piracy in conjunction with the Transitional Federal Government of Somalia. Since Somalia has no maritime law enforcement capability, the resolution also called on states, the International Maritime Organization and other international organizations to build a partnership to develop coastal security forces. The Security Council adopted Resolution 1838, expressing its grave concern over the proliferation of acts of piracy against vessels off the coast of Somalia, and the threat it poses to the delivery of World Food Program shipments to Somalia. The resolution called upon states to take part in fighting piracy by deploying naval vessels and aircraft to the Gulf of Aden and surrounding waters. The Security Council Resolution 1846 broadened the international political support and legal capabilities to combat piracy off the Somali coast. The resolution suggests states consider application of the 1988 Convention on the Suppression of Unlawful Acts against the Safety of Maritime Navigation to facilitate the extradition and prosecution of the Somali pirates. The Security Council Resolution 1851 authorized states to take action against piracy safe havens on the shore in Somalia. The resolution also invited the states with maritime forces in the area and the regional states to conclude “shiprider” agreements or arrangements so that local law enforcement officials could embark on board foreign warships patrolling the area. The regional countries are particularly important in this regard because they are ideally situated to conclude the endgame — conducting criminal investigations and trials. In order to restore social order and stop armed conflicts in Somalia and cut support for Somali piracy from outside world, the Security Council made resolutions 733 and 1676 respectively in 1992 and 2006, prohibiting the export of arms to Somalia and the provision of military technology and military training for Somali armed groups.¹⁶

In order to coordinate actions against the Somali piracy, the United Nations established the Contact Group on Piracy off the Coast of Somalia on 14 January 2009. This Group is responsible for information collection and for negotiation and coordination among the states in regard to combating Somali piracy. The Group has several working groups to develop collective action regarding different aspects of the effort against Somali piracy.

The United Nations at the same time encourages the regional organizations to make collective efforts to combat Somali piracy. As a result of this, the Africa Union, the Arab League, and the European Union take measures respectively to deal with the Somali piracy. For example, the European Union deployed naval forces to the Gulf of Aden under Operation Atalanta, the first EU operational naval deployment outside Europe, to conduct counter-piracy patrols and to provide escorting service for the vessels sailing off the Somali coast and for the vessels to deliver humanitarian aids to Somalia.

¹⁶ These resolutions adopted by the Security Council of the United Nations are closely connected. For a better understanding of these resolutions, please visit the official website of the United Nations for the full version of the resolutions.

As a response to the resolutions of the Security Council of the United Nations, some states also send warships to the marine areas off the coast of Somalia to combat the Somali piracy and to provide escorting service. Warships from the United Kingdom, the United States, Denmark, the Netherlands, France, Pakistan, India, Iran, Russia, China, New Zealand, Australia, Republic of Korea and other countries operate at the same time in the area. China sent a series of warships to fight Somali piracy, the first overseas operational deployment in the history of the Chinese navy. Japan approved a deployment by the Japanese Maritime Self-Defense Force as a “police action” to patrol the marine area off the Somali coast. The multinational counterpiracy naval force of more than 20 nations also made coalition efforts against the Somali piracy.

In addition, in order to help Somalia solve the political, economic and social problem and crisis, the United Nations is very active in pushing forward the Somali political reconciliation process, the United Nations is also engaged in Somali humanitarian aids program.

Finally, many special international organizations also pay close attention to the Somali piracy. For example, the International Maritime Organization has been constantly considering the issue of the Somali piracy. Its center in Kuala Lumpur keeps monitoring the incidents of the Somali piracy, collects and distributes information about the Somali piracy, and gives an important impetus to the legislation on the Somali piracy. It also adopted a resolution in November 2007, which called on regional states in east Africa to conclude a treaty to prevent, deter and suppress piracy.

In conclusion, many states and international organizations have worked hand in hand to deal with the Somali piracy. Much effort has been made and many measures have been taken. The measures include but not limited to political, diplomatic, legal, economic, social and military measures.

4. Problems yet to be solved

Though much effort has been made and many measures have been taken, the Somali piracy has not been brought under control, one evidence of which is that the Somali pirates are still able to carry out attacks in a vast marine area off the Somali coast. There are still daily reports that the Somali pirates have hijacked vessels. This shows that the effort is not enough and the measures are not perfect. There still exist some problems which need to be addressed.

4.1 Definition of piracy

The first problem is that the current definition of piracy is confusing and

misleading. According to the Geneva Convention on the High Seas 1958 and the United Nations Convention on the Law of the Sea 1982, piracy includes any outlawful act of violence, detention or depredation committed on the high seas for private ends by the crew or passengers of a private vessel or aircraft against another vessel or aircraft or persons or property on board it.¹⁷ This definition precludes any act of warship or government ship being classified as act of piracy.

Statistics show that a large portion of marine piracy happens within territorial seas,¹⁸ but the above definition does not cover the piracy acts which take place within a state's territorial sea. If the state in whose territorial sea the act of piracy takes place can not or would not like to exercise jurisdiction over such act of piracy, then such act of piracy can escape punishment. In addition, above definition only refers to piracy attacks conducted by a private vessel or aircraft against another vessel or aircraft, so above definition can not cover the piracy acts against oil platform or artificial island or any other marine constructions. The above definition also precludes the piracy acts with nature of politics or religion. It ignores the fact that some acts of piracy are conducted in the name of politics or religion. Due to these defects, the above definition of piracy can not meet the current need of combating piracy. A new and uniform definition of piracy should be codified.

4.2 Jurisdiction over and punishment of piracy

Because piracy heavily damages the marine order and threatens the safety of life and property on the seas, piracy act is called a crime against the whole community of mankind.¹⁹ Pirates are deemed as persons who are not entitled to the protection of any state. Therefore, Geneva Convention on High Seas 1958 and the United Nations Convention on the Law of the Sea 1982 require the community of states to cooperate in stemming the piracy taking place on high seas or waters outside jurisdiction of any state. According to these conventions, any state's warships and vessels on governmental service are allowed to visit or board any vessel of whatever flag on high seas if the vessel is suspected of committing crime of piracy.²⁰ However, if the suspicions finally prove unfounded and the vessel has done nothing to justify the visiting and boarding, any losses or damages it has sustained should be compensated by the state whose warship and governmental vessel has conducted the act of visit or boarding. If the suspicion is confirmed, pirate vessels can be seized and the pirates can be arrested by the visiting or boarding warship or governmental

17 Refer to Article 15 of the Geneva Convention on the High Seas 1958 and Article 101 of the United Nations Convention on the Law of the Sea 1982.

18 Danadillon (2005) Maritime Piracy: Defining the Problem. *SAIS Review* 25(1), p.156.

19 Huang. J.-P (2001) On Universal Jurisdiction Principle and Practice. *Politics and Law Forum* (Issue 2), p.45.

20 Refer to Article 21 of the Geneva Convention on the High Seas and the Article 107 of the United Nations Convention on the Law of the Sea.

vessel. Certainly, if the seizure or arrest proves wrongful, the state whose warship or governmental vessel has carried out the seizure and arrest shall be responsible for the wrongful seizure and arrest and shall compensate any losses and damages so incurred.²¹ These provisions lay down very strict conditions for warships and governmental vessels to visit or board vessels suspected of committing piracy and impose strict liability for any wrongful seizure of suspected vessel or arrest of suspected pirate. These provisions may make warships or governmental vessels worry about the effects of their intervention and do nothing or act passively in combating piracy. Using the Somali piracy as an example, if the warships or governmental vessels only response passively to calls of help in order to observe the above strict conditions and avoid any liability, the Somali piracy can not be stemmed and eradicated. Taking into consideration of the large scale, the high frequency and the ferocity of the Somali piracy, the warships and governmental vessels in that marine area should be given more freedom in operation to restore the normal marine order. According to international law on armed conflicts, during armed conflict, merchant vessels may be boarded under the belligerent right of visit and search to determine the neutral character of the goods on board. The Security Council of the United Nations may, treating the fight against the Somali piracy alike an armed conflict, authorize all states to take all necessary action against the Somali piracy and provide more freedom of visit and board for the warships.

One problem for the warships patrolling off the Somali coast is what to do with the Somali pirates who have been caught. To determine which state should prosecute the Somali pirates caught at sea is particularly vexing, considering that an incident of the Somali piracy attack may concern persons, properties and interests of different states. According to Geneva Convention on High Seas 1958 and the United Nations Convention on the Law of the Sea 1982, pirates can be tried by any state before whose court the pirates are brought, and this state can apply its own law in imposing penalty on the pirates. But it depends on the municipal law of each State to implement this competence. In the case of the Somali piracy, the reality is that municipal laws of many states have no relevant provisions in regard to the trial and punishment of the Somali pirates. For those states that have relevant provisions, the treatment of the Somali pirates is quite different in law and practice. There is an urgent need to unify the law and practice in relation to the trial and punishment of the Somali piracy.

Concerned at the rising incidents of acts of piracy threatening the marine order and safety of navigation, the International Maritime Organization proposed the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation in 1988. This Convention specifies as crime certain acts against shipping, including the seizure of vessels, the endangering of safe navigation by the use of violence against persons on board

21 Refer to Article 20 of the Geneva Convention on the High Seas and the Article 106 of the United Nations Convention on the Law of the Sea.

or by damage to the vessel, its cargo or equipment. According to this Convention, member States should make these listed acts as punishable under their municipal laws and establish their jurisdiction over offences committed on or against their ships, in their territory, or by their nationals.²² This Convention further stipulates that a member State in whose territory an alleged offender is found is obliged either to extradite him to any State asserting jurisdiction over him or to submit without any exception the case to its own competent authority for prosecution. In regard to the case of the Somali piracy, one problem is that many states are reluctant to exercise jurisdiction over the Somali pirates because of the high cost in prosecution. In most cases, it is quite complicated and expensive to send the suspects to the arresting state for trial and punishment. As a result, it often happens that the patrolling warships just release the Somali piracy suspects shortly after they have successfully captured or arrested the suspects.²³

For piracy acts committed within the territorial sea of Somalia, the problem is that the Somali government is not able to exercise jurisdiction over the pirates because of the nationwide disorder and anarchy. In addition, there are not enough lawyers and judges in Somalia and the relevant laws and procedures are quite far from international standards.

In conclusion, on the one hand, the Somali government can not be relied on when jurisdiction and punishment of the Somali pirates is concerned; on the other hand, most other states would not like to exercise jurisdiction either due to the municipal law barrier or due to the high cost thereof. As a result, the Somali pirates often escape trial and punishment.

4.3 Cooperation among the naval forces

Many states have dispatched warships to the marine areas off the Somali coast to provide escorting service and to combat the Somali piracy.²⁴ Because every state insists on the exclusive control over the operation of its own patrolling warships, there lacks effective coordination among warships of different states.

Nowadays the Somali pirates operate attacks not only in the Gulf of Aden but also in large marine area of west of the Indian Ocean, this makes it necessary to send more than 60 warships to cover the whole area.²⁵ The reality is that there are only about 40 warships working in that area. This means there is a serious shortage of patrolling

22 Refer to Articles 5 and 6 of the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation 1988.

23 For example, Russian Ministry of Defence confirmed on 7 May 2010 that its navy had released 10 Somali pirates after they had been captured by a Russian patrolling warship for attacking a Russian commercial vessel on 6 May 2010. For the detailed information, please refer to Sanjin Municipal Newspaper 8 May 2010.

24 China has participated in the international effort and has sent its warships for the first time in its history to the marine area off the Somali coast for combating the Somali piracy.

25 Refer to <http://wenku.baidu.com/view/072a0e66f5335a8102d22000.html> (Last accessed on 17 Jun. 2010)

warships. The shortage of patrolling warships in together with the lack of good coordination makes combating effect far from satisfaction.

The fact that more than one-third of attempted ship hijackings in the Gulf of Aden are successful illustrates that the shortage of warships and the strategy of the passive defence adopted by the naval forces have been unable to deter or disrupt many piracy attacks. This means that we not only need more warships but also need to reconsider the strategy and tactics we are using to address the problem.

4.4 The Use of force against Somali piracy

In the process of operation, warships sometimes use force against the Somali pirates. In most cases they are too conservative in use of force. When to use force and how to use force is quite a problem for the warships.

In addition, with the escalating of Somali piracy, more and more merchant vessels get armed²⁶. There arises a debate on whether a merchant vessel should be armed and what effect an armed merchant vessel can have on safeguarding the marine order and safety and on protecting the persons and property on board the vessel. The same question raised to warships can also be raised on armed merchant vessels: when to use force and how to use force.

If the above questions can not be correctly addressed, there must be disorder in the use of force against Somali piracy and this can lead to disaster.

5. Some suggestions

In order to address the above problems and effectively combat the Somali piracy, the following measures should be considered.

International conventions in regard to combating piracy should be reviewed. Uniform rules should be made according to principles of international law, and especially a uniform definition of piracy should be given in order to enable it to cover all piracy acts. Such uniform rules should get rid of any conflicts or contradictions existing in the current international conventions. This can set down universal standards and can unify the national practice in the field of combating piracy.

At present, many states, global and regional organizations have involved in combating the Somali piracy. There urgently needs an effective organizer to harmonize

²⁶ Fitzgerald, M., naval general of the United States, once said that merchant vessels themselves should take appropriate preventive measures against Somali piracy because warships could not provide 100% protection for every vessel. For detailed information, please refer to China News Network on 16 Apr. 2010.

all the actions against the Somali piracy. In order to make full use of the forces and resources, we should strengthen the international cooperation and emphasize the role of the United Nations in coordinating all the efforts in combating the Somali piracy.²⁷ According to the Charter of the United Nations, one of its main functions is to harmonize the actions of the world community of states. As the Somali piracy has been focus of world attention and the Somali pirates have been threatening world peace and security, it naturally follows that the United Nations should play a primary role in combating the Somali piracy. In order to solve the problem of lacking effective coordination among the warships of different states, the Security Council of the United Nations can establish a special committee to coordinate the military action against the Somali piracy. This special committee should be composed of representatives from all the states which have deployed patrolling warships to that area.

In order to solve the problem of jurisdiction over the Somali pirates and to unify the punishment of the Somali pirates, a special tribunal can be established by the Security Council of the United Nations. There have been precedents for the Security Council of the United Nations to establish special tribunal for the trial and punishment of a series of special crime. For instance, the Security Council of the United Nations has established a special tribunal for the crimes in the Rwanda and in the former Yugoslavia respectively. The advantages of the special tribunal regime are as follows: it can concentrate all the resources, it may overcome the barrier of municipal procedures, it is neutral and independent, it can achieve substantial and procedural justice,²⁸ and it is helpful for the piracy suspects and common people to recognize and accept the judgment on the Somali pirates.

At present, in order to solve the problem of prosecution and trial of the Somali pirates, some states have reached special arrangement with some African states on the handling of the Somali pirates captured by their warships. For example, the United Kingdom signed a counterpiracy cooperation agreement with Kenya in December 2008, agreeing to transfer captured pirates to the latter for trial and prosecution. The United States and Kenya have made a similar arrangement. These agreements can on the one hand facilitate the handling of the captured pirates and on the other hand benefit the patrolling warships by ensuring the quick removal of captured pirates from warships and freeing them for follow-on tasking. But Kenya and other states in this region have insufficient number of lawyers, prosecutors and judges, and they sometimes lack other resources for the prosecution and trial. In view of this, the Security Council of the United Nations can enter into a special agreement with, for example, Kenya, on establishing an international tribunal Kenya for the prosecution and trial of the captured Somali pirates. I believe the operation of such

27 International cooperation is a basic principle in the Geneva Convention on High Seas 1958, the United Nations Convention on the Law of the Sea 1982 and the Charter of the United Nations.

28 Zhang, L. (2009) Criminal Issues in Combating the Somali Piracy. *International Law of the People's University* (Issue 9), p.47-48.

a tribunal can be more efficient.

Each state concerned should establish national counter-piracy centre for effectively harmonizing all its resources and forces against piracy. Operation against piracy relates to many government departments such as ministry of defence, ministry of foreign affairs, ministry of communication and transportation, etc. The successful operation against piracy depends on efficient information collection and exchange, and on high organization of the forces and resources of different government departments. If there is no such a national counter-piracy center, there shall be no concentrated force against piracy.

Each maritime enterprise and each vessel should establish its own security regime against piracy. Practice has proved that it is a fundamental work in combating the Somali piracy for each enterprise and each vessel to get well-prepared for any piracy attack.²⁹ High alert and strong self-defence is very important in combating the Somali piracy. For enterprises which operate off the Somali coast and for vessels which sail off that area, special arrangement must be made against possible Somali piracy attack. For example, enough counter-piracy equipment should be provided, crew should be well-trained for piracy attack, special watching and alert regime should be kept during the passage of that area. There are many cases in which the Somali pirates have been defeated by the well-prepared, well-equipped and well-trained crew. This shows the extraordinary importance of the counter-piracy regime of concerned enterprise and vessel.

We should study the feasibility of arming the merchant vessels. This suggestion may cause some opposition and doubt. The main opposition is based on the following reasons: it can result in high cost of operation of vessel, it can increase the possibility of internal disorder inside a vessel, it can cause the strong reaction from the pirates,³⁰ port authorities of some states refuse the port access to armed merchant vessels, etc. But we can not deny that armed merchant vessel is more a deterrence to pirates and armed merchant vessel can enhance the confidence of the crew in combating piracy. The shortcomings of armed merchant vessel can be overcome by the establishment of a special control regime, for example, merchant vessels can only be armed when usually sailing in marine area where pirates often strike, armed service can only be provided by registered professional company, and the use of arms must follow a strict procedure. Through detailed design, the advantages of armed merchant vessel can be fully developed and the disadvantages can be effectively avoided. Evidence shows that armed merchant vessel can in most cases defeat the attacks by pirates.³¹ A typical example of these cases is about

29 There are many examples in which well-prepared crew successfully fought the Somali piracy attacks. One of these examples is the crew of M/V Zhenhua No.4 in combating the Somali piracy attack. <http://zhidao.baidu.com/question/98427504.html?fr=ala> (Last accessed on 17 Jun. 2010)

30 Mariners and some naval officials express some concern that a more robust defense or greater resistance on the part of merchant vessels might lead to more aggressive tactics by pirates. International Maritime Bureau once expressed its worry that with more merchant vessels being armed there might be an arms race between the armed merchant vessels and the pirates and this arms race might result in more armed attacks by pirates.

an American vessel. This vessel first was hijacked by the Somali pirates in April 2009. This same vessel defeated the Somali pirates at the same marine area in November 2009. At the first time, it was not armed; at the second time, it was armed.³² So we have enough ground to try the armed merchant vessel. With the practice going further, we can finally seek truth from the facts. If the result is positive, we can continue and enlarge the practice; if the result shows more negative effects, we can just stop the practice.

We should reorganize the patrolling strategy. Because the shipping line is too long and the marine area which needs to be patrolled is too large, there is a serious shortage of patrolling warships. In addition, patrolling warships of each state act by themselves and operate in the whole area, and this practice aggravates the shortage of patrolling warships. In view of the shortcomings of this practice, at the international conference on coordinating the patrol over the Gulf of Aden held in November 2009, China proposed a new strategy of “United Action, Divided Patrolling Zone” to address this problem. The main point of this new strategy is that all the patrolling warships from different states should be united together and the patrolling warships of each state should be given, according to the number of warships and their condition, a particular piece of marine area for patrolling.³³ Thus patrolling warships of each state need not patrol over all the area, and they need only escort the vessels sailing through their given patrolling area. This new strategy can level up the cooperation among the warships and improve the efficiency of the escorting and patrolling. For the success of this strategy, there also needs a fast response regime that can maintain 24-hour communication among the maritime states patrolling off the Somali coast, the flag states and the regional states so that these nations may quickly coordinate interdiction of vessels hijacked by pirates and resolve questions regarding the disposition of the pirates captured.

More support should be provided to the regional states around Somalia for strengthening their ability to keep marine order and safety. The support should include development of coastal surveillance infrastructure, patrol boats and maritime interdiction capabilities. If these regional states can stabilize their own coast and marine area, and at the same time provide necessary assistance to the international operation against the Somali piracy, this will be a great contribution to the combating of the Somali piracy.

More attentions should be paid to problems existing on land of Somalia³⁴. The problem of the Somali piracy exhibits on seas but the root is on land. The phenomenon

31 According to John Harbour, the spokesman for the European Union Naval Forces, some merchant ships sailing off the coast of Somalia have been armed, and it is true that armed merchant ships can deter the attacks of pirates and increase their difficulty in seizure of vessels.

32 Refer to Xinmin Evening Newspaper of 19 Nov. 2009, p.A18.

33 Refer to the Xinmin Evening Newspaper of 19 Nov. 2009, p.B2.

34 A high officer of the International Maritime Organization once said that the Somali piracy problem was essentially a problem of peace and development and that military action alone could not solve the problem. Please refer to article on Yangzhou Times of 20 Nov. 2008.

of the Somali piracy is a reflection of the combined crisis of politics, economy, society and culture inside Somalia. Therefore, in order to eradicate the root of the Somali piracy, the international community of states should speed up the Somali political process of internal conciliation, help establish a powerful central government of Somalia, help restore the social order in Somalia, continue the humanitarian aids program, and help solve the problem of poverty in Somalia. It is a systematic work to combat the Somali piracy, it is necessary to make use of any means and any resources to combat the Somali piracy, and it is very important to strengthen the cooperation in the battle against the Somali piracy.

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