Asia-Pacific
Economic Cooperation

Exploration on Strengthening of Maritime Connectivity

Transportation Working Group

November 2016

APEC Project: TPT 02 2016S

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APEC#216-TR-01.1

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1. Background

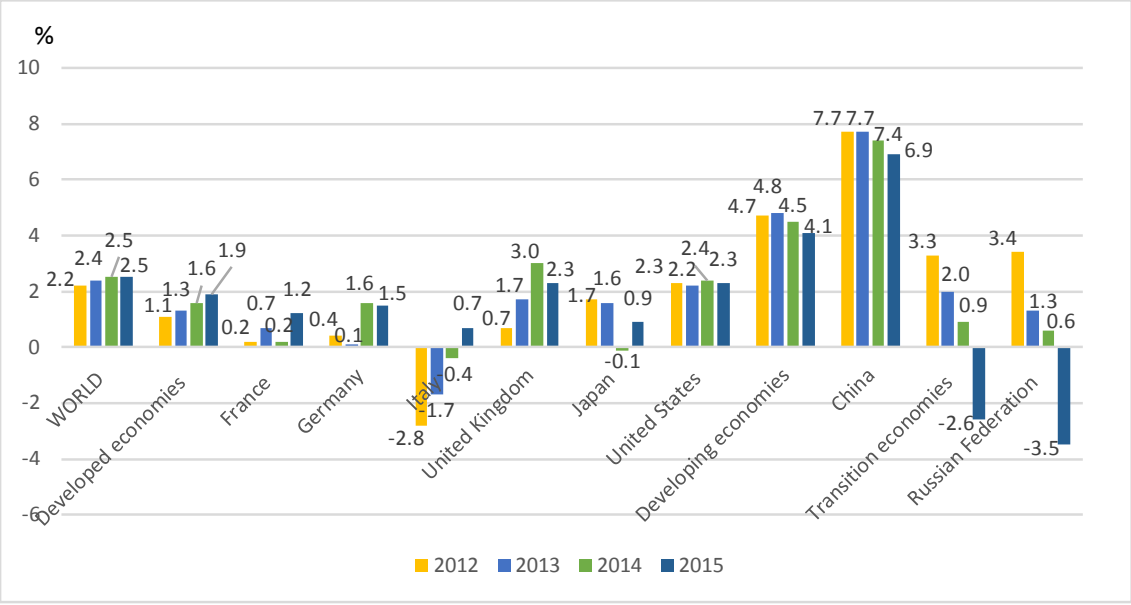
(1) Trend of Global Economic Growth and Seaborne Shipments

The world economy embarked on a slow-moving recovery led by uneven growth in developed economies and a slowdown in developing economies and economies in transition. In 2014, the world gross domestic product (GDP) increased marginally by 2.5 per cent, up from 2.4 per cent in 2013.

The emerging recovery in the developed economies was led by accelerated growth in the United States (2.4 %) and the United Kingdom of Great Britain and Northern Ireland (3.0 %) and a fragile recovery in the European Union (1.3%). Meanwhile, GDP growth in Japan came to a standstill due, among other factors, to the 2014 consumption tax increase and the fading away of the effect of the fiscal and monetary stimulus introduced in 2013.

Although developing economies remained the engine of growth, contributing three quarters of global expansion in 2014 (International Monetary Fund, 2015), slower GDP growth reflects, in particular, weaker expansion in developing America and a slowdown in China. In China, for instance, GDP growth rate registers a fall from 7.7% in 2012 and 2013 to 7.4% in 2014.

GDP growth in the transition economies was constrained by weak exports and external financing constraints as well as the uncertainty caused by the geopolitical conflicts in the region. Russia's growth rate, in particular, dipped down 3.4% in 2012 to 0.6% in 2014.



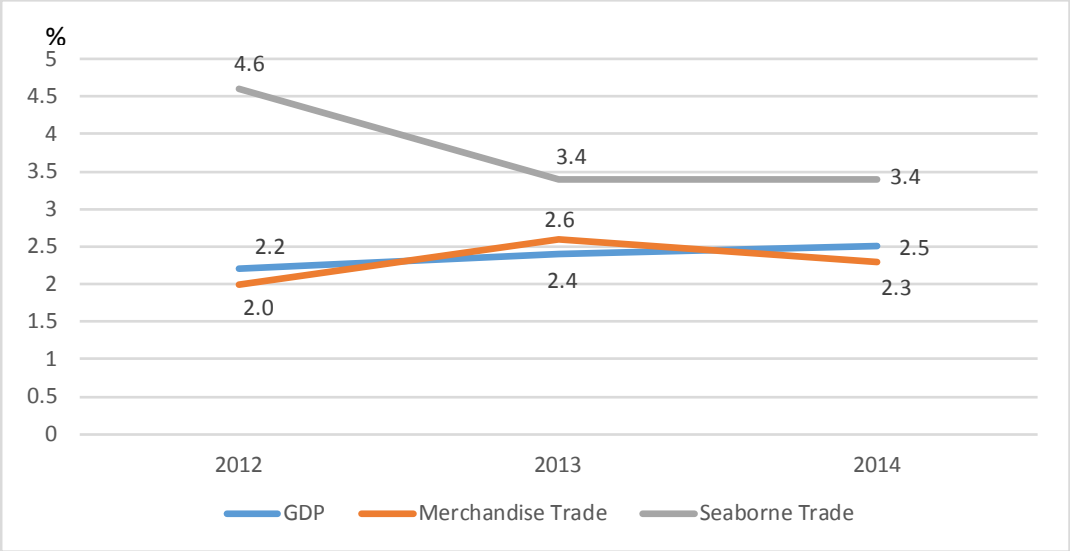
Source: "Review of Maritime Transport 2015" by UNCTAD

Note: 1. The data of 2015 are results of forecast.

2. Calculations for economy aggregates are based on GDP at constant 2005 dollars.

Figure 1 World Economic Growth, 2012–2015 (annual percentage change)

Meanwhile, world merchandise trade increased by 2.3 per cent, which is down from 2.6 percent in 2013 and below the pre-crisis levels. On the other hand, seaborne trade growth in 2014 stood at 3.4%, which is at the same rate as in 2013 though down from 4.6% in 2012. The growth rate of seaborne trade has been higher than that of merchandise trade and GDP. The volume of seaborne trade accounted for four fifths of total world merchandise trade, reflecting its overwhelming importance among total merchandise trade.



Source: “Review of Maritime Transport 2015” by UNCTAD

Figure 2 Growth Rate of World GDP, Merchandise Trade and Seaborne Shipments, 2012–2014 (annual percentage change)

(2) Increased Importance of Maritime Connectivity to Regional Economic Integration

According to the APEC document “APEC Strategic for Promoting Global Value Chains Development and Cooperation” issued in 2014, Global Value Chains (GVCs) have become a dominant feature of the global economy. Better understanding and supporting the “trading tasks” involved in adding value to the final products that cross borders has become paramount to realizing a more effective policy and regulatory infrastructure for global trade. Efficient and workable GVCs within and between APEC economies has accordingly become a key focus for economies at all levels of development.

In addition to the efforts to facilitate the improvement of supply chain efficiency, APEC issued the document of “APEC Connectivity Blueprint for 2015-2025” (“Blueprint”) in 2014, resolving to strengthen connectivity in terms of “Physical Connectivity”, “Institutional Connectivity” and “People-to-People Connectivity”.

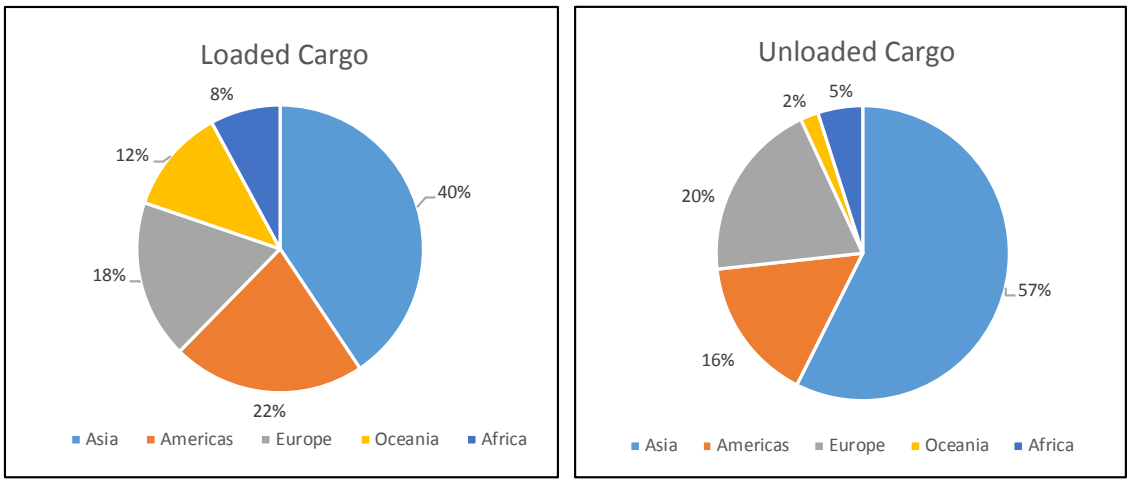
Regarding the issue of maritime connectivity, APEC proclaimed in the Blueprint to help facilitate the efficient and effective operation of maritime transportation and shipments, especially considering

that a majority of maritime infrastructure development projects happen on a unilateral basis.

(3) Significance of Maritime Transportation to the Issue of Connectivity

Economies in the APEC region share the Pacific, which provides people especially in this region with abundance of natural resources in fishery and tourism among others.

As seen from the following figure, the share of Asia region in seaborne trade ranks top in both loaded and unloaded cargo. If add Oceania and part of Americas to the Asia region, the share of APEC region among the world's seaborne trade in terms of loaded cargo and unloaded cargo will reach more than 60% and be close to 70% respectively.



Source: "Review of Maritime Transport 2015" by UNCTAD

Figure 3 World Seaborne Trade by Region, 2014 (percentage share in world tonnage)

The intraregional trade depends largely on maritime transportation, which stands as an important basis for "Physical Connectivity", "Institutional Connectivity" and "People-to-People Connectivity" in the APEC region.

The strategic importance of maritime transport infrastructure and services for market access, globalized production, trade competitiveness, employment, income generation, poverty reduction and social progress cannot be overemphasized. Consequently, for many developing economies, addressing the physical and non-physical barriers such as infrastructure issues (for example, insufficiency, inadequacy, congestion and maintenance requirements), missing links and interoperability of, for example, equipment, vehicles, technologies and standards, is key.

(4) Major Challenges Faced by Maritime Transportation

However, maritime transportation in this region is facing the following challenges:

- Growing and concentrated traffic volumes brought about by ever-increasing ship size
- The cost of adaptation of port and port hinterland infrastructure measures
- A changing marketplace as a result of increased alliance between shipping lines
- Budget constraints limiting the possibilities of public funding for transport infrastructure
- Volatility in energy prices, the new energy landscape and the transition to alternative fuels
- The entry into force of stricter sulfur limits (e.g. ECA)
- Increasing social and environmental pressure
- Potential changes in shipping routes from new or enlarged international passage ways

2. Purpose of the Study

This study is aimed to identify the problems relevant to the issue of maritime connectivity and to put forward recommendations for necessary improvement with an eye to contributing to the future efforts to be made by APEC. In addition, with respect to the following viewpoint, this study also embraces the perspective of GVCs and is expected to be contributive to the implementation of "APEC Strategic Blueprint for Promoting Global Value Chains Development and Cooperation".

As pointed out by APEC in this document, given the diverse needs and situations of APEC economies participating in global trade networks today, an overall policy direction guiding improved cooperation and a more focused GVCs evolution is essential to facilitating sustainable, inclusive and balanced growth in the Asia-Pacific region. Consistent overall policy based on input from each economy is essential for moving APEC's trade and investment agenda forward, and facilitating APEC's push for regional economic integration.

In 2013, APEC Leaders agreed to promote GVCs development and cooperation in the APEC region on the basis of previous work on connectivity. This agreement highlights the need for APEC economies to work strategically and take action in creating an enabling environment for GVCs development and cooperation. In response to Leaders' instruction, APEC economies agree to develop a Strategic Blueprint for promoting global value chains development and cooperation.

Moreover, this study has been conducted on the basis of approval by the APEC Transportation Working Group (TPTWG), with the purpose of following up the efforts and achievement made by TPTWG and APEC Transportation Ministers Meeting (TMM) from the perspective of enhancing intraregional maritime connectivity as well as specifying the current issues needed to be addressed, so as to facilitate the enforcement of policies to be taken by APEC and the respective economies in the near future. The policy/strategy discussions conducted by TMM and efforts and achievement made by TPTWG are summarized in the following tables.

Table 1　Policy/Strategy Discussions Conducted by TMM

Issues	Items Discussed
● Inclusive Mobility	➢ Endorse the initiative on creating an Inclusive Mobility Framework for the APEC region ➢ Pave the way for the development of projects, programs, activities and transport planning mechanisms to address the transport needs of all individuals
● Developing Sustainable Transport Systems	➢ Enhancing Transportation Safety and Security ➢ Investing in Resilient Infrastructure
● Encouraging Innovation in Transportation Systems	➢ Harmonizing Vehicle Standards ➢ Studying Disruptive Technology and Evolving Regulations ➢ Using Intelligent Transport Systems (ITS) to Improve Transportation Efficiency and Effectiveness

Source: http://apec2015.ph/meetings/tmm/

Table 2 Efforts and Achievements Made by TPTWG

Efforts (on-going projects)	Achievements (completed projects)
● International Ship and Port Facility Security (ISPS) Code Implementation Assistance Program ● Promotion of Regional Economic Integration by Developing APEC Gateway Port Connectivity ● Attracting Private Investment to Transportation Infrastructure Public-Private Partnerships ● Global Supply Chain Resilience: Phase 3 Continued Implementation ● Enhancing Aviation Connectivity and Emissions Reduction via Implementation of Performance-Based Navigation (PBN) Assistance Program ● Promoting Cruise Visits to Ports within APEC Region ● Framework of Heavy Vehicle Safety in Transport Supply Chain for APEC Developing Economies	● Transport, Energy and Environmental Benefits of Intermodal Freight Strategies (2010) ● Security Monitoring Model and Network for Regional Supply Chain with a particular focus on food security (2010) ● International Ship and Port Facility Security (ISPS) Code Implementation Assistance Program (ICIAP) (2012) ● International Ship and Port Facility Security (ISPS) Code Port Security Visit Program (PSVP) (2010) ● The Last-Mile of Supply Chain – Third Party Logistics Forum and Technical Visits (2011) ● Sharing Best Practices for Seamless Intermodal Cargo Movement ● Study to Develop a Green Port Evaluation Index (2011)

Source: http://www.apec.org/Groups/SOM-Steering-Committee-on-Economic-and-Technical-Cooperation/Working-Groups/Transportation.aspx

3. Way to Proceed

The study has been conducted based on the result of literature research and input from the APEC economies to identify the areas where the potentiality of maritime connectivity cannot be fully exercised.

Specifically, it was designed to be composed of two elements: (1) Identifying the issues and challenges against the full exercise of potential of maritime connectivity including trans-pacific, sub-regional (ex. Maritime ASEAN Economic Corridor), and archipelago (i.e., remote islands in an economy) in the APEC region from the viewpoint of three pillars of connectivity in the APEC Connectivity Blueprint: Physical, Institutional and People-to-people Connectivity. (2) Exploring the

way to address the identified issues and challenges of maritime connectivity and to develop a set of recommendations to strengthen maritime connectivity in the APEC region.

During the process of implementation, prior to the analytical work, a survey by sending questionnaires with an attached template to respective APEC economies was conducted with a view to collecting their down-to-earth ideas on what they regard as the real issues and challenges posed to the effective functioning of maritime connectivity. The same survey to identify the real needs from the private sector was also conducted through the facilitation of ABAC.

Meanwhile, the literature research was conducted to search for information especially regarding the actions taken by APEC economies to address the issues and challenges mentioned above. Besides, the background data and information regarding the current status of maritime connectivity and maritime transportation were acquired from various documents issued by APEC and other international organizations like UNCTAD and IMO.

4. Current Status Regarding Maritime Connectivity in the APEC Region

(1) Maritime Transportation in the APEC Region

Table 3 Liner Shipping Connectivity Index (LSCI), 2004 – 2012

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Rank	Change 12/04 (%)
China	100.0	108.3	113.1	127.8	137.4	132.5	143.6	152.1	156.2	1	56.2
Hong Kong, China	94.4	96.8	99.3	106.2	108.8	104.5	113.6	115.3	117.2	2	22.8
Singapore	81.9	83.9	86.1	87.5	94.5	99.5	103.8	105.0	113.2	3	31.3
Korea	68.7	73.0	71.9	77.2	76.4	86.7	82.6	92.0	101.7	4	33.1
Malaysia	62.8	65.0	69.2	81.6	77.6	81.2	88.1	91.0	99.7	5	36.9
United States	83.3	87.6	85.8	83.7	82.5	82.4	83.8	81.6	91.7	6	8.4
Chinese Taipei	59.6	63.7	65.6	62.4	62.6	60.9	64.4	66.7	66.6	13	7.1
Japan	69.1	66.7	64.5	62.7	66.6	66.3	67.4	67.8	63.1	15	-6.1
Viet Nam	12.9	14.3	15.1	17.6	18.7	26.4	31.4	49.7	48.7	22	35.8
Mexico	25.3	25.5	29.8	31.0	31.2	31.9	36.3	36.1	38.8	33	13.5
Canada	39.7	39.8	36.3	34.4	34.3	41.3	42.4	38.4	38.3	35	-1.4
Thailand	31.0	31.9	33.9	35.3	36.5	36.8	43.8	36.7	37.7	36	6.7
Russia	11.9	12.7	12.8	14.1	15.3	20.6	20.9	20.6	37.0	38	25.1
Chile	15.5	15.5	16.1	17.5	17.4	18.8	22.1	22.8	33.0	41	17.5
Peru	14.8	15.0	16.3	16.9	17.4	17.0	21.8	21.2	32.8	42	18.0
Australia	26.6	28.0	27.0	26.8	38.2	28.8	28.1	28.3	28.8	45	2.2
Indonesia	25.9	28.8	25.8	26.3	24.8	25.7	25.6	25.9	26.3	48	0.4
New Zealand	20.9	20.6	20.7	20.6	20.5	10.6	18.4	18.5	19.4	61	-1.5
The Philippines	15.4	15.9	16.5	18.4	30.3	15.9	15.2	18.6	17.2	66	1.7
Papua New Guinea	7.0	6.4	4.7	6.9	6.9	6.6	6.4	8.8	6.9	106	-0.1
Brunei Darussalam	3.9	3.5	3.3	3.7	3.7	3.9	5.1	4.7	4.4	128	0.5

Source: UNCTAD

One of the most significant development related to transportation has been the fast expansion of maritime transport in promoting international trade. Maritime transport is the backbone of cross-border freight movement, currently supporting 80% of the volume of global trade.

Recognizing that access to shipping services is vital to increase trade competitiveness, many APEC economies make maritime transport an integral part of international logistics. According to the UNCTAD Liner Shipping Connectivity Index (LSCI) 54, an indicator which aims to capture how well an economy is connected to global shipping networks, six APEC economies – including China; Hong Kong, China; Singapore; Korea; Malaysia and the United States – occupied the top 6 positions in 2012. Other APEC economies have been making steady progress in connecting to global shipping networks. The LSCI score for Viet Nam improved by 35.8 points between 2004 and 2012, an impressive improvement, considering the economy scored only 12.9 points in 2004.

In respect to the central player of the maritime transportation, the world's fleets, out of the top 20 economies/territories of ownership of the fleets. 8 are from the APEC region. The 8 APEC economies are Japan; China; Singapore; Korea; Hong Kong, China; USA; Chinese Taipei, and Russia, respectively ranking 2nd, 3rd, 5th, 6th, 7th, 8th, 11th and 21st in the world in terms of dead weight of tonnage (dwt).

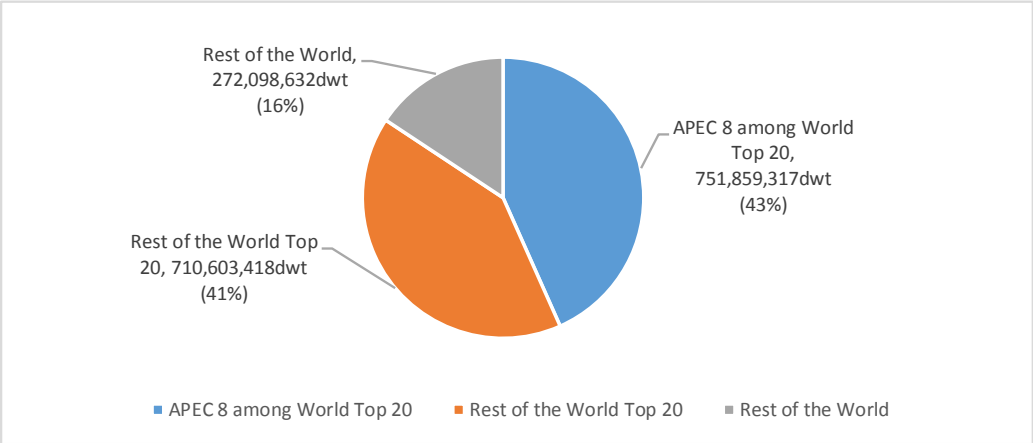
Table 4 Top 20 Countries/Territories of Ownership of the World Fleets as of January 1, 2015

Rank (dwt)	Number of Vessels				Dead-weight Tonnage (dwt)				
	Country/Territory of Ownership	National Flag	Foreign Flag	Total	National Flag	Foreign Flag	Total	Foreign Flag as a % of Total	Total as a % of World
1	Greece	796	3,221	4,017	70,425,265	209,004,526	279,429,790	74.80	16.11
2	Japan	769	3,217	3,986	19,497,605	211,177,574	230,675,179	91.55	13.30
3	China	2,970	1,996	4,966	73,810,769	83,746,441	157,557,210	53.15	9.08
4	Germany	283	3,249	3,532	12,543,258	109,492,374	122,035,632	89.72	7.04
5	Singapore	1,336	1,020	2,356	48,983,688	35,038,564	84,022,252	41.70	4.84
6	Republic of Korea	775	843	1,618	16,032,807	64,148,678	80,181,485	80.00	4.62
7	Hong Kong, China	727	531	1,258	56,122,972	19,198,299	75,321,271	25.49	4.34
8	United States	789	1,183	1,972	8,731,781	51,531,743	60,263,524	85.51	3.47
9	United Kingdom	477	750	1,227	12,477,513	35,904,386	48,381,899	74.21	2.79
10	Norway	848	1,009	1,857	17,066,669	29,303,873	46,370,542	63.20	2.67
11	Chinese Taipei	117	752	869	4,681,240	40,833,077	45,514,317	89.71	2.62
12	Bermuda	5	317	322	289,818	41,932,611	42,222,429	99.31	2.43
13	Denmark	392	538	930	15,286,153	20,893,511	36,179,664	57.75	2.09
14	Turkey	576	954	1,530	8,321,506	19,366,264	27,687,770	69.95	1.60
15	Monaco	0	260	260	0	23,929,323	23,929,323	100.00	1.38
16	Italy	596	207	803	15,961,983	6,040,199	22,002,182	27.45	1.27
17	India	697	147	844	14,546,706	7,268,449	21,815,155	33.32	1.26
18	Brazil	228	163	391	3,150,493	17,308,798	20,459,291	84.60	1.18
19	Belgium	87	156	243	7,302,545	12,787,196	20,089,741	63.65	1.16
20	Russia	1,291	448	1,739	5,920,435	12,403,644	18,324,079	67.69	1.06

Source: UNCTAD

Note: Propelled seagoing vessels of 100 GT and above.

Of the world's total dead weight tonnage 1,734,561,367dwt, the above-mentioned 8 APEC economies account for 43%, which is larger than the proportion of the rest of the World's top 20 as well as that of the rest of the world.



Source: UNCTAD

Figure 4 Position of APEC Major Ship-owning Economies in the World in Terms of DWT

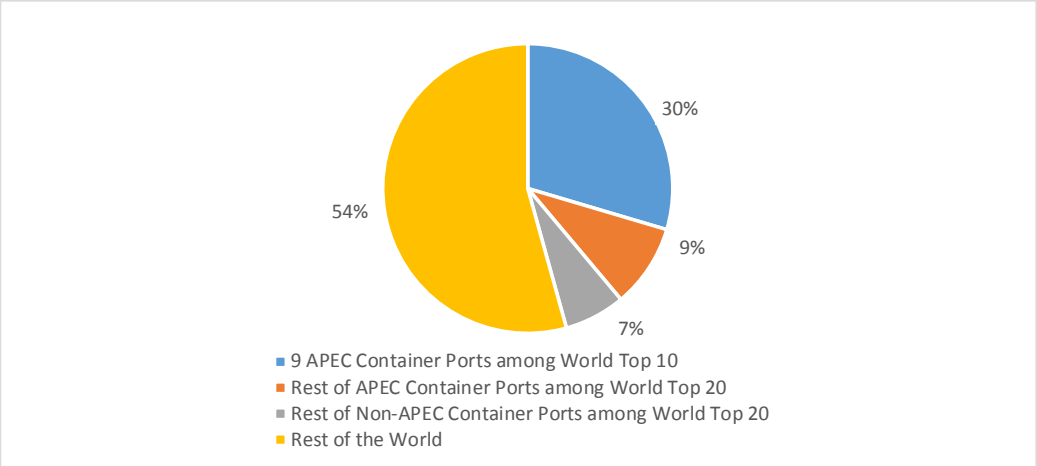
(2) Maritime Infrastructure in the APEC Region

Table 5 shows the world's 20 leading container ports for the period 2012–2014. The top 20 container ports accounted for approximately 45.7 % of world container port throughput in 2014. These ports showed a 4.5% increase in throughput compared to 2013, the same as the estimated increase for 2013.

Among the top 20 container ports, 16 are from the APEC region, which account for around 39% world container port throughput in 2014. A further look at the top 10 container ports in the list finds that 9 of them are from the APEC region, and their throughput accounts for 30%, close to 1/3 of the world total.

The only non-APEC container port that entered the world's top 10 in 2014 is Dubai of UAE (ranking 9th), and the rest of the non-APEC container ports among the top 20 are Rotterdam of Netherland (11th), Hamburg of Germany (15th) and Antwerp of Belgium (16th). The total of the 4 non-APEC ports among the top 20 accounts for not more than 7% of the world's total throughput.

The respective proportions of "the 9 APEC container ports among world top 10", "the rest of APEC container ports among world top 20", "the rest of non-APEC container ports among world top 20" and "the rest of the world" to the world's total throughput are illustrated by the following figure, which substantiates the overwhelming importance of container ports of APEC economies in the world's maritime transportation.



Source: UNCTAD

Figure 5 Position of APEC Major Container Ports in the World in Terms of Throughput

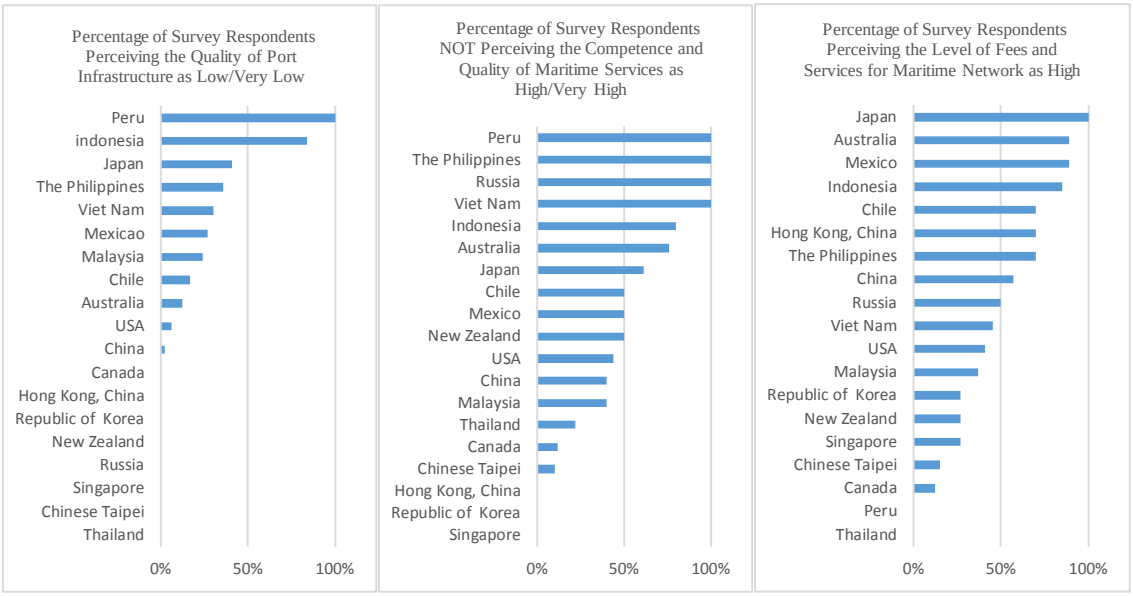
Table 5 Top 20 Container Terminals and Their Throughput, 2012-2014 (TEUS and %)

Rank	Port Name	2012	2013	2014	Percentage Change (2013-2012)	Percentage Change (2014-2013)
1	Shanghai	32,529,000	36,617,000	35,290,000	12.57	-3.62
2	Singapore	31,649,400	32,600,000	33,869,000	3.00	3.89
3	Shenzhen	22,940,130	23,279,000	24,040,000	1.48	3.27
4	Hong Kong, China	23,117,000	22,352,000	22,200,000	-3.31	-0.68
5	Ningbo	15,670,000	17,351,000	19,450,000	10.73	12.10
6	Busan	17,046,177	17,686,000	18,678,000	3.75	5.61
7	Guangzhou	14,743,600	15,309,000	16,610,000	3.83	8.50
8	Qingdao	14,503,000	15,520,000	16,580,000	7.01	6.83
9	Dubai	13,270,000	13,641,000	15,200,000	2.80	11.43
10	Tianjin	12,300,000	13,000,000	14,060,000	5.69	8.15
11	Rotterdam	11,865,916	11,621,000	12,298,000	-2.06	5.83
12	Port Klang	10,001,495	10,350,000	10,946,000	3.48	5.76
13	Kaohsiong	9,781,221	9,938,000	10,593,000	1.60	6.59
14	Dalian	8,064,000	10,015,000	10,130,000	24.19	1.15
15	Hamburg	8,863,896	9,258,000	9,729,000	4.45	5.09
16	Antwerp	8,635,169	8,578,000	8,978,000	-0.66	4.66
17	Xiaman	7,201,700	8,008,000	8,572,000	11.20	7.04
18	Tanjung Pelepas	7,700,000	7,628,000	8,500,000	-0.94	11.43
19	Los Angeles	8,077,714	7,869,000	8,340,000	-2.58	5.99
20	Jakarta	6,100,000	6,171,000	6,053,000	1.16	-1.91
Total Top 20		284,059,418	296,791,000	310,116,000	4.48	4.49

Source: UNCTAD

Note: Singapore does not include the port of Jurong.

Based on the latest survey of logistics professionals working in each economy, the quality of port infrastructure is not considered low by the majority of respondents, with the exception of Indonesia and Peru. However, there is room for at least half of APEC economies to improve on the competence and quality of their maritime transport services.



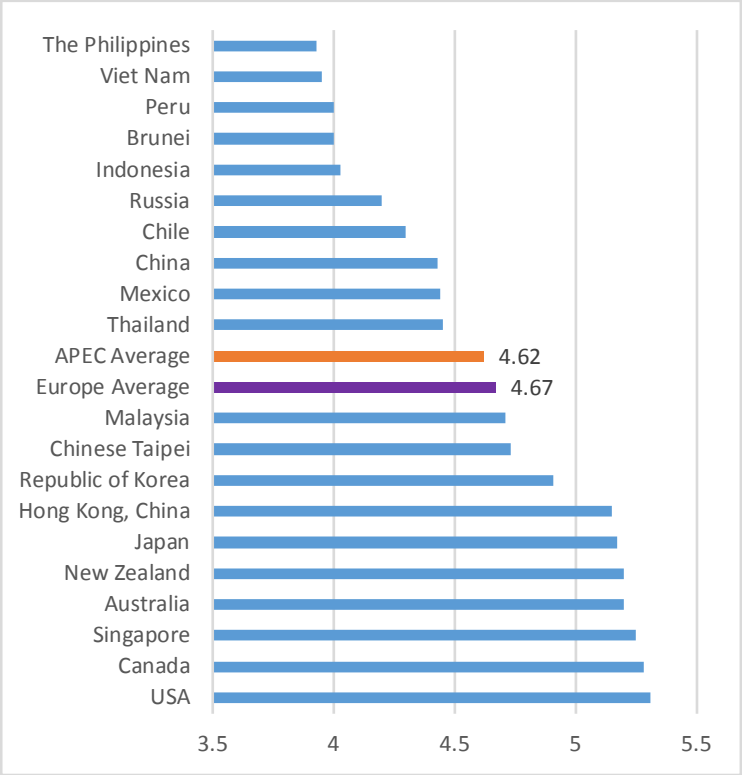
Source: "Improving Connectivity in the Asia Pacific Region: Perspectives of the APEC Policy Support Unit"
Asia-Pacific Economic Cooperation Policy Support Unit Asia-Pacific Economic Cooperation Secretariat (September 2013)

Figure 6 Results of Survey on the Quality of Port Infrastructure in the APEC Region

(3) Maritime Tourism in the APEC Region

For tourism, despite the impressive gains to in the previous section, there is still substantial room to expand the tourism sector and harness an important area of potential growth. The World Economic Forum's Travel and Tourism Competitiveness Report 2013 contains a ranking for 20 of the 21 APEC economies. APEC has 7 economies ranked in the top 15 globally for their attractiveness and accessibility.

However, as seen in the infrastructure section of this report, the APEC region continues to trail the global leader, Europe: 20 European economies rank in the top 30 globally. Although the regions' average scores are close together, with Europe averaging 4.67 out of 7 full points in the rating and APEC economies averaging 4.62, allowing considerable opportunity for APEC fora such as the Tourism Working Group to take a leading role in making the APEC region the world's most attractive tourism destination, such a difference in score reflects the fact that there is still much room left for APEC economies to improve their tourism infrastructure in order to catch up with the European economies.



Source: "Improving Connectivity in the Asia Pacific Region: Perspectives of the APEC Policy Support Unit" Asia-Pacific Economic Cooperation Policy Support Unit Asia-Pacific Economic Cooperation Secretariat (September 2013)

Figure 7　Travel and Tourism Competitiveness Index, 2013

5. Issues and Challenges

(1) Overview of the Issues and Challenges

As the major tasks of this study, literature research and questionnaires are conducted to identify key issues and challenges faced by the APEC economies in their efforts to strengthen maritime connectivity. The APEC economies having responded to the questionnaire survey includes Canada; Singapore; Thailand; Chile; The Philippines; Peru; Hong Kong, China; Australia. The issues and challenges identified thereby include the following ones:

- Port Congestion (Landside Logistics Issue, Scale of Port Issue, Cost Issue for Port Infrastructure, Soft Side Management Issue for Port Infrastructure)
- Shipment Information Sharing
- Trade Liberalization and Regulatory Issue
- Relation with IMO Rule
- Issue of Travel Facilitation

These issues/challenges can be categorized on the basis of the three pillars of "APEC Connectivity Blueprint", the "Physical Connectivity", "Institutional Connectivity" and "People-to-People Connectivity". The issue of Port Congestion is regarded as the effect of 4 issues, i.e. the Landside Logistics Issue, Scale of Port Issue, Cost Issue for Port Infrastructure and Soft Side Management Issue for Port Infrastructure. Among the 4 issues, the first 3 ones are relevant to the pillar of "Physical Connectivity", while the last one, together with the issues of Shipment Information Sharing, Trade Liberalization and Regulatory Issue and Relation with IMO Rule is relevant to the pillar of "Institutional Connectivity". With regard to the pillar of "People-to-People Connectivity", only the issue of Travel Facilitation falls into this category.

An overview of respective issues perceived by the 9 APEC economies having responded to the questionnaire survey is given below. Among them, the issue of Landside Logistics was mentioned by all the respondents (100%), and the issues of Shipment Information Sharing (56%), Trade Liberalization and Regulatory (44%) and Scale of Port Issue (33%) were mentioned by relatively more respondents.

Table 6 Major Issues Identified and the Number of Respondents Mentioning the Respective Issues

Category	Issue Identified	Number of Respondents Mentioning the Issue
Physical Connectivity	Landside Logistics (cause of Port Congestion)	9 (100%)
	Scale of Port (cause of Port Congestion)	3 (33%)
	Cost Issue for Port Infrastructure (cause of Port Congestion)	2 (22%)
Institutional Connectivity	Soft Side Management (cause of Port Congestion)	1 (11%)
	Shipment Information Sharing	5 (56%)
	Trade Liberalization and Regulatory Issue	4 (44%)
	Relation with IMO Rule	1 (11%)
People-to-People Connectivity	Issue of Travel Facilitation	1 (11%)

Source: Answer sheets received from the respondents of the questionnaire survey.

Note: The values in brackets reflect the proportions of number of respondents mentioning the respective issues

(2) Analysis of Respective Issues and Challenges

Mainly based on information provided by the above-mentioned APEC economies' respondents as well as information acquired from the results of literature research, the cause-and-effect relation regarding the respective issues and their possible directions of development are analyzed in detail in the following paragraphs.

1) Landside Logistics Issue (Cause of Port Congestion)

As one of the major causes of port congestion, the issue of inefficient land logistics is being found in major container ports. The causes of this may be traffic regulations like day truck ban enforced in the Manila Port, or insufficient landside infrastructure development in such as connecting road traffic as mentioned by economies of Thailand, Peru and Australia, but the fundamental reasons are considered to be the increase in passenger and freight traffic and growing freight volumes.

The problem of inefficient landside logistics resulted from the above-mentioned issues is in turn giving rise to the issues like delay in the delivery of raw materials and intermediate goods needed for production in many industries, which further exacerbates the efficiency of landside logistics by increasing the turnaround time of trucks and ships, and is bring about the decrease in production, loss of job and income, and increased cost of commodities.

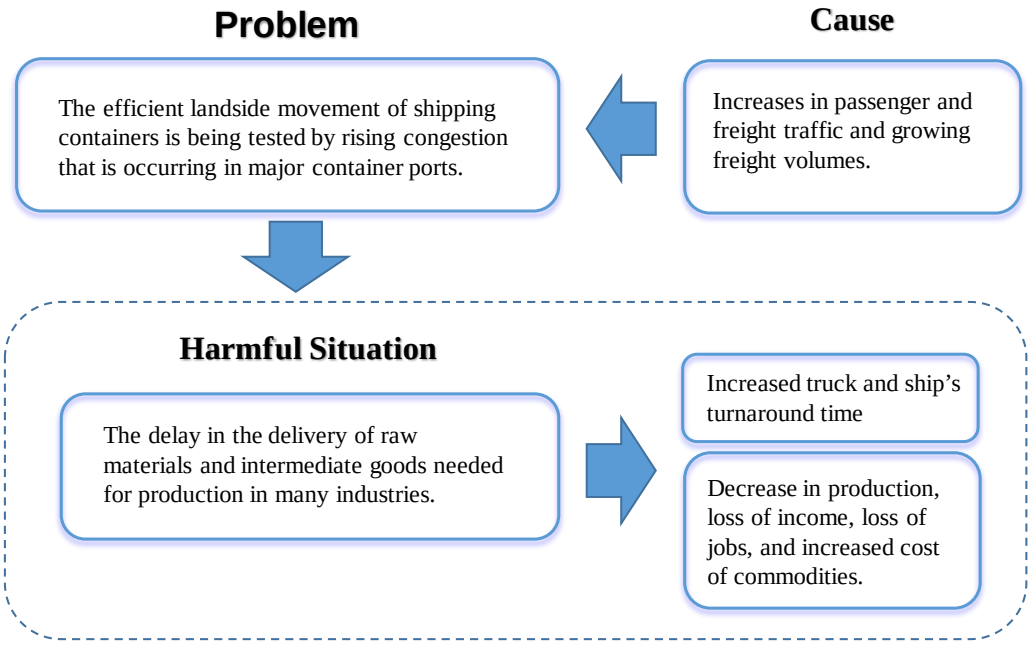


Figure 8 Cause-and-Effect Relation Regarding the Issue of Landside Logistics

To address this issue, the following measures seem to be indispensable:

- Enhancement of interagency coordination including creation of an interagency committee that composed of relevant government agencies.
- Adoption of highly efficient port facilities to improve productivity and efficiency of port operation.
- Development of intermodal facilities, especially introduction of railway system to improve the landside logistics capacity.

2) Scale of Port Issue (Cause of Port Congestion)

In respect to the issue of Scale of Port which is also regarded as one of the causes of Port Congestion, as mentioned by the respondent from Canada, the accelerating trend by ocean carriers towards the introduction of mega-ships into the marketplace adds infrastructural pressure on ports that are not suited to handle such ships, which is reflected in the exacerbating gap between ports that are mega-ship capable and those that are lagging or in the process of adaptation. This is particularly obvious in the Transpacific trade where Asian ports typically outperform their North American counterparts on berth productivity and the other quayside metrics.

But on the whole, the key problem is that most of the ports in the APEC regions are unable to handle the rapidly increasing containers, and the gap between the existing port size and increasing number of mega container vessels is widening. This problem is handicapping the efficient and cost effective container shipping, which is further intensified if intermodal facilities including rail and highway connection are not upgraded to support the increase in demand, as pointed out by the respondent from Australia.

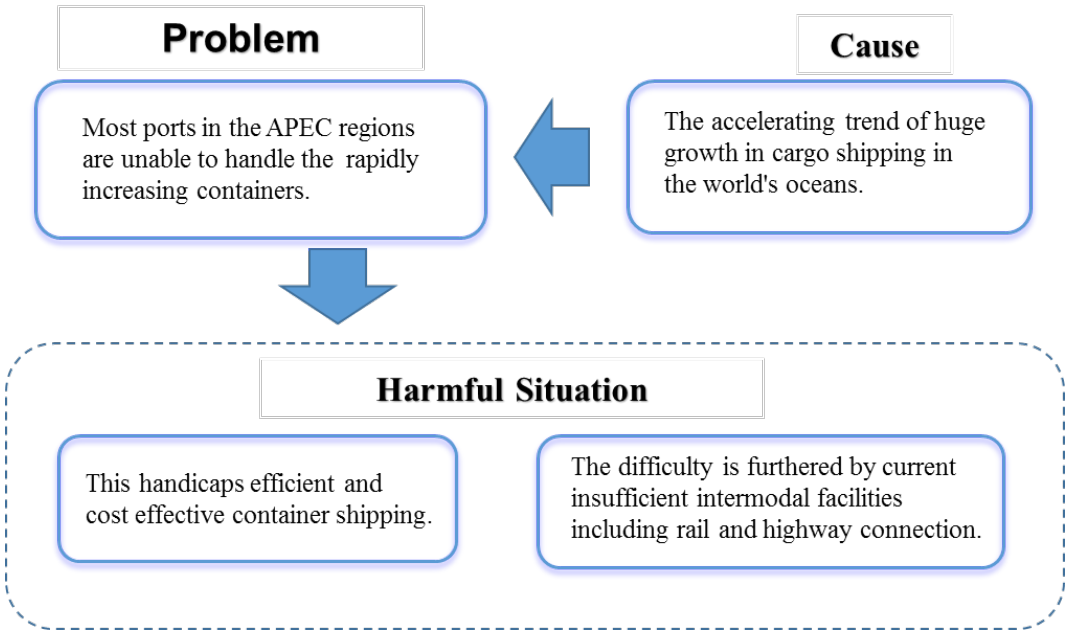
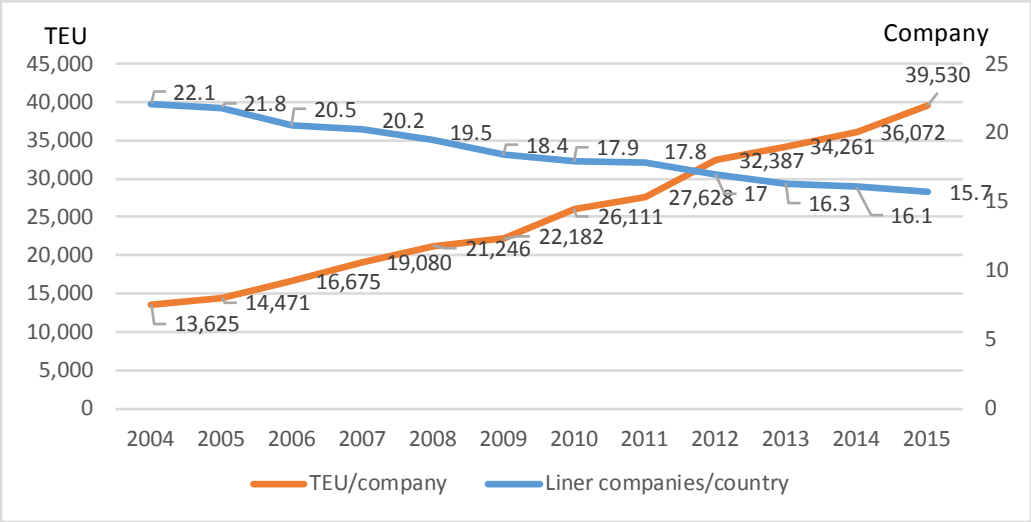


Figure 9 Cause-and-Effect Relation Regarding the Issue of Scale of Port

With regard to the rapidly increasing containers and increasing number of mega container vessels, the figure below tells the truth. It shows that while the container-carrying capacity per provider per economy tripled between 2004 and 2015, the average number of companies that provide services to each economy's ports decreased by 29%. Both trends illustrate two sides of the same coin. As ships get bigger and companies aim at achieving economies of scale, there remain fewer companies in individual markets. Therefore, the process of concentration in liner shipping is

the very reason for the increase of mega container vessels.



Source: UNCTAD

Figure 10 Trend of Average Number of Companies per economy and Average Container-Carrying Capacity Deployed (TEUs) per Company per economy (2004–2015)

The possible direction regarding the measure to address this issue is considered to be development of the APEC Gateway Port Connectivity aimed to connect regional seaports, as well as seaports and their hinterland areas.

3) Cost Issue for Port Infrastructure

The Cost Issue for Port Infrastructure is another issue relevant to the issue of Port Congestion. In addition to the trend of introducing mega container vessels into the maritime transportation which widening the gap between ports with mega-ship accommodating capability and those without this capability, the difference in the reaction of government bodies worldwide is creating an uneven playing field for port upgrading. An example of this is that the subsidized dredging programs launched by the governments of some economies are providing their ports with cost advantage over those do not enjoy this kind of privilege.

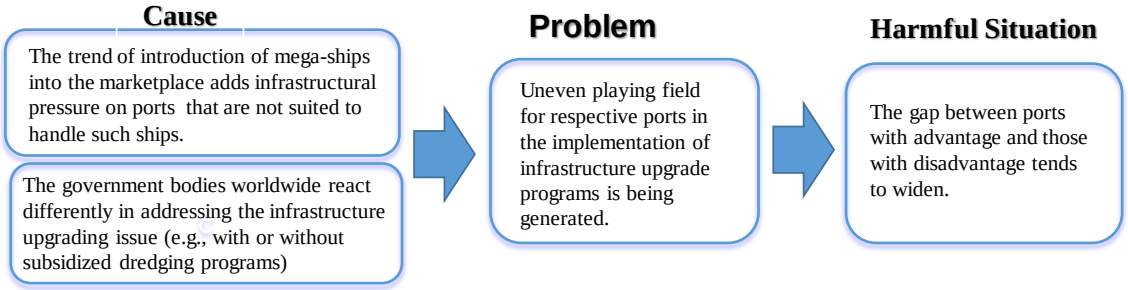


Figure 11　Cause-and-Effect Relation Regarding the Cost Issue for Port Infrastructure

One of the effective measures to address this issue is thought to be promotion of infrastructure investment through Public-Private Partnership (PPP), which is expected to be able to make up for the gap between ports with and without government subsidy.

4)　Soft Side Management Issue for Port Infrastructure

Another factor closely related to the issue of Port Congestion is the difference of labor regimes between economies within APEC, which adversely affects ports' productivity and capacity to implement automation and other productivity incentives.

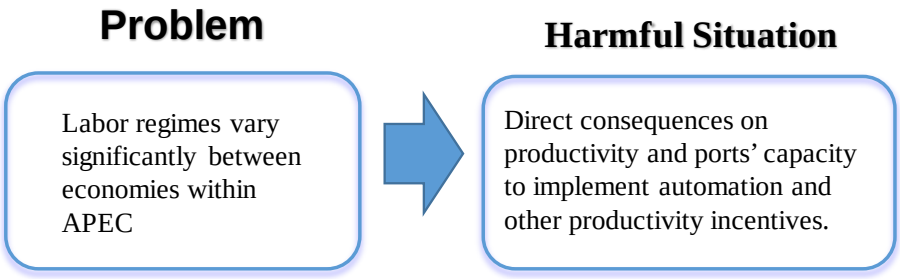


Figure 12　Problem Analysis Regarding the Soft Side Management Issue for Port Infrastructure

Therefore, policy-making on global supply chain is required to address these imbalances in cost bearing. In this regard, inter-governmental policy dialogue and cooperation seems a possible way to solve the problem.

5)　Shipment Information Sharing

As mentioned by respondents from Canada; Hong Kong, China and Australia, one of the key issues impeding the functioning of maritime connectivity is that of the Shipment Information Sharing. The facts cited by the respondents regarding this issue include the following:

- Lack of fluid information exchange between supply chain parties hampering supply chain fluidity and overall competitiveness, because of the absence of comprehensive shipment monitoring information on the part of the port authorities.
- Lack of information on the in-transit location of freight shipment in respect to the end-to-end supply chain visibility
- A common e-platform, and the full inter-connectivity and operability of different economies' platforms across the APEC economies needed to bring material efficiency gains
- Standards for the IT used and document requirements different with each member ecomomy
- Slow progress in the Single Window project

In short, the handicap that the port authorities of respective economies do not possess comprehensive shipment monitoring information gives rise to the current state that information between supply chain parties remains fragmented and inconsistent in APEC region. A typical example of this is the lack of information on the in-transit location of freight shipment. As a result, information becomes scarce once cargo leaves port premises, disallowing a broader view of end-to-end supply chain performance.

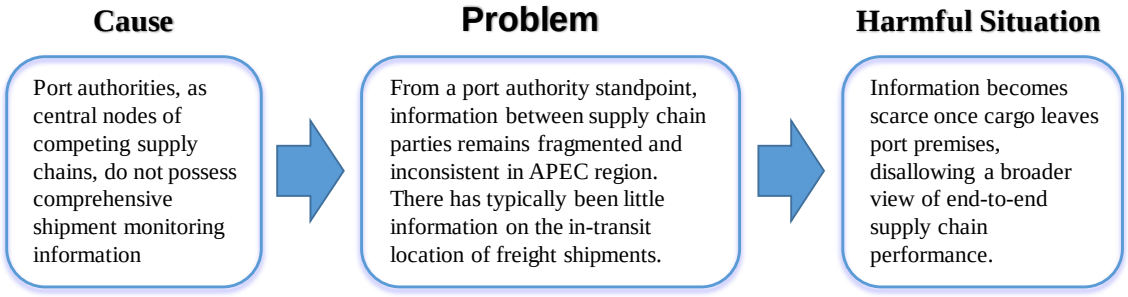


Figure 13 Cause-and-Effect Relation Regarding the Shipment Information Sharing Issue

It is considered advisable to address this issue by continuing the effort to establish the Single Window System in respective APEC member economies and to promote international interoperability and paperless trading between these Single Window systems within APEC.

6) Trade Liberalization and Regulatory Issue

The issue of Trade Liberalization and Regulatory was mentioned by respondents from Canada; Singapore; Thailand and Hong Kong, China, and the essence of the issue is that the current free trade regime for the APEC region is still fragmented.

The possible direction for addressing this issue includes the following suggestions:

- Continuation of efforts in simplifying, unifying and loosening the tariffs/customs regulations for commodity classification needed.
- Harmonization of standards regarding cargo security and safety requirements especially needed.
- Establishment of an APEC region-wide FTA needed for efficient cargo flow throughout the region.

7) Relation with IMO Rule

Issues and challenges facing the APEC economies in their efforts to strengthen maritime connectivity also include the way of adaptation to the regulations established by the International Maritime Organization (IMO). Specifically, “The SOLAS Container Weight Verification

Requirement" and the "Emission Control Areas (ECAs)" have created uncertainty and dilemmas as follows.

In respect to the new weighing rule for containers which came into effect on July 1, 2016, the shippers are urging their governments to clarify how they can meet the requirements of the new rule. Either by weighing a full container or weighing all cargo and adding it to the container's weight, the weighing systems will have to be clarified under the IMO requirements. Uncertainty still reigns over its implementation, but a crucial element remains that of ensuring all economies respect this new regulation. Disobedience of some parts could cause a rise in negotiated rates for the entire supply chain, hampering trade and connectivity, and could impose constraint between all actors of the supply chain.

With regard to the regulation of ECAs, it has created difficult technology-related dilemmas for ports and carriers alike. For carriers, the cost of shipping fluctuates depending on the geography of a port. Carriers and ports have already begun committing to shore power conversion since the regulation was introduced in 2005, which has generated technology uncertainty while placing some regions in cost disadvantage. Moreover, at the environmental level (i.e. policy and enforcement level), inconsistency between APEC economies is being generated.

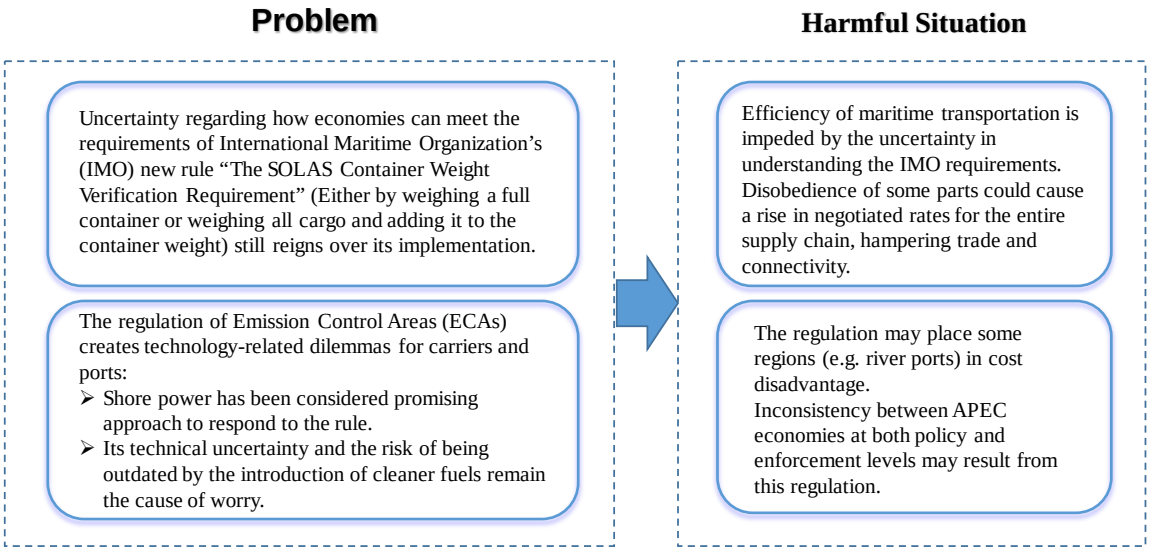


Figure 14 Cause-and-Effect Relation Regarding the Issue of Relation with IMO

The possible solution to the above-mentioned problems seems to be integration of standards in APEC economies. For this purpose, conversations between APEC economies and IMO to reach a conclusion or some arrangement are indispensable.

8) Issue of Travel Facilitation

The issue of Travel Facilitation through promotion of cruise visits to ports within APEC region has been mainly proposed by the Japan in light of the following facts.

On the one hand, the global cruise passengers have witnessed a remarkably increase in the past decades, with the significant growth achieved mainly in the US in the 1970s and a subsequent expansion worldwide especially the increase during the last decade when the number of global cruise passengers doubled from 10 million in 2000 to 19.8 million in 2011; on the other hand, the ratio of cruise passengers to population remains low in that it is currently less than 1% of the population in Europe, less than 4% of that in the US, and not more than 0.06% of that in the APEC region.

As the part of the efforts to address this issue, promotion of cruise ship port calls with an eye to reinvigorating regional economies and human exchange among APEC economies, as well as promotion of web-based information provision regarding cruise port facilities and one stop desk for cruise industry are now in progress.

6. Responses of APEC and Economies

(1) Efforts Made by APEC

The following table summarizes the major efforts made by APEC to address the above-mentioned issues. All of them are discussed and promoted by the Maritime Expert Group (MEG) of TPT-WG, though some of them are initiated by individual APEC economies. Those efforts initiated by APEC economies will be dealt with in details in the subsequent section.

Table 7 Efforts Made by APEC to Address the Issues Relevant to Maritime Connectivity

Issues	Efforts/Actions	APEC Organizations
Port Congestion	● Discussion of achievements related to the connectivity goals (a presentation entitled "Alleviating Traffic Congestion around Container Terminal" made by OCDI) ● Promotion of Regional Economic Integration by Developing APEC Gateway Port Connectivity	● Maritime Expert Group (MEG) of TPT-WG
Information Sharing	● Discussion about Port EDI system (Single Window) and NEAL-NET ● Asia-Pacific Model E-port Network (APMEN) ● Hong Kong Intra-Asia Supply Chain Visibility Pilot	● MEG of TPT-WG ● CTI ● MEG of TPT-WG
Travel Facilitation	● Promoting Cruise Visits to Ports within APEC Region	● MEG of TPT-WG
Trade Liberalization and Regulation	● Efforts to achieve the liberalization of transportation services and to enhance the safety of APEC transport systems to encourage economic development in the Asia-Pacific region.	● MEG of TPT-WG
Relation with IMO Rule	● Collaborating with IMO on a series of joint national maritime security workshops in the region during 2015 and 2016, on topics ranging from drills and exercises mandated under IMO's International Ship and Port Facility Security Code (ISPS Code) to self-assessment and audit	● MEG of TPT-WG

Source: Various APEC documents

(2) Efforts Made by Respective Economies

1) Australia

The initiatives taken by the Australian government to address the issues of Landside Logistics and Shipment Information Sharing are “Facilitation of the Use of Rail to Manage the Container Traffic” as indicated in the table below.

In light of the limited capacity to upgrade connecting road infrastructure for ports, the Australian government is aiming to facilitate the use of rail to manage the movement of container traffic through its key role in the development of the Moorebank Intermodal Terminal through the initiative of “Facilitation of the Use of Rail to Manage the Container Traffic”. The background for the taking of this initiative is that the efficient landside movement of shipping containers is considered to be tested by rising congestion occurring within and around Australia’s major container ports, due to increases in passenger and freight traffic and growing freight volumes. The evidence for this is the report delivered by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) stating that each of Australia’s five major container ports have experienced increased truck-turnaround times of around 13% to 35% over the last five years.

Table 8 Efforts Made by Australia to Address the Issues Relevant to Maritime Connectivity

Name of Initiative/Project	Target Issue	Outline
Facilitation of the Use of Rail to Manage the Container Traffic	Landside Logistics	Purpose of the Project: ➢ Facilitating the use of rail to manage the movement of container traffic through its key role in the development of the Moorebank intermodal Terminal in Sydney.

Source: Answer sheet of questionnaire provided by the Australian government

2) China

In China, example of effort made to promote Shipment Information Sharing is found in the initiative taken by the Qingdao Port known as “Strategic Cooperation between Port and IT/E-Commerce Company Alibaba”.

On June 12, 2016, the Qingdao Port International Co., Ltd. Signed a strategic cooperation memorandum with the IT/E- Commerce giant Alibaba Group to confirm their cooperation in the following three aspects: a) constructing the Qingdao Port Cloud, b) starting Cross-border E-commerce, and c) conducting Internet finance and supplies purchasing.

In the aspect of cloud construction, Qingdao Port will utilize the Alibaba Cloud’s advantages of cloud computing and big data. In cross-border e-commerce business, the parties integrate these businesses involving in payment, warehousing, logistics and custom clearance, to achieve the integration of the Qingdao Port Logistics Platform and Alibaba E-commerce Platform. In Internet business, the two sides will cooperate in Qingdao Port Internet Financial Comprehensive Service Platform construction and electronic payment and financing. In addition, they will achieve the

connection between Qingdao Port Purchasing System and Alibaba E-commerce Platform to improve the convenience of supplies purchasing and commodity diversity.

This initiative is expected to set the trend among ports in China for allying with IT company in promoting the introduction of information technology into the port management and operation system so as to improve shipment information sharing.

Besides, China also takes the initiative in promoting the Asia-Pacific Model E-Port Network (APMEN) with a view to addressing the issue of shipment information sharing through providing successful E-port frameworks to help APEC economies implement their Single Window programs.

3) Hong Kong, China

The initiative taken by Hong Kong, China is the project entitled “Hong Kong Intra-Asia Supply Chain Visibility Pilot”. The pilot project was sponsored by Hong Kong Logistics Development Council to examine economical, operational, and technical feasibility of exchanging data and information among stakeholders along the supply chain.

Results identified through implementation of the pilot project includes the following three points:

- The sharing of data with existing equipment of different economies can be achieved through standards for data exchange.
- Further cost reduction for cross-border Supply Chain Visibility can be achieved by interoperable equipment.
- In addition to standards, mutual recognition and agreed operational procedures will facilitate cross- border Supply Chain Visibility, especially for transshipment certification process.

The conclusion drawn from the results of the project is that, with standards, cross-border supply chain visibility is technically feasible, and cross-border supply chain visibility will help address APEC Supply Chain Connectivity chokepoints No.8, “Lack of regional cross-border customs-transit arrangement”.

4) Japan

Actions taken by Japan to address issues relevant to maritime connectivity are outlined in the following table.

The initiatives of “Port Electronic Data Interchange (EDI)” and “North East Asha Logistics Information Service Network (NEAL-NET)” have been taken to address the issue of Shipment Information Sharing. The EDI initiative was reported to have achieved the effect of reducing the time and cost in preparing the complicated documents and submitting them to different agencies with different system and enabling the shipment information sharing among different agencies so as to speed up the port administrative procedures.

The measure of introducing the equipment of New Container Hanger was aimed at addressing the issues of Landside Logistics and Environmental Regulation altogether, which has demonstrated its advantage of improving the loading/unloading efficiency by excluding the process of marshalling to mitigate the port congestion.

The initiative of Promoting Cruise Visits to Ports within APEC Region was proposed as an APEC project aimed at promoting human exchange and economic revitalization in an environmentally friendly manner.

Table 9 Efforts Made by Japan to Address the Issues Relevant to Maritime Connectivity

Name of Initiative/Project	Target Issue	Outline
Port Electronic Data Interchange (EDI)	Shipment Information Sharing	Major purpose and advantages of EDI: ➢ Reducing the time and cost in preparing the complicated documents and submitting them to different agencies with different system ➢ Enabling the shipment information sharing among different agencies, thus speeding up the port administrative procedures
North East Asia Logistics Information Service Network (NEAL-NET)		Purpose and Contents of NEAL-NET: ➢ Sharing of container logistics information among Japan, China and Korea ➢ Connecting Japan's system "Colins", China's system "LOD-INK" and Korea's system "SP-IDC" together to provide integrated service
Introduction of New Container Hanger	Landside Logistics and Environmental Regulation	Purpose and advantage of the new equipment: ➢ Contributing to the improvement of loading /unloading efficiency by excluding the process of marshalling to mitigate the port congestion
Promoting Cruise Visits to Ports within APEC Region	Travel Facilitation	Purpose of the Project: ➢ Promoting human exchange and economic revitalization in an environmentally friendly manner by encouraging the visit of cruising vessels to ports with the regions of APEC in collaboration with IAPH

Source: Various APEC documents and documents of MLIT of Japan

5) Singapore

In Singapore, the following two projects are conducted to address the issues of landside logistics, environmental regulation as well as information sharing relevant to maritime connectivity as outlined in the table below.

As one of the key projects of PSA's on-going program to develop innovative and cutting-edge technology solutions for its existing terminal operation, as well as the future Tuas Terminal, the first one listed in the table below is conducted to introduce 22 new Automated Guided Vehicles (AGV) to transport containers between the quay side and the container yard completely without human drivers. The new AGVs will be battery-powered for zero-emission operations in the port area, utilizing state-of-the-art navigation systems,

As another key project of above-mentioned program, the second one seeks to invest in and

nurture start-ups that are keen to create innovative logistics solutions fusing information and communications technology including IoT (Internet of Things), cloud, data analytics, AI (Artificial Intelligence) and optimization, as well as engineering solutions including robotics and automation in container and cargo handling operations, and transaction solutions for the maritime trade and finance ecosystems.

Table 10 Efforts Made by Singapore to Address the Issues Relevant to Maritime Connectivity

Name of Initiative/Project	Target Issue	Outline
Automated Guided Vehicle (AGV) system	Landside Logistics and Environmental Regulation	Purpose of the Project: ➢ Introducing 22 new Automated Guided Vehicles (AGV) to transport containers between the quay side and the container yard completely without human drivers. ➢ Powering the vehicles with battery for zero-emission operations in the port area, utilizing state-of-the-art navigation systems.
PSA unboxed Incubator program	Landside Logistics and Shipment Information Sharing	Purpose of the Project: ➢ Seeking to invest in and nurture start-ups that are keen to create innovative logistics solutions fusing information and communications technology including IoT (Internet of Things), cloud, data analytics, AI (Artificial Intelligence) and optimization, as well as engineering solutions including robotics and automation in container and cargo handling operations, and transaction solutions for the maritime trade and finance ecosystems.

Source: "News Release" by PSA Singapore, 20 June, 2016, and "News Release" by PSA International, 9 May, 2016

6) The Philippines

In the case of the Philippines, two examples of measures taken by the local governments in response to the needs to deal with the problems relevant to maritime connectivity are worthy of mentioning.

The first example is the measure of Lifting of Truck Ban taken against the background that the City Government of Manila imposed a truck ban from February 24 to the end of May in 2014, which had caused severe port and road congestion. In light of the adverse effects, the City Government of Manila announced the lifting of the truck ban in September the same year, thus bringing the port congestion back to the normal situation.

The second example concerns the program formulated by the Cebu Port Authority as explained in the presentation entitled "Redefining Cebu's Port Usage a Boon to Tourism and Lasting Solution in Anticipating Port/City Traffic Congestion" given by its General Manager at the International and Intelligent Transport System Experts Group (IIEG) Meeting in Tokyo, Japan, October 11-13, 2010. The background and purpose of the program are described as follows:

In anticipation of the upcoming traffic congestion in both the port and the city, the Cebu Port

Authority propose the plan to relocate major port activities to an alternative site as a lasting solution to the port congestion problem, and meanwhile convert the land-use of the existing facilities into a business/commercial area with tourism-oriented facilities.

Table 11 Efforts Made by The Philippines to Address the Issues Relevant to Maritime Connectivity

Name of Initiative/Project	Target Issue	Outline
Lifting of Truck Ban	Landside Logistics	Purpose of the Project: ➢ In light of the port and road congestion caused by truck ban imposed by the City Government of Manila from February 24 to the end of May in 2014, Lifting the truck ban to bring the port congestion back to the normal level
Redefining Cebu's Port Usage a Boon to Tourism and Lasting Solution in Anticipating Port/City Traffic Congestion	Port Congestion and Tourism Promotion	Purpose of the Program ➢ Relocating major port activities to an alternative site as a lasting solution in anticipation of port/city traffic congestion. ➢ Converting the land-use of the existing facilities into a business/commercial area with tourism-oriented facilities.

Source: 1. "Manila Ports Less Congestion Now, Says Ports Agency" from Rappler.com

2. Presentation by Cebu Port Authority at International and Intelligent Transport System Experts Group (IIEG) Meeting, Tokyo, Japan, October 11-13, 2010

7. Possible Directions Identified

Regarding the issues and challenges faced by APEC economies in the process of developing maritime connectivity, the possible directions for addressing these issues and challenges are identified as outlined below, which are intended to be the recommendations for APEC and APEC economies.

(1) Port Congestion

The possible directions for solving the four problems assumed to be the causes of the Port Congestion issue are identified as the following:

1) Landside Logistics

- Enhancement of interagency coordination including creation of an interagency committee that composed of relevant government agencies
- Adoption of highly efficient port facilities to improve productivity and efficiency of port operation
- Development of intermodal facilities, especially introduction of railway system to improve the landside logistics capacity

2) Scale of Port

- Development of the APEC Gateway Port Connectivity aimed to connect regional seaports,

as well as seaports and their hinterland areas

3) Cost issue for port infrastructure

- Promoting Infrastructure Investment through Public‐Private Partnership (PPP) to make up for the gap between ports with and without government subsidy

4) Soft Side Management Issue for Port Infrastructure

- Facilitating inter-governmental policy dialogue and cooperation to address the imbalances between economies within APEC in cost bearing

(2) Shipment Information Sharing

Continuing the effort to establish the Single Window System in respective APEC member economies and to promote international interoperability and paperless trading between these Single Window systems within APEC is considered the fundamental way to address the issue of Shipment Information Sharing.

(3) Trade Liberalization and Regulation Issue

With regard to the issue of Trade Liberalization and Regulation, the following suggestions contain some of the desirable solutions:

- Continuation of efforts in simplifying, unifying and loosening the tariffs/customs regulations for commodity classification
- Harmonization of standards regarding cargo security and safety requirements
- Establishment of an APEC region-wide FTA needed for efficient cargo flow throughout the region

(4) Issue of Travel Facilitation

The possible direction for addressing the issue of Travel Facilitation includes the following two aspects:

- Promotion of cruise ship port calls to reinvigorate regional economies and human exchange
- Promotion of web-based information provision regarding cruise port facilities and one stop desk for cruise industry

(5) Relation with IMO Rule

The possible way to deal with the problems arising in relation with IMO rule is considered to be the integration of standards in APEC economies. For this purpose, conversations between APEC

economies and IMO to reach a conclusion or some arrangement are indispensable.

8. Concluding Remarks

This study has enabled us to identify and summarize the above findings as some of the possible directions for the economies' beneficial reference.

It can be said that APEC economies' past and ongoing efforts are very much valuable as they have greatly contributed to the efficiency and effectiveness on the APEC region's economic growth.

But at the same time, through the analysis of these challenges brought up by economies and ABAC on this project, it has been shown that efforts to deal with these challenges are still in the process of being made mainly by each economy individually and even now these challenges remain to be the major bottlenecks in the development of maritime transportation in respective economies. In many cases, the APEC economies are struggling to solve these challenges by themselves respectively.

The development of GVCs is becoming a dominant feature of the global economy and the establishment of efficient and workable GVCs is becoming a common value shared by the APEC economies and a focus of their policies. One important approach to facilitating efficient and effective operation of maritime transportation and shipments is to promote cross-fora collaboration between economies, which will definitely contribute to strengthening the maritime connectivity development in the APEC region through establishment of efficient and workable GVCs.

Some valuable efforts to accelerate the progress of maritime connectivity through collaboration between economies have already been going on, but it is more important to create an environment together with many opportunities for collaboration and knowledge sharing between economies.

APEC itself is a desirable platform to enable the regional economies to help each other. It is vital for APEC to explore further the future vision of maritime connectivity based on the results of a comprehensive analysis on the existing issues and challenges.