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Connectivity and Trade Performance: Concept and Its Evidence from APEC Economies

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Connectivity and Trade Performance: Concept and Its Evidence from APEC Economies ☆

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Abstract

Connectivity is one of the specific agenda in APEC summit 2013 in Indonesia. Physical connectivity is one of the pillars among three pillar of connectivity. Infrastructures are very important to facilitate connectivity, namely logistics. This paper is aimed at (i) exploring the relation between logistics (both domestic and international logistics) and trade performance by using gravity model; (ii) developing the logistics cost index (Domestic Logistics Cost Index and International Logistics Cost Index) which is based on economic logic of gravity model; (iii) showing the empirical evidence of the relation between the export performance and the new logistics cost index in APEC economies; (iv) Understanding the selected case of cross border and inside the border connectivity development including its challenges. Some interesting findings are shown in the following: First, the extension of gravity model shows that logistics that consist of domestic and international logistics have positive relation with the improvement trade performance. Second, both of the new logistics index has a positive relation with the export performance in APEC economies; Third, by using the new logistic indices, it could be shown that the improvement of logistics condition of one country/economy in APEC tend to increase the export performance of the economy/country and in the same time it will increase the export of the other APEC economies to that country. Fourth, there are progress and challenges in the development of the infrastructures that support logistics in Indonesia.

JEL Classifications: F1, F4

Keywords: Domestic Logistics Cost, International Logistic Cost, Export Performance, APEC Economies, Indonesia

1. Introduction

One of the APEC specific agenda in 2013 is connectivity that emphasizes connectivity in

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terms of physical connectivity, institution connectivity and people to people connectivity. Even though there are three pillars of connectivity, physical connectivity is very important to support economic integration. This paper is aimed at addressing the importance of connectivity toward the economic integration in APEC economies.

Toward a better economic integration, physical connectivity should be at the centre of the stage. Our current trend shows that to integrate our economy with the world and regional economy, joining the global value chain is a must, not only for large enterprises but also including SMEs (Small and Medium Enterprises). Necessary condition in taking advantage in value chains is having a better connectivity.

Let us move to closer look on what is physical connectivity. Connectivity should be supported by a better logistics. The core factors that become the backbones of logistics are physical infrastructures.

This paper is addressing several objectives: first, developing common understanding of the role of the logistics in the economic integration by providing theoretical development from the existing theory; Second, developing index of logistics and showing the relation with the economic integration in APEC economies; and Third, providing novelty of the existing and planning of physical connectivity in the APEC region, especially in Indonesia.

2. APEC and Logistics: Some Important Notes

Most of the analyst of APEC shows that the golden years of APEC were in 1989-1997 that have achieved many progress: big influence in the conclusion of Uruguay Round, the Bogor Goals, Osaka Action Agenda, and Its Action Plans.

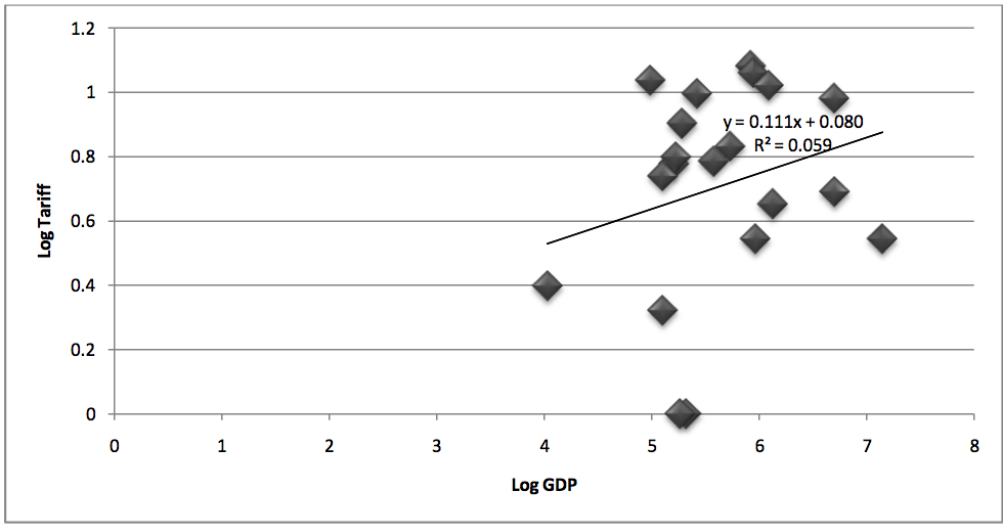
To give one of the examples of the comparison between the golden years and the years after 1997 in the multilateral liberalization achievement could be seen from the statement of the APEC Leaders in AELM. Since 2005 in Busan (South Korea), the APEC Economic Leaders Meeting (AELM) statement has put annex of the urgency to conclude the DDA (Doha Development Agenda); however, those statements are not as powerful as the statement of AELM in 1993 because until now the DDA has no significant progress, while in 1993 the statement of the urgency of the completion of Uruguay Round (UR) in AELM 1, Washington, Seattle, USA concluded the Uruguay Round as stated below:

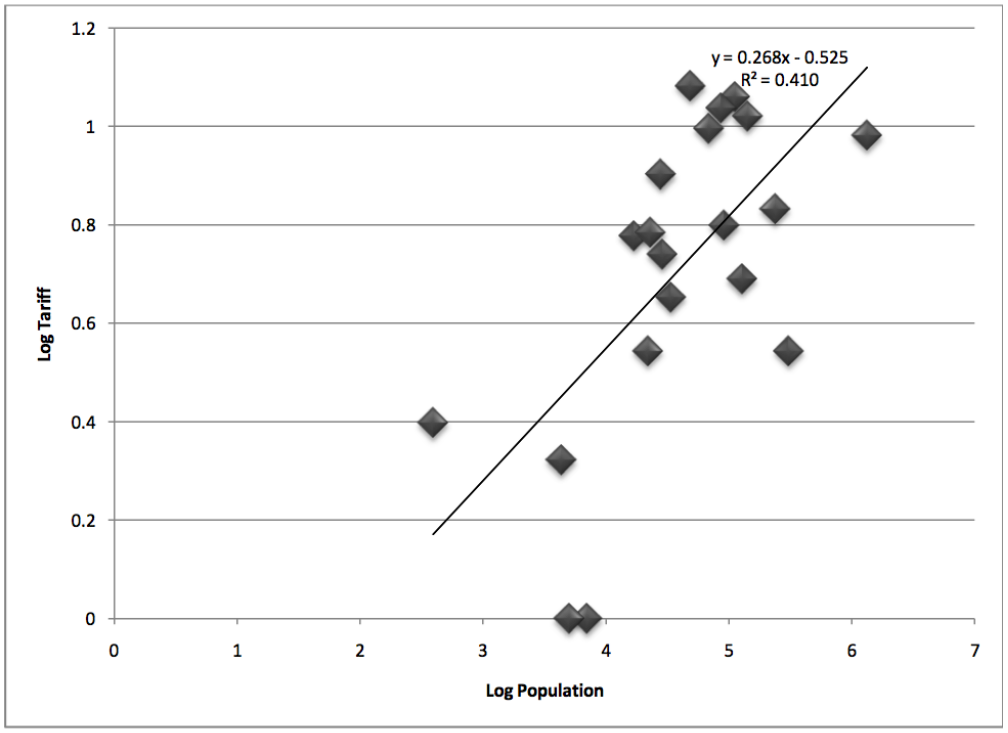
> "The foundation of our economic growth has been the open multilateral trading system. Therefore, we pledge our utmost efforts to bring the Uruguay Round to a successful conclusion by December 15. We are determined the Asia Pacific region will lead the way in taking concrete steps to produce the strongest possible outcome in Geneva. Increased participation by APEC economies in a strengthened GATT system also will facilitate greater regional cooperation(AELM Statement, Washington, Seattle, USA, page 1) ."

In the next AELM, according to the AELM statement in 1994 (Bogor, Indonesia), APEC claimed that it has a vital role in the successful of Uruguay Round in 1994 as mentioned in the following statement:

> "We are pleased to note the significant contribution APEC made in bringing about a successful conclusion of the Uruguay Round. We agree to carry out our Uruguay Round commitments fully and without delay and call on all participants in the Uruguay Round to do the same.(AELM, November 15, 1994, Bogor, Indonesia, page 1). "

Figure 1: Size (GDP,Population) vs. Simple Average Tariff





Source: APEC Statistics, processed. Downloaded from http://www.apec.org, April 3, 2012

Since the Uruguay Round concluded, the development of the multilateral trading system, namely Doha Round, has no significant progress. One of the main explanations could be from political economy of protection which shows that the multi interest of the domestic market of each economy (at least some of the economies) which oppose the further multilateral liberalization[1]. If the political economy were the main reasons of the protectionism, there will be a positive relation between the higher the size of the economy (GDP) or the population with the level of the protection. The figure above is showing the relation between GDP and average tariff and also between Population and average tariff in APEC economies.

In international trade theory, at least there are two barriers of the flow of goods and services: transportation (logistics in broader term) and tariff/non tariff barrier (policy). It seems that further liberalization in term of tariff reduction is probably has achieved its limit but the commitment to this liberalization are must be encouraged or at least keeping this achievement from the threat of protectionism with standstill principle in APEC.

It is now the time to improve another medium of the integration on increasing the flow of goods and services (also capital and people) through the increasing logistics performance. APEC has urged the important of the logistics through on what so-called trade facilitation since its establishment, especially since the Osaka Action Agenda stated in AELM 3, 1995, in Osaka, Japan.

APEC has put a special concern on the logistics in improving the flow of goods, services, capital, and people through the trade and investment facilitation activities. The general statements that have relation with the logistics could be seen in the Appendix 1 based on AELM 1993-2011. Most of the statements are linked to statement about trade facilitations, transportation, and communication.

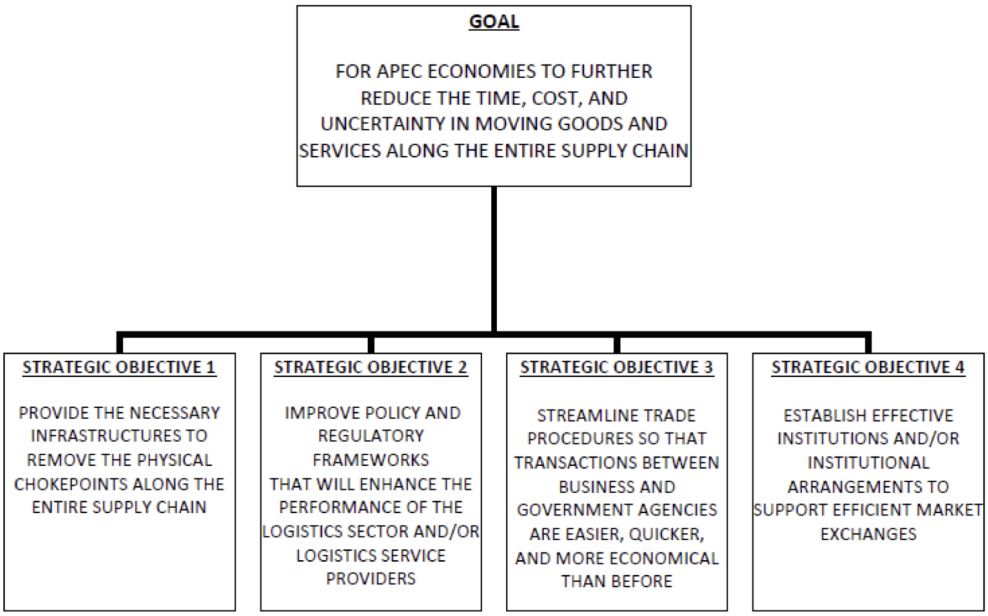
The statements of the AELM that have direct relations with the logistics are ranged from transportation, custom, telecommunication, supply-chain, to the security of maritime, aviation, and land transportation. The specific issues on the statement of the APEC ministerial meetings about transportation and telecommunication could be seen in the Appendix 2 and Appendix 3.

APEC Secretariat through Policy Support Unit (PSU) has started to analyze the logistics cost in relation with supply chain since 2009. Several publications of the PSU to understand the current condition of the logistics in APEC economies could be summarized as follows.

First, the PSU (2009a) has tried to outline the evolution of logistics into its current comprehensive supply chain focus which is basically focusing in logistics. Second, PSU (2009b) in A Results-oriented approach to APECs Supply Chain Connectivity Initiative (SCI) highlight the following formula of goals and strategy of APEC economies. Third, PSU (2010) in The Economic Impact of Enhanced Multimodal Connectivity in the APEC Region APEC Policy Support Unit has shown that "Performance of individual transport modes and logistics, as well as overall multimodal transport performance, have a robust and significant association with stronger trade relations". Fourth, PSU (2011) in APECs Achievements in Trade Facilitation 2007-2010: Final Assessment of Second Trade Facilitation Action Plan (TFAP II) has shown that the Data from the World Banks Trading Across Borders indicators reveal that there has been a 5% reduction in total trade transaction costs across the APEC region over the period of TFAP II, which resulted in total savings of USD 58.7 billion.

[1] In the other front, the progress of regional and bilateral trading blocs have increased their role in further liberalization of some economies; however, these kind of liberalization has negative impacts of the non-member, especially on what so-called trade diversion which lead to the world inefficiency.

Figure 2: Goals and Strategic Objectives of APEC in (Logistic Costs and) Supply Chain



Source: PSU (2009b)

3. Conceptual Framework: Relation between Logistics Performance and Trade

3.1. The economic logic of gravity model and the logistics cost

One of the best models in predicting the trade volume is the gravity model which is based on the work of Newton in Physics. This model has been modified into economic logic. In the simple model, the "flow" of goods from one place to another place is depend positively on the "mass" of the two places/economy, but negatively relation with the "distance" of the those places. This simple model has been used in showing the flow of goods (export and import), the flow of factor of production (for example: FDI and labor migration), and the flow of people (Tourism). The interpretation of the mass is reflecting the capacity of those two economies, the greater of the capacity the higher of the flow of something between them while the distance is reflecting the cost/barrier that has the opposite direction.

In this paper, the focus of our analysis is from export side as shown in the equation below:

$$X_{ij} = Y_i Y_j / D_{ij} \tag{1}$$

Xij = Export from economy/region/country i to j[2] ; Yi = Output of country i (push factor/supply side of export i to j); Yj = Output of country j (pull factor/demand side of export i to j or demand factor of import j from i); and D_{ij} = Distance (economic cost or economic distance or international economic cost) of exported goods from i to j. Equation 1 shows that there is positive relation between export flows and both of the output in i and j, while there is negative relation with the economic distance.

$$Y_i = f(K_i, N_i, A_i) \tag{2}$$

[2]In this paper, we treat economy, region, or country as the economic entity and they have the same meaning. This treatment is also applied to the whole part of this paper/study

K_i = Capital Stock of country/economy i; N_i = Number of Labor of country i; A_i = Productivity/Technological Progress of country i;

$$A_i = f(L_i, H_i); (\delta Y_i/\delta A_i)(\delta A_i/\delta L_i) < 0 \quad (3)$$

Li = Domestic Logistics cost of country/economy i; H_i = Human capital of country i. Equation 3 emphasize that productivity in economy i is affected by domestic human capital and its domestic logistics cost of origin i. furthermore, this equation shows that the improvement of the domestic logistics performance of origin will improve the productivity of the economy of origin i or improve the capacity to supply the world (export).

$$Y_j = f(K_j, N_j, A_j) \quad (4)$$

K_j = Capital Stock of country j; N_j = Number of Labor of country j; A_j = Productivity/Technological Progress of country j.

$$A_j = f(L_j, H_j); (\delta Y_j/\delta A_j)(\delta A_j/\delta L_j) < 0 \quad (5)$$

L_j = Domestic Logistics cost of country/economy j; H_j = Human capital of country/economy j. Equation 5 emphasize that productivity in economy j is affected by domestic human capital and its domestic logistic cost of destination j. In addition, this equation shows that better logistics performance of economy j will improve the productivity of the destination economy j and improve the capacity to the world demand (import).

$$\begin{aligned} D_{ij} = f(P_i/P_j, T_{ij}, \text{and} L_{ij}); \\ \delta D_{ij}/\delta(P_i/P_j) > 0; \\ \delta D_{ij}/|\delta T_{ij} > 0; \delta D_{ij}/\delta L_{ij} > 0 \end{aligned} \quad (6)$$

D_{ij} = Distance (international trade cost) of exported goods from i to j depend on of P_i/P_j = Relative price of the exported goods in i relatively in j. There is a positive relation between relative price and distance and it means that there is a negative relation between the relative price and the flow of goods from i to j; T_{ij} = Nominal import tariff of exported goods from i to j that is seen from importer j. There is a positive relation between tariff and the economic distance or there is negative relation between the tariffs and the flow of goods from i to j; and L_{ij} = Logistic cost of exported goods from origin i to destination j or so-called international logistic cost. To emphasize the role of logistics, it is shown that the improvement of international logistics from i to j will improve the export performance from i to j. Moreover, the flow of the imported goods is just the mirror of export flow and the relations are the same that the better performance of domestic logistic cost and international logistic cost will improve the import.

3.2. Logistics cost and the flow of bilateral trade

The equation 3, 5, and 6 above are showing the relation of the tariffs and logistics with exporting goods from i to j. Some conclusions are: first, the import tariffs of j country have a negative and direct relation with the export from i to j; second, the domestic logistics cost in both country has a negative and indirect relation with the export from i to j. It means the lower domestic cost in both countries will make them more productive and increase their capacity as push and pull factor. Third, the international logistic cost between i and j has a direct negative relation of the flowing exporting goods from i to j. The question then, how the worlds deal with those three important factors? The first factor is very famous in the international economics especially when we discuss with the trade policy: tariff. Sometimes the non tariff barriers are also included in this tariff as tariff equivalent. Tariff barriers have been reduced significantly since the establishment of WTO (World Trade Organization)[3].

[3]There are three steps that have been developed to attack this barrier: first, multilateral negotiation through GATT (later becomes WTO); second, since the multilateral negotiation has no much progress, some countries/economies developed regional negotia-

The second factor is not as famous as the tariff and it does not directly affect the flow of goods and services. International trade theory does not discus domestic logistics cost. Furthermore, negotiation among economies/countries do not include this factor explicitly in the first time because this is the domestic problem or behind the border; however, this domestic logistics cost are now realized as the important factor to be explored to boost the trade, especially export.

The third factor is very famous in the international trade theory but sometimes ignored for the sake of the simplicity: international logistic cost. This is the part of the at the border barrier which is not easy to be reduced in the short run because it must include the role of the economies of scale of the traded goods. The economies of scale of the trade will push the demand for the improvement at the border logistic or at the point of exit and entry such as international seaport and airport.

Based on the framework above this paper is moving to answer this following question: do the domestic and international logistics cost have correlation with the bilateral flow of goods and services between Indonesia and each APEC economies? This paper will find the relation between the volume of the trade flow between Indonesia and each APEC economies with the logistic cost both the domestic (origin and destination) and international logistics cost. The more detail steps are: (i) Developing new logistics indices based on the simple logic of gravity model that is developed above. This index is needed to address the empirical evidence of the relation between the logistics performance and the trade. This paper is specifically separated the domestics and international logistics cost both in theoretical and empirical analysis. (ii) Showing the relation between the new indices of logistics (domestic and international) and the international trade of APEC economies

This paper will analyze the relation between the cost of logistics and exported goods in the bilateral trade in APEC economies. Logistics cost will be divided into domestic logistic cost of origin country (L_i), the logistics cost of destination country (L_j) and international logistics cost (L_{ij}). The following figure could be used to see the role of logistics in exported goods from country i to j (X_{ij}). Even though this framework is set for exported goods and services, it could also be used for imported of goods and services analysis as the mirror or from the destination country perspectives. The construction of logistics index is based on the simple gravity model logic as explained above.

This paper will employ the data base of the World Bank about infrastructure indicators. The data are also taken from bilateral trade data between Indonesia and each APEC partner from UNCOMTRADE through APEC STATISTICS of APEC website. This is an alternative index to evaluate the logistics performance which is different from LPI (Logistics Performance Index)[4]. The steps are shown in the following:

tion. Most of the multilateral negotiation is based on the regional grouping and closer regionally; third, to compete further, some economies/countries develop bilateral negotiations. Some of those negotiations are more than only trade liberalization such is including factor of production or even as economic union. This factor which part of the at the border barriers has showing many progress. The reduction of tariff barriers has rapid progress since the establishment of the WTO and probably the limit has been met to explore the reduction of this barrier. One of the indicators is the Doha Development Agenda (DDA) has no significant progress. As shown in the introduction above that political economy is one of the important reasons why most countries reluctant to conclude the Doha Round.

[4]World Bank (2011):The Logistics Performance Index is based on a worldwide survey of operators on the ground (global freight forwarders and express carriers), providing feedback on the logistics friendliness of the countries in which they operate and those with which they trade. They combine in-depth knowledge of the countries in which they operate with informed qualitative assessments of other countries with which they trade, and experience of global logistics environment. The LPI consists therefore

First, this paper will select the infrastructure indicators from the World Bank data base that could be included into two categories of logistics: logistics cost each domestic economy and international logistics cost of each economy. The division of domestic and international logistics is based on the common sense and data availability. There will be two set of logistics cost which consist of infrastructure indicators.

Second, the selected of logistic cost indicators will be composed into two new composite indicators of logistics: domestic logistics cost index and international logistics cost index. The weighted of the indicators are based on common sense which one is more important for domestic and international logistics.

Third, finding the relation of the flow of export volume and the new indicators of logistics will be applied in APEC economies.

4. Construction of DLI and ILI : Process and Result

The selected indicators of DLI (Domestic Logistics Index) and ILI (International Logistics Index) are chosen based on two constraints: the availability of the data in the WDI (World Development Indicators) and the proper indicators that could reflect the performance of the logistics index[5]. The DLI is based on logistics infrastructure, especially the infrastructure that supports the domestic economy activity or inside the border (see Appendix 4), while the ILI is based on indicators that reflect the border infrastructure and international connection or based on at the border and beyond (see Appendix 5).

The table above shows us that there are 9 indicators that will be used in the index construction. Some process that reduces the number economies/countries from 195 in the WDI into only 60 economies/countries that meet the criteria: first, some countries/economies that have all the complete data (9 indicators) in 2010 are directly included; second, some countries/economies that have only 5 complete indicators in 2010 are used by adjustment: using the incomplete indicators from the year closest to the 2010 but not later than 10 years[6]. The result of the 60 economies/countries index is shown in the table below:

The DLI and ILI index are ranged from 1 to 5 to make this index is used the same scale of LPI (Logistics Performance Index)[7]. Some interesting findings are: first, the lowest perfor-

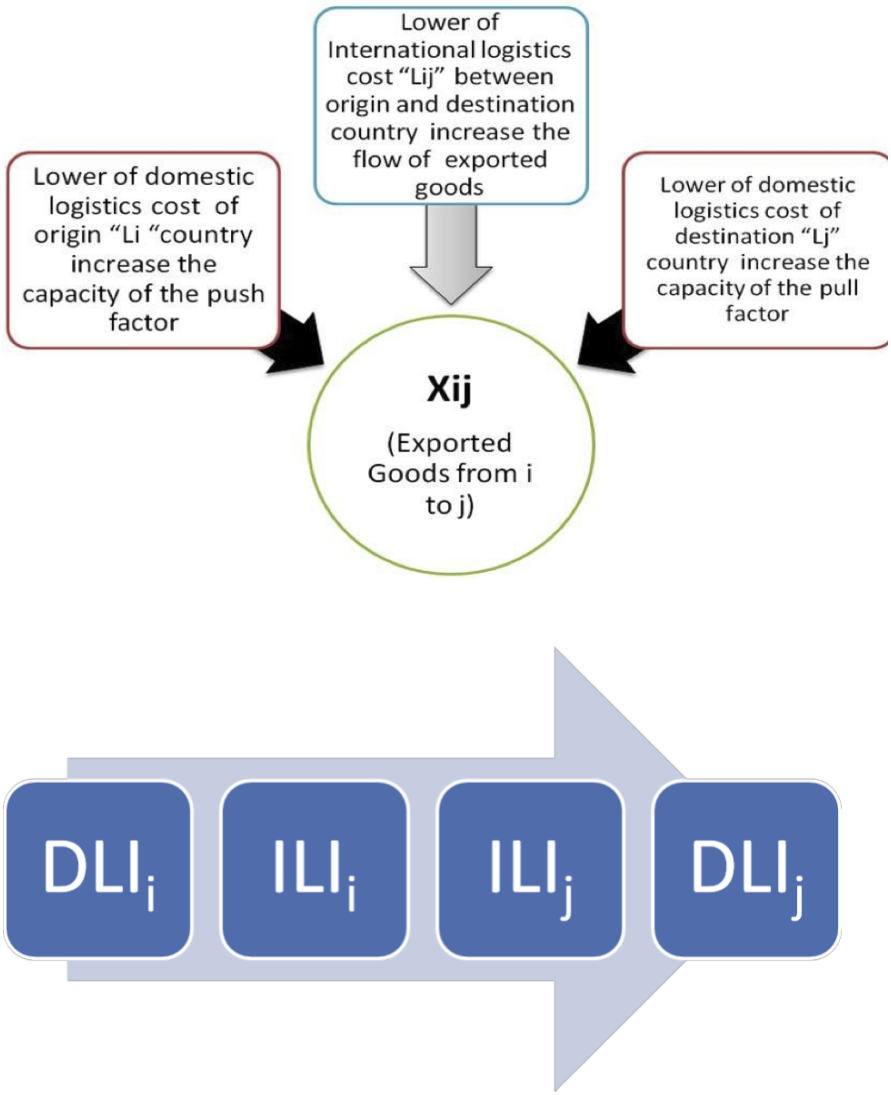
of both qualitative and quantitative measures and helps build profiles of logistics friendliness for these countries. It measures performance along the logistics supply chain within a country and offers two different perspectives: International and Domestic. LPI consist of Efficiency of the customs clearance process; Quality of trade and transport-related infrastructure; Ease of arranging competitively priced shipments; Competence and quality of logistics services; Ability to track and trace consignments; Frequency with which shipments reach the consignee within the scheduled or expected time. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTTLF/0,,contentMDK:21514122~menuPK:3875957~pagePK:210058~piPK:210062~theSitePK:515434,00.html, downloaded December 22, 2011.

[5]The division of domestic and international logistics could not be separated perfectly because there are so many overlapping between the domestic and international logistics; however, the separation as shown in the tabel could be one of the first steps to analyze from these perspectives. The reason is more pragmatic that the data constructions are based on the available data only. The sources of data are taken from the WDI (World Development Indicators).

[6]Some indicators such as paved roads tend to be stagnant from year to year data. For example, if the data in 2010 is not available, but the paved road in 2008 is 80%, it is assumed that in 2010, this data could be used in 2010. This treatment is based on the data in most countries that this kind of indicator tends to be stable around 5-10 years. As additional information, Hong Kong and Singapore do not have the railways data and it is assumed to be 0.

[7]To composite into domestic and international logistics cost, some of the following steps are taken: First, all indicators are set to have a positive relation with the increasing of the logistics performance. The data setting will be based on data availability and the judgment

Figure 3: The Role of Logistics in the Movement of Goods X from Origin (i) to the Destination (j)



Notes: Xij= exported goods from origin(i) to destination (j); Li = Logistics Cost of Origin; Lj= Logistics Cost of Destination; Lij = Logistics Cost from i to j; DLIi = Domestic Logistic Index in country/economy I (origin); ILIi = International Logistics Index from country/economy i (origin);DLIj=Domestic Logistic Index to country/economy j (destination); ILIj = International Logistics Index in country/economy j (destination)

Table 1: Indicators of and Its Share in DLI and ILI

Indicators of DLI	Share
Roads, paved (% of total roads)	0.45
Road sector energy consumption (% of total energy consumption)	0.3
Quality of port infrastructure (underdeveloped=1, developed=7)	0.1
Railways, goods transported (million ton-km)	0.05
Telephone lines (per 100 people)	0.05
Internet users (per 100 people)	0.05
Total	1
Indicator of ILI	Share
Liner shipping connectivity index	0.3
Container port traffic (TEU: 20 foot equivalent units)	0.3
Quality of port infrastructure (underdeveloped=1, developed=7)	0.2
Burden of customs procedure, (1=extremely inefficient to 7=extremely efficient)	0.1
Telephone lines (per 100 people)	0.05
Internet users (per 100 people)	0.05
Total	1

Source:

mance for DLI is Cote d'Ivoire and the lowest ILI is Venezuela; second, the highest performance of DLI is Ireland and ILI is China; third, the average of DLI of APEC is lower than the average of 60 economies, while the average of ILI of APEC is higher than the average of 60 economies.

There are some interesting findings from APEC economies as shown in the Figure above: first, even China has the highest ILI, its DLI is very low; second, on the average level, both DLI and ILI of developing economies in APEC is lower than the developed economies.

DLI of APEC economies as shown in the figures show that the highest DLI is the US and the lowest is Philippines. The APEC economies that show above average of APEC DLI are US, Singapore, Hong Kong, New Zealand, Thailand, Malaysia, South Korea, and Japan, while below average are Russian Federation, Mexico, Canada, Peru, China, Vietnam, Chile, Indonesia, and Philippines.

ILI of APEC economies tend to show the pattern as following: first, China has the highest index while Philippines is the lowest one; second, China, Hong Kong, Singapore, US, South Korea, Malaysia, Japan, Canada are economies that have higher ILI than the average of APEC ILI while New Zealand, Chile, Thailand, Mexico, Vietnam, Indonesia, Russian Federation, Peru and Philippines are lower than average of ILI.

Both of the figures above have shown us that the order of the DLI and ILI are not the same or we can say that the logistics for domestics is sometimes do not in-line with the logistics for international trade. The domestic logistics support the capacity of production (both for domestic consumption and also to be exported) and demand of the foreign goods/services (im-

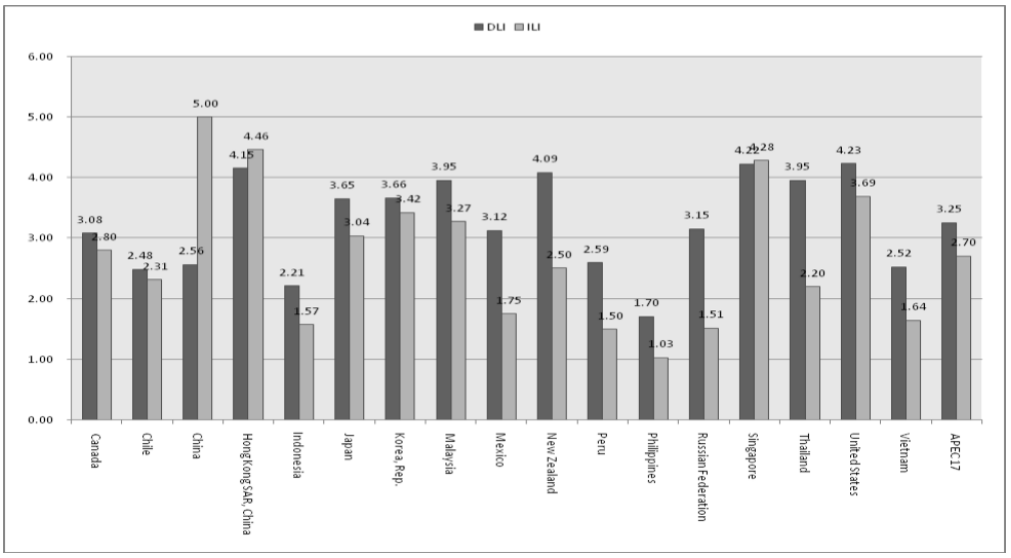
of the authors. This index will be based on the following formula= $(((Xi-Xmin)/(Xmax-Xmin))x4+1)$. The range of the index is from 1 to 5. The reason of this range is this new index will be compared to the LPI which has the range from 1 to 5. Second, each the indicator will be given weight based on the prior information and common sense. Furthermore, the domestic and international logistics indicators will be re-indexing with the same formula above. The formula = $(((Xi - Xmin)/(Xmax - Xmin))x4 + 1)$. The range of the index is from 1 to 5. The reason of this range is this new index will be compared to the LPI which has the range from 1 to 5.

Table 2: DLI and ILI of Sixty Economies/Countries, 2010

No	Country/Economy	DLI	ILI	No	Country/Economy	DLI	ILI
1	Algeria	3.14	1.32	33	Morocco	3.705	2.15
2	Argentina	2.473	1.541	34	Netherlands	4.152	3.747
3	Bangladesh	1.129	1.049	35	New Zealand	4.086	2.503
4	Belgium	3.864	3.498	36	Nigeria	1.356	1.116
5	Brazil	2.162	1.522	37	Oman	2.576	2.562
6	Canada	3.078	2.798	38	Pakistan	2.848	1.589
7	Chile	2.483	2.31	39	Panama	2.852	2.516
8	China	2.559	5	40	Peru	2.592	1.496
9	Cote d'Ivoire	1	1.64	41	Philippines	1.704	1.029
10	Croatia	4.084	1.675	42	Poland	3.186	1.66
11	Denmark	4.794	2.763	43	Portugal	4.386	2.347
12	Dominican Rep.	2.903	1.807	44	Romania	2.036	1.325
13	Egypt, Arab Rep.	3.64	2.106	45	Russian Federation	3.147	1.512
14	Finland	3.294	2.497	46	Saudi Arabia	2.521	2.49
15	France	4.363	3.267	47	Singapore	4.224	4.28
16	Germany	4.408	3.777	48	South Africa	1.762	1.945
17	Greece	4.191	1.979	49	Spain	4.671	3.152
18	Honduras	2.501	1.721	50	Sri Lanka	3.721	2.092
19	Hong Kong,Chn	4.152	4.462	51	Sweden	2.733	2.888
20	India	2.148	1.811	52	Syrian Arab Rep.	3.803	1.133
21	Indonesia	2.212	1.569	53	Thailand	3.953	2.197
22	Iran, Islamic Rep.	3.469	1.681	54	Turkey	2.353	1.907
23	Ireland	5	2.098	55	Ukraine	3.275	1.419
24	Israel	4.165	2.211	56	United Arab E.	4.191	3.312
25	Italy	4.334	2.392	57	United Kingdom	4.528	3.356
26	Jamaica	3.209	2.044	58	United States	4.229	3.686
27	Japan	3.65	3.038	59	Venezuela, RB	2.765	1
28	Korea, Rep.	3.66	3.421	60	Vietnam	2.524	1.642
29	Kuwait	3.525	1.602		Min (1.00)	Cote d'	Venezuela
30	Malaysia	3.953	3.273		Max (5.00)	Ireland	China
31	Malta	4.39	2.672		Average (All)	3.282	2.306
32	Mexico	3.125	1.751		Average (APEC 17)	3.255	2.704

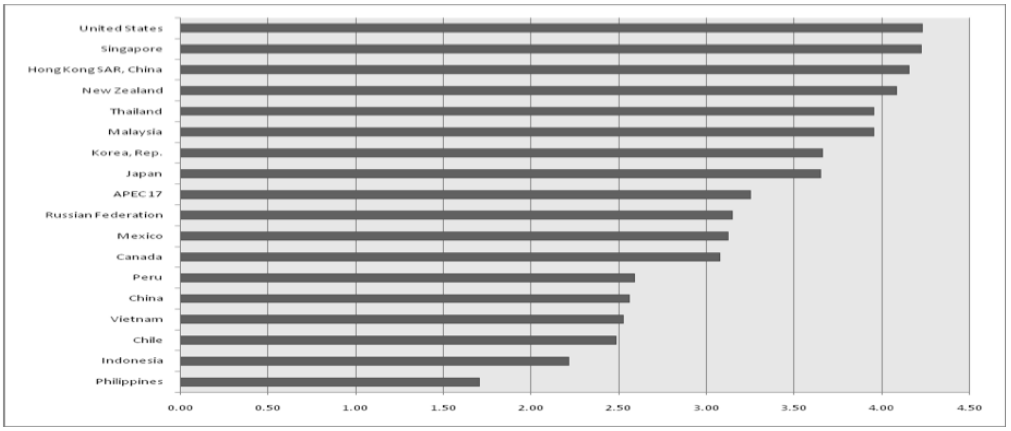
Source: WDI, processed, downloaded from http://www.worldbank.org on December 22, 2011

Figure 4: DLI and ILI of APEC Economies



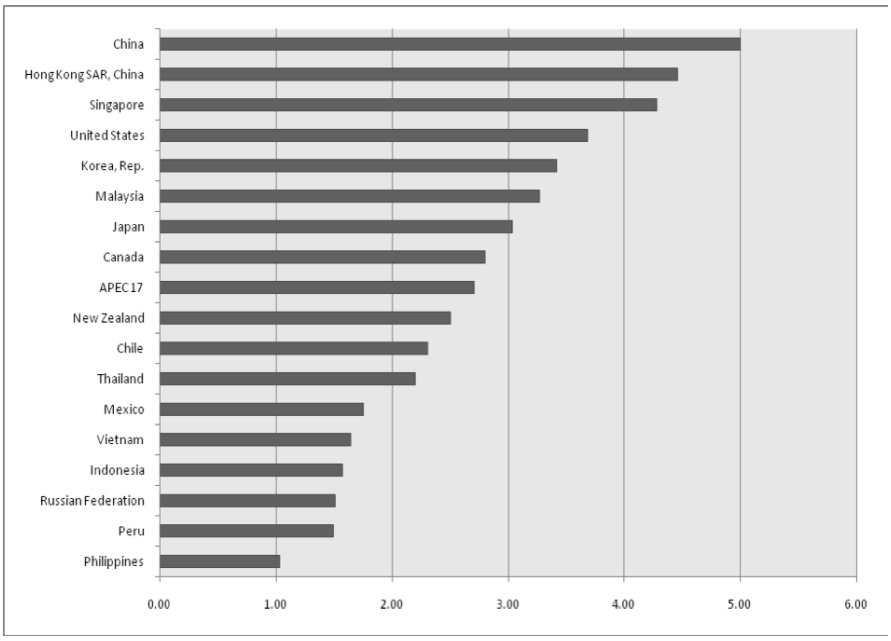
Source: WDI, processed, downloaded from http://www.worldbank.org on December 22, 2011

Figure 5: Order of DLI of 17 APEC Economies



Source: WDI, processed, downloaded from http://www.worldbank.org on December 22, 2011

Figure 6: Order of ILI of 17 APEC Economies



Source: WDI, processed, downloaded from http://www.worldbank.org on December 22, 2011

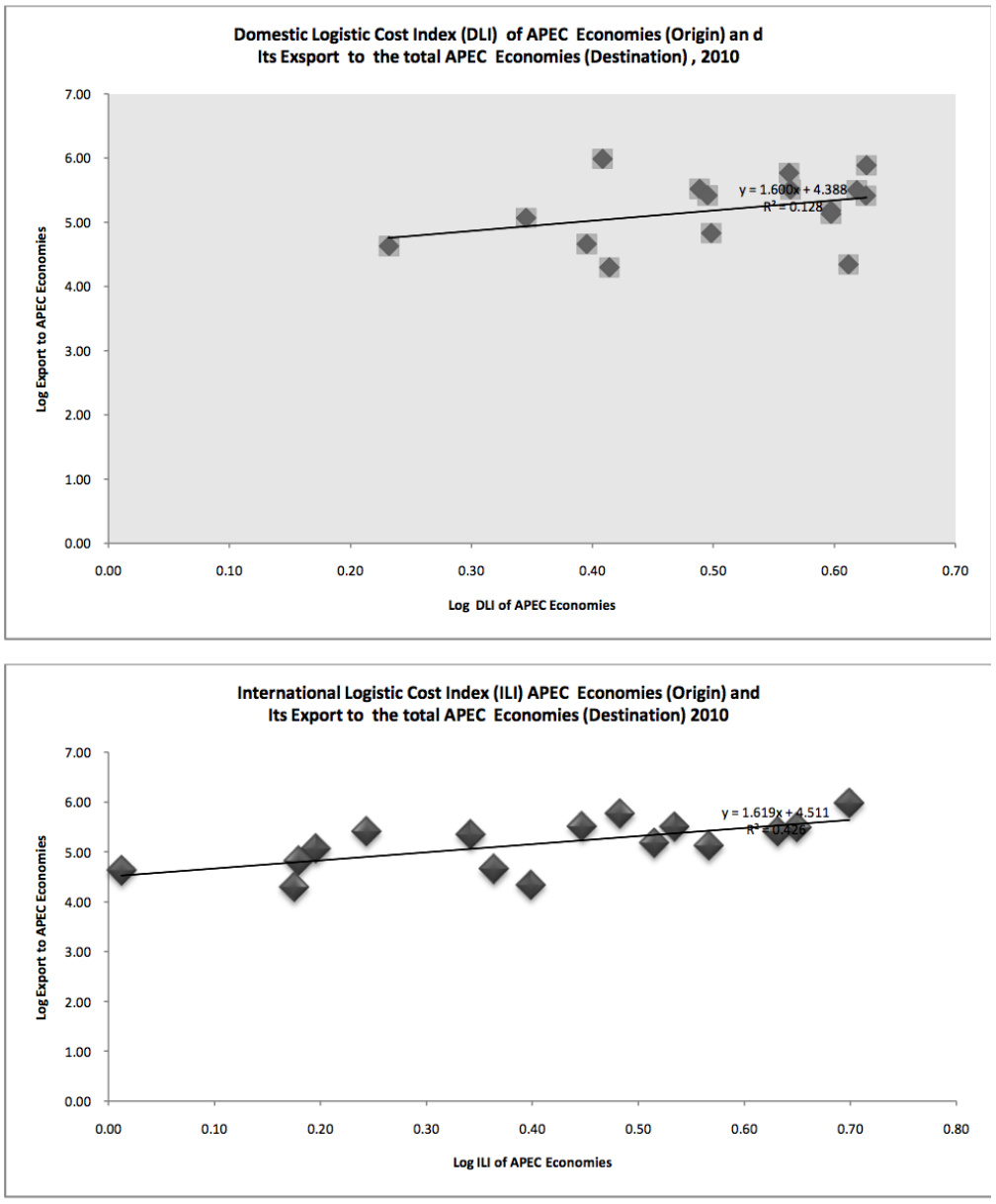
ported), while the international logistics support the capacity of the movement of the goods/services between/among economies (exported and imported). To give an illustration of the domestics and international logistics role, we could see this index of China and US. Chinese economy has the highest ILI in APEC to support the capacity of the movement of goods/services, while only in 13th position in DLI to support the production (or export, indirectly) and demand of foreign good (import). In contrast, the US economy has the highest DLI to support the production (or export, indirectly) and demand of foreign goods/services (import) while only in 4th position to support the capacity of the movement of goods/services. This illustration is supported by the fact that the Chinese trade is higher than the US, but US domestic economy is higher than China.

5. Trade and Logistics Performance in APEC

As explained in the gravity model framework that the movement of the goods/services from the origin to destination should through for logistics components: domestics logistic of origin country (DLIi), international logistics of origin country (ILIi), domestic logistics of destination country (DLIj), and international logistics of destination countries (ILIj).

To find out the relation between export and those components, this study divide the figure into four parts: first, the relation between the DLI of origin economies in APEC to the total export to APEC; second, the relation between the ILI of origin economies to the total export to APEC; third, the relation between the bilateral export of Indonesia into APEC and the DLI of the destination APEC economies; and fourth, the relation between the bilateral export of Indonesia and the ILI of the destination APEC economies.

Figure 7: DLI and ILI of APEC Economies and Their Total Export to APEC, 2010



Source: WDI (World Development Indicators), processed, downloaded from http://www.worldbank.org on December 22, 2011; and APEC Statistics, processed, from Bilateral Trade Linkage, downloaded from http://www.apec.org on December 22, 2011.

All figures shows that the DLIi, ILIi, DLIj, and ILIj have a positive relation with the export both seen from origin and destination countries/economies.

From four relationships above, we could also show that the development of the logistics in APEC economies will not only improve the export performance of the country/economies but also provide opportunity for other economies to increase their export performance in APEC.

6. Infrastructure Impediments in Indonesia.

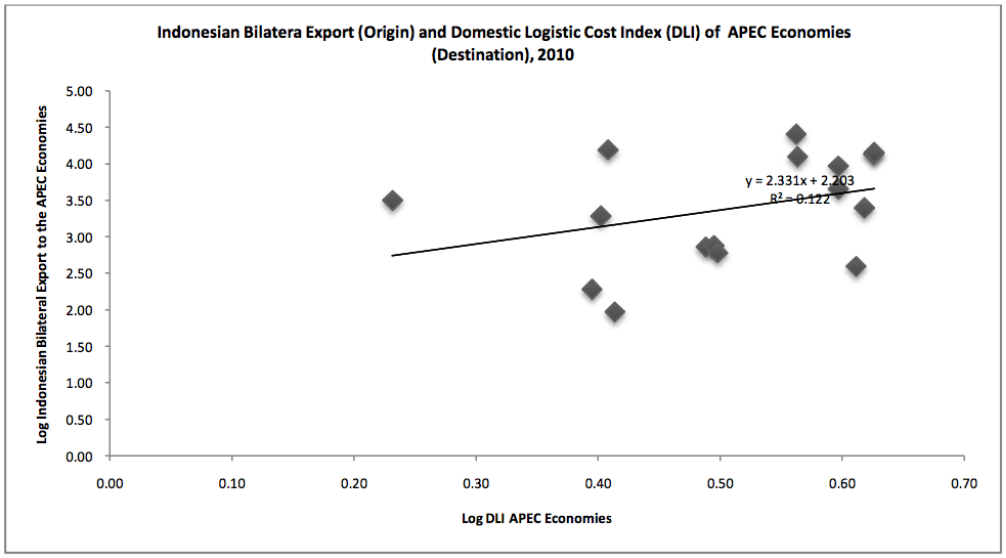
Several studies and surveys have shown that Indonesia should face the problem of logistics infrastructure to integrate its economy with the global production and distribution network, for example: (1) Study of LPEM FEUI and JBIC (2005) has shown that the logistic cost in Indonesia is around 14.8%, which is very high compared to Japan for example (4.88%) and the source of inefficiency is the infrastructure, especially road and port; (2) Study of LPEM FEUI, The Asia Foundation, and the World Bank (2008) shows that the road quality and topography is one of the most important impediments in Indonesia trucking industry. (3) Survey of World Bank in Doing Business shows that Indonesia Doing Business in the rank 128 which shows lower pwerformance compared to several ASEAN neighbor. (4) The Logistics Performance Index (LPI) in 2012 is lower than the other ASEAN country such as Philippines, Thailand, and Malaysia. It is even lower than the average of East Asia and Pacific.

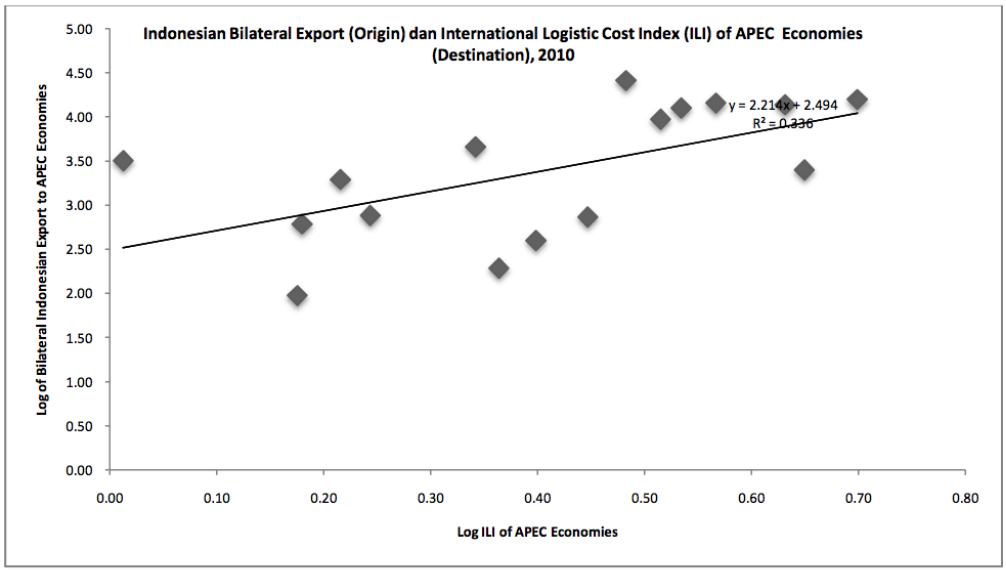
Asian connectivity, especially land transportation, has been started since 1959. UNESCAP (United Nations Economic and Social Commission of Asia and the Pacific) have defined what linkages should receive priority under the Asian Highway (AH) network (Including TAR-Trans-Asian Railway-and others)[8]. There are two main infrastructure developments: standardized Asian Highway (AH) that involves 32 Asian countries including Indonesia and Trans-Asian Railway that involve 28 Asian countries. The AH has been investing US $ 26 billion to upgrade and improve the AH but the investment needed US $ 18 billion remain. Indonesia AH including AH 2 (Java and Bali Island Network) and AH 25 (Sumatra Network). The connectivity by regional ASEAN and sub regional such as Sijori (Singapore-Johor-Riau) and BIMP-EGA (Brunei-Indonesia-Malaysia-Philippines Economic Growth Area) have also important role in the connectivity in Asia.

Selected infrastructure data comparison between Indonesia and selected countries shows that infrastructure of Indonesia in road, internet, sanitation facilities, and electricity are still below China, Malaysia, and Japan. However if we see from the series data 2000-2011, from those indicators, only paved road that shows fluctuation while internet, sanitation facilities, and electricity rend to be improved from the available data. Data of Indonesia investment in infrastructure from 1990-2011 has shown that the infrastructure development has a correlation with the economic condition (economic growth). In general, during the golden years of growth (1990-1996) the growth of infrastructure investment, especially the transport tend to be high while during the economic crisis, especially 1997-2000 tend to be negative both total and transport. However, during the period 1993-2011 telecommunication infrastructure development tend to be exist each year. During 1997-2011, the development of transport infrastructure becomes worse, while the

[8] (1) capital-to-capital links for international transport; (2) connections to main industrial and agricultural centers as well as growth triangles and zones (links to important origin and destination points); (3) connections to major sea and river ports (integration of land and water transport networks); and (4) connections to major container terminals and depots (integration of road and rail networks). Source: http://www.unescap.org/jecf/p06highway.htm#ESCAP'sRoleandAchievements

Figure 8: Indonesian Export to APEC Economies and DLI and ILI of APEC Economies, 2010





Source: WDI (World Development Indicators), processed, downloaded from http://www.worldbank.org on December 22, 2011; and APEC Statistics, processed, from Bilateral Trade Linkage, downloaded from http://www.apec.org on December 22, 2011.

Table 3: Infrastructure of Indonesia and Selected Asian Countries 2009

Indicator Name	Indonesia	China	Malaysia	Japan
GDP growth (annual %)	4.6	9.2	-1.5	-5.5
GNI per capita, Atlas method (current US$)	2160	3620	7550	37580
Roads, paved (% of total roads)	56.9	53.5	80.9	78.2
Internet users (per 100 people)	6.9	28.9	55.9	78
Improved sanitation facilities (% of pop. access)	54	63	96	100
Electric power consumption (kWh per capita)	597.1	2632.8	3911.9	7838

Source: World Bank, World Development Indicators.(http://www.worldbank.org) Date: 06/05/2013

telecommunication is improved during the period. The long series of Indonesia data 1981-2011 has shown that there is a tendency correlation between the economic growth and the current account balance[9]. During the golden years of growth in mid 1990s, the current account tend to be negative which reflect the higher import of the capital goods which including the import of capital goods related to the infrastructure development. Since the time of the crises 1997/1998, the tendency of current account is positive while the growth is stagnant. However, according to The Economist survey in 2013, Indonesia is one of the favorite countries to be invested in 2013 after China and India.

Indonesia has prioritized several activities to accelerate its development for 2011-2025. Those activities are from various sector such as agriculture, mining, industry, and two specific areas (Jabodetabek and Sunda Straits Strategic Area). Total activities are 22 plus infrastructures[10].

Jabodetabek is Greater Jakarta which consists of 3 Provinces: Jakarta, West Jawa, and Banten. This area contributes around 50-60% of Indonesia FDI location in Indonesia or around 80-90% of the Java Island FDI. Sunda Straits Strategic Area, especially Java Sunda Straits Bridge, is connecting two biggest economies in Indonesia: Java Island and Sumatera Island. Java contributes 60% of Indonesian economy and Sumatra consists of 20% of Indonesian economy. The bridge development will connect 80% Indonesian economy.

The AH contributes on the development of the connection in Java-Bali and Sumatra Island and MP3I (Indonesia Masterplan for Acceleration and Expansion of Indonesia Economic development 2011-2015) contribute further to the 6 economic corridors: Java, Sumatra, Kalimantan, Sulawesi, Bali-Nusa Tenggara, and Papua-Maluku.

The total identified cost for the MP3I is Rp 4,012 Trillion or around US $ 400 Billion. It consist Rp2,226 Trillion for main activities and Rp 1,786 Trillion for infrastructure. The infrastructures consist of road, seaport, power and energy, airport, railway, water, ICT, and others. Power and energy, road, and railway are the three largest priorities. As information, even though the MP3I divide= the main activities and infrastructure, some of the part in activities including infrastructure. Each activity will be developed through development of regulation/policies, human resource development, technology, and connectivity. Activities in Jabodetabek (Rp 352 Triillion or USD 35 Billion) and Sunda Strait Strategic Area (Rp150 Trillion or US $ 15 Billion) are mostly involving infrastructure development; for ex-

[9]The data could be retrieved from WDI (World Development Indicators) of the World Bank

[10]For further information, see: Coordinating Ministry For Economic Affairs, Republic of Indonesia, 2011, Masterplan for Acceleration and Expansion of Indonesia Economic Development 2011-2025.

Table 4: Investment of Infrastructure in Indonesia 1990-2011

Year	Transport	Telecom	Water&Sew.	Energy	Total	Growth (%)
1990	116	-	-	-	116	
1991	11	-	-	-	11	-91
1992	115	-	-	137	252	2229
1993	352	250	-	-	602	139
1994	27	1249	-	596	1871	211
1995	503	1804	200	2470	4977	166
1996	-	3694	-	3204	6898	39
1997	-	1511	123	2725	4359	-37
1998	-	579	632	330	1541	-65
1999	1028	1260	-	125	2413	57
2000	-	642	-	-	642	-73
2001	-	1421	37	-	1458	127
2002	-	1322	-	188	1509	4
2003	-	940	-	829	1769	17
2004	159	895	8	158	1220	-31
2005	-	1338	-	106	1444	18
2006	372	1676	20	611	2679	86
2007	1140	3517	-	305	4961	85
2008	-	2876	-	2863	5739	16
2009	220	1833	-	-	2053	-64
2010	-	1108	-	2300	3408	66
2011	-	813	-	35	848	-75
Total	4041	28726	1020	16981	50768	
Average	184	1306	46	772	577	134

*in current US$ millions. "-" is zero or less than US $ 1 million. Source: World Bank and PPIAF, PPI Project Database. (http://ppi.worldbank.org) Date: 06/05/2013

ample Jabodetabek including MRT and Port development while Sunda Strait Strategy will including Java Sunda Sumatra Straits Bridge development. And it is expected the financing around US $ 400 could be from private (51%), Government (10%), SOE (18%), and Others/Mix (21%).

7. Challenges of Infrastructure Development in Indonesia

Indonesia has acknowledge that the development of infrastructure is very important for economic integration both domestic and international perspectives; however, there are several challenges that should be faced in order to drive the development in infrastructures, especially financing, budget process, land acquisition, institution and its coordination, and its social impacts.

(1) Financing Scheme. Asian AH, TAR, and MP3EI (also ASEAN and Sub Regional Cooperation) have an important role for Asia and APEC connectivity, especially physical connectivity. The problem is how the APEC economies and Indonesia financing the infrastructure. The data shows that AH connectivity still need US $ 18 billion. And Indonesia development acceleration need US $ 400 billion and around more than 50% is allocated for connectivity (infrastructures).

One of the strategies for this financing gap problem is Public-Private Partnership. The government issued Presidential Regulation No

56/2011 to support this. It is followed by MOF (Ministry of Finance) regulation 223/2013. MP3EI is expected could be financed by private around 51% and GOI is only 10%. (2) Budget Process. Infrastructure problems, especially which is financed by the government budget (central, province, and local) has stronger challenges during the decentralization. The budget allocation (and also infrastructure development budget) must involve stronger role of parliament (central, province, and local) and civil society (including NGO).

(3) Problems in land acquisition. Land acquisition problem become stronger since the democratization in Indonesia. Some infrastructure projects, for example Jakarta MRT, should deal with this condition. The government has issued Presidential Regulation No 7/2012 to increase the capability in land acquisition for public interest. This regulation has been challenged by civil society.

(4) Institution. The institution role is challenged in implementing the infrastructure development, especially when dealing with PPP. We had two summits for infrastructure in the past, but the project implementation/execution is less than expected. And one of the reasons is the follow up of the summit by the institution needed is less than expected.

(5) Social Impacts. The social impacts of the infrastructure development are also needed to be addressed since started. For example, the Java Sunda Straits Bridge development should consider how to give benefits or at least lower the negative impact on the current/existing economic activities in inter-island connector such as RO-RO etc, because the bridge could substitute their services.

This bridge is very important to connect two biggest island economies in Indonesia (Java and Sumatra contribute 80% of Indonesian economy). And it is also connect Asia through AH. The identified investment will consist of US $ 15-20. This special area development has been instructed through Presidential Regulation No 86/2011 and the development should be started by 2014. The investment of this JSS will use PPP scheme.

8. Conclusion and Policy Recommendation

There are several conclusions from this study. First, this study shows that the gravity model could help us to understand the role of the logistics cost in the trade performance of each economies.Second, from the domestic economy, the increasing logistics performance will improve the economic capacity and in the same time will increase the competitiveness of its export Third, the construction of logistics index in this study is quite convincing because the result shows that in average, the developed economies tend to be have higher index than the developing economies Fourth, based on simple statistics, it is shown that the logistic index (domestic logistics and international logistics of origin and destination economies) have a positive relation with the trade performance of the origin and destination economies. Fifth, the development of logistics one economy in APEC, as focused in this study, will increase the trade performance of both that economy and all APEC economies. Sixth, there are progress and challenges in the development of the infrastructures that support logistics in Indonesia Policy recommendation from this study are: first, APEC economies, especially Indonesia, should focus on the developing both of their domestic and international logistics as the first priority policy to improve trade performance; second, APEC economies, especially Indonesia, should develop domestic and international logistic index to be evaluated yearly which is based on the both objective and subjective data that available for all APEC economies.

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Table 1. AELM Statement and Relevant Statement for Logistics

No	AELM	Important General Statement	Relevant for Logistics
1	**Seattle, Washington, US, Nov 20 1993**	**Vision Statement**. "Recognizing our economic interdependence as well as economic diversity, we envision of community of Asia Pacific economies" (p.1)	"advances in telecommunication and transportation shrink time and distance barriers in our region and link our economies so that goods and people move quickly and efficiently" (p.1)
2	**Bogor, Indonesia, Nov 15 1994**	**Declaration of Common Resolve**. "industrialized economies achieving the goal of free and open trade and investment no later than the year 2010 and developing economies no later than the year 2020" (Bogor Goals). (p.2)	"we emphasize the important of trade facilitation because the trade liberalization effort alone are insufficient to generate trade expansion" (p.2)
3	**Osaka, Japan, November 19,1995**	**Declaration for Action**. "The Osaka Action Agenda (OAA) is the template for future APEC work toward our common goals. It represents three pillars of trade and investment liberalization, their facilitation, and economic and technical cooperation. Achieving sustained economic development throughout the APEC region depends on pursuing action in each of these areas vigorously" (p.1)	"….,in our collective actions including harmonizing and enhancing the efficiency of customs procedures and promoting mutual recognition and improving conformity assessment capabilities will yield immediate and tangible benefits for business." (p.2)
4	**Subic, Republic of the Philippines, 25 November 1996**	**From Vision to Action**. "MAPA (Manila Action Plan for APEC) contains the first step of an evolutionary process of progressive and comprehensive trade and investment liberalization toward achieving our Bogor Goals by 2010/2020, in accordance with Osaka Agenda."(p.1)	"Lack of infrastructure severely constraints sustained growth. Since public finance cannot fully meet the enormous requirement of the region, private sector investment must be mobilized. Providing the appropriate financial, economic, commercial, and regulatory environment is the key to stimulating such investments" (p.3)
5	**Vancouver, Canada, 25 November 1997**	**Connecting the APEC Community**. "We endorse the agreement of our ministers that action should be taken with respect to early voluntarily liberalization in 15 sectors (EVSL), with nine to be advanced throughout 1998 with a view to implementation beginning in 1999" (p.2)	"The Blueprint for APEC Customs Modernization, which puts forward a comprehensive program to harmonize and simplify customs clearances by the year 2000, provide a model." (p.2) "We endorse the attached Vancouver Framework for Enhanced Public-Private Partnerships for Infrastructure Development." (p.4)
6	**Kuala Lumpur, Malaysia, 18 November 1998**	**Strengthening the foundation for growth.** "We are firmly resolve strengthen social safety nets, financial systems individually and globally, trade and investment flows, the scientific and technological base, human resource development, economic infrastructure, and business and commercial links so as to provide the base and set the pace for sustained growth into 21st century."(p.5)	"We commend Ministers for formulating the APEC Blueprint For Action On Electronic Commerce containing broad themes and cooperative activities for the promotion and development of electronic commerce in the region." (p.8)
7	**Auckland, New Zealand, September 13, 1999**	**The Auckland Challenge**. "In reconfirming our commitment to achieve the Bogor Goals of free and open trade and investment by 2010/2010, we endorse the	"APEC's trade facilitation programmes are already delivering substantial benefit-in custom harmonization, standards and conformance, and increased mobility of business people.

		attached APEC principles to Enhance Competition and Regulatory Reform. These principles provide a core part of the framework for strengthening our markets which will better integrate individual and collective actions by APEC economies to achieve those goals"(p.1)	We welcome the agreed new initiatives, and instruct Ministers to give priority to this work next year, in consultation with business, and to better communicate the value of APEC's trade facilitation role"(p.2)
8	**Bandar Seri Begawan, Brunei Darussalam, Nov 16 2000**	**Delivering to the Community**. "We understand that in all our economies there are people who have yet to gain the benefits of economic growth, especially in rural and provincial communities. We also appreciate that the many people who have been hard hit by the economic crisis have had their faith in openness severely tested." (p.1)	"We believe the APEC Ecotech Clearing House websites is an important addition to electronic interaction with the community by providing a transparent and ready mechanism to show the effectiveness of our extensive program of economic and technical cooperation" (p.5)
9	**Shanghai, People's Republic of China, October 21 2001**	**Meeting New Challenges in the New Century**. "….We wish to send a clear and strong message on the collective resolve of the Asia-Pacific Community to counter terrorism…" (p.1)	"…,we have made further progress by formulating and delivering a long term, forward-looking and more action-oriented e-APEC strategy for the development of the New Economy through the promotion of information and communication technology (ICT) and its application in our region." (p.3)
10	**Los Cabos, Mexico, October 27 2002**	**Expanding the Benefits of Cooperation for Economic Growth and Development—Implementing the Vision**. "…., it is crucial to strengthen the soundness and efficiency of financial systems, particularly through better credit culture and strengthening of banking supervision, and to continue with broader structural, regulatory and structural reform, which complement open market policies, promote sustained economic growth and good governance, withstand economic shock and create a better business environment for all."(P.2)	"Collectively, we are working in APEC to introduce more effective baggage screening in airports in the region, improve coordination between immigration officials, implement new cyber security standards, advance the energy security initiative to address disruption in energy markets, and enhance anti-piracy cooperation."(p.1,annex of AELM on fighting terrorism & promoting growth; trade facilitation and Secure Trade in APEC Region (STAR))
11	**Bangkok,Thailand, October 20-21 2003**	**A World of Differences: Partnership for the Future**. "Implement the APEC Action Plan on SARS and our Health Security Initiative to help APEC prevent and respond to regional health threats, including naturally-occurring infectious disease and bio-terrorism." (p.2)	"Each economy will ensure that its laws, regulations, and progressively, procedures and administrative rulings of general application respecting matters…are promptly published or otherwise made available, for example through internet,…"
12	**Santiago de Chile, November 20-21 2004**	**Santiago Declaration: "One Community, Our Future"**. "We agreed to launch the Santiago Initiative for Expanded Trade in APEC to complement the achievement of free and open trade in the region. An overarching dimension of the initiative is capacity building so that all economies can implement and	"Steps to advance compliance with the International maritime Organization's on Ship and Port Security Standards through cooperative efforts" (p.3)

		benefit from their work on trade liberalization and facilitation." (p.1)	
13	**Busan, South Korea, November 18-19 2005**	**Busan Declaration: "Toward One Community: Meet the Challenge, Make the Change."** "We show our strong political will in a separate statement, in which we declared our firm support for the WTO Doha Development Agenda (DDA) negotiation to proceed expeditiously so as to achieve an ambitious and overall balanced outcome at the end of the round." (p.1)	"We welcomed new initiatives on the safe handling of and trade……, Total Supply Chain and the APEC framework for the security and Facilitation on Global Trade." (p.3)
14	**Hanoi, Vietnam, November 18 2006**	**Towards a Dynamic Community for Sustainable Development and Prosperity.** "We acknowledge the role of high-quality, consistent, transparent and comprehensive RTAs/FTAs in advancing trade liberalization and the need to ensure that RTAs/FTAs lead to greater trade liberalization and genuine reduction in trade transaction cost." (p.1)	"We also endorse the APEC Port Service Network Initiative to facilitate cooperation and communication among ports and related sectors in APEC member economies" (p.2) "We affirms the significance of Information and Communication Technology (ICT) for APEC's development" (p.2)
15	**Sydney, Australia, September 9 2007**	**"Strengthening Our Community, Building A Sustainable Future".** "We addressed the challenges of climate change, energy security and clean development" (p.1)	"We welcomed APEC's work to address and prevent threats to customs, maritime, aviation, and mass transit sectors…" (p.4)
16	**Lima, Peru, November 22-23 2008**	**"A New Commitment to Asia-Pacific Development".** "The current global financial crisis is one of the most serious economic challenges we have ever faced. We will act quickly and decisively to address the impending global economic slowdown. We welcomed the economic and financial measures to resolve this crisis…" (p.1)	"endorsed the continued process of implementation of APEC's second Trade Facilitation Action Plan (TFAP II) to achieve our stated goal of reducing trade transaction costs by additional five percent between 2007-2010" (p.2)
17	**Singapore, November 14-15 2009**	**"Sustaining Growth, Connecting the Region".** "We will put in place next year a comprehensive long-term growth strategy that supports more balanced growth within and across economies, achieve greater inclusiveness in our societies, sustains our environment, and which seeks to raise our growth potential through innovation and a knowledge-based economy."(p.1)	"We welcome the Supply Chain Connectivity Framework, which has identified eight checkpoints in regional supply chains and suggested actions to address these checkpoints. We welcome the commitment from transport ministers to achieve greater seamlessness in our muti-modal transport networks and call for official s to continue cohesive efforts towards improving supply chain connectivity" (p.4)
18	**Yokohama, Japan, November 13-14 2010**	**"The Yokohama Vision: Bogor and Beyond".** " We seek to develop an APEC community in which trade and investment are freer and more open; supply-chain are better connected; doing business is cheaper, faster, and easier; growth is more balance, inclusive, sustainable, innovative, and secured; and we are better too be able to cope with threats to human	"We commit to address impediments to moving goods and services through Asia Pacific supply-chains by implementing the APEC Supply-Chain Connectivity Framework Action Plan with a view to achieving an APEC-wide target of ten percent improvement in supply-chain performance by 2015."(p.4)

		security and economic activity" (p.2)	
19	**Honolulu, Hawaii, United States, November 12 - 13 Nov 2011**	**"The Honolulu Declaration: Toward a Seamless Regional Economy".** "We meet at a time of uncertainty for the global economy. Growth and job creation have weakened in many economies, and significant downside risks remain, including those arising from the financial challenges in Europe and a succession of natural disasters in our region." (p.1)	"Establish commercially useful de minimis values in our economies that will exempt low-value shipments from customs duties and streamline entry documentation requirements, as a key contribution to our goal of an APEC-wide 10 percent improvement in supply-chain performance by 2015"(p.2)

Source: APEC Economic Leaders Meeting (AELM) Statement from 1993-2011. Downloaded from http://www.apec.org, 2010-2012.

Appendix 2. APEC Ministers Responsible for Transportation dalam Joint Ministerial Statement 1995-2010

No	Year	City	Important Statement
1	13 June 1995	Washington, D.C, AS	The ministers agreed on 12 principles and 8 priorities and action for transportation developments in APEC. The principles are based on integrated, safe, efficient, sustainable transportation infrastructure to support the movement of goods, services and human.
2	22-24 June 1997	Victoria, Canada	Action for APEC transportation: safe and sustainable environment of transportation system, more competitive, infrastructure development, human resource development, and new transport technology.
3	6-9 May 2002	Lima, Peru	Increasing regional cooperation for security, reducing barrier for trade and investment through transportation services liberalization, ecotech, and human resource development.
4	27-29 July 2004	Bali, Indonesia	Trade in the APEC Region (STAR) initiative to build a safe and secure transportation for the movement of goods, services, and people.
5	28-30 March 2007	Adelaide, Australia	1. Transportation role in trade liberalization and facilitation; 2. Transport safety and security
6	2009	Manila, Filipina	1. Providing seamless and environmentally friendly transportation systems through innovation and the use of advanced technology, congestion reduction, enhanced transport safety, security and effective sustainability 2. Priorities for the next two years: Liberalization and Facilitation of Transport Services, Seamless Transportation Systems, Aviation Safety and Security, Land Transport and Mass Transit Safety and Security, Maritime Safety and Security, Sustainable Transport, Industry Involvement, and Information Sharing

Source: ASC UI, Issues Development in APEC 1989-2010, based on APEC Ministers Responsible for Transportation Joint Statements 1994-2010. Downloaded from http://www.apec.org 2010-2012.

Appendix 3. APEC Ministers Responsible for Telecommunication and Information dalam Joint Ministerial Statement 1995-2010

No	Year	City	Important Statement
1	29-30 Mei 1995	Seoul, Korea	1. TI development: technology, network, content, human resource, policy and regulation; 2. Asia Pacific Information Infrastructure (APII) initiative
2	5-6 Sept. 1996	Gold Coast, Australia	1.APII's purpose and principles; 2. Appendix 1: Gold Coast Decalaration (Action Program); 3. Appendix 2: Soul Declaration; 4. Appendix 3: List of Fully Liberalised Telecommunications Services Sector; 5. Appendix 4: Pilot project for APII
3	3-5 June 1998	Singapore	1. Development of Business Facilitation, Development Co-operation, Human Resource Development, Liberalisation, Ministers-Industry Leaders' Dialogue; 2. Appendix 1: Singapore Declaration; 3.Appendix 2: Electronic Commerce; 4. Appendix 3: Universal Access Principles; 5. Appendix 4: APEC Mutual Recognition Arrangement for Conformity Assessment of Telecommunications Equipment.
4	24-26 May 2000	Cancun, Mexico	1. Cancun Declaration; 2. Appendix 1: Action Program TELWG; 3. Appendix 2: APEC Principles on International Charging Arrangements for Internet Services; 4. Appendix 3. APEC Principles of Interconnection
5	29-30 May 2002	Shanghai, China	1. Shanghai Declaration; 2. Appendix 1: Action Program TEL WG; 3. Appendix 2: Statement for Security of Information and Communications Infrastructures
6	1-3 June 2005	Lima, Peru	1.Lima Declaration: Enabling Digital Opportunities: harnessing infrastructures to advance the Information Society; 2. Appendix 1: Program Aksi TEL WG; 3. Appendix 2: Key Principles for Broadband Development In the APEC Region; 4. Appendix 3: Compliance and Enforcement Principles ; 5. Appendix 4 : Guiding Principles for PKI-Based Approaches to Electronic Authentication; 5. Appendix 5: APEC Principles for Action against Spam
7	23-25 April 2008	Bangkok, Thailand	Bangkok Declaration Digital Prosperity: Turning Challenges into Achievement" (Challenges and Strategies to Promote Universal Services, Changing Market Profiles and Flexible Regulatory Frameworks, Promoting a Safe and Trusted ICT Environment for Digital Prosperity, Enhancing Outreach Activities on Cyber Security, ICT Capacity Building for a Prosperous Future)
8	30-31 Oct. 2010	Okinawa, Jepang	Okinawa Declaration: "ICT as an Engine for New Socio-economic Growth" (Develop ICT to Promote New Growth, Enhance Socio-Economic Activities through the Use of ICT, Promote a Safe and Trusted ICT Environment, Promote Regional Economic Integration, Strengthen Cooperation in the ICT Sector)

Source: ASC UI, Issues Development in APEC 1989-2010, based on APEC Ministers Responsible for Telecommunication and Information Joint Statements 1994-2010. Downloaded from http://www.apec.org 2010-2012.

Appendix 4. Indicators of Domestic Logistics Index (DLI)

DOMESTIC LOGISTICS INDICATORS	REASON	SOURCE
1. Railways, goods transported (million ton-km). Goods transported by railway are the volume of goods transported by railway, measured in metric tons times kilometers traveled	This indicator could reflect the connectivity within region/ecnomy or among the centers of economic activities in one domestic country/economy. The higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor).	World Development Indicators, World Bank, www.worldbank.org
2.Roads, paved (% of total roads) Paved roads are those surfaced with crushed stone (macadam) and hydrocarbon binder or bituminized agents, with concrete, or with cobblestones, as a percentage of all the country's roads, measured in length.	This indicator could show the land transportation physical infrastructure in one domestic country/economy. The higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor)	World Development Indicators, World Bank, www.worldbank.org
3. Road sector energy consumption (% of total energy consumption). Road sector energy consumption is the total energy used in the road sector including petroleum products, natural gas, electricity, and combustible renewable and waste. Total energy consumption is the total country energy consumption.	This indicator could show the intensity of the usage road transportation in one domestic country/economy. The higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor)	World Development Indicators, World Bank, www.worldbank.org
4. Quality of port infrastructure (underdeveloped=1, developed=7) The Quality of Port Infrastructure measures business executives' perception of their country's port facilities. Data are from the World Economic Forum's Executive Opinion Survey, conducted for 30 years in collaboration with 150 partner institutes. The 2009 round included more than 13,000 respondents from 133 countries. Sampling follows a dual stratification based on company size and the sector of activity. Data are collected online or through in-person interviews. Responses are aggregated using sector-weighted averaging. The data for the latest year are combined with the data for the previous year to create a two-year moving average. Scores range from 1 (port infrastructure considered extremely underdeveloped) to 7 (port infrastructure considered efficient by international standards). Respondents in	The Quality of port infrastructure reflects the higher capacity of the logistics both for domestic and international logistics. In the domestic logistics, the higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor)	World Development Indicators, World Bank, www.worldbank.org

landlocked countries were asked how accessible are port facilities (1 = extremely inaccessible; 7 = extremely accessible)		
5. Telephone lines (per 100 people); Telephone lines are fixed telephone lines that connect a subscriber's terminal equipment to the public switched telephone network and that have a port on a telephone exchange. Integrated services digital network channels ands fixed wireless subscribers are included.	This indicator show the capacity of medium for information both of the provider and user of the logistics and it has potential to improve the efficiency of their connection in domestic and international. From the perspectives of domestic logistics, the higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor)	World Development Indicators, World Bank, www.worldbank.org
6.Internet users (per 100 people); Internet users are people with access to the worldwide network.	This indicator could reflect the connectivity among user and provider of logistics and it has potential to improve the efficiency of their connection in both domestic and international. From domestic logistics perspectives, the higher this indicator the higher the capacity of logistics that could affect the supply availability of exporting countries perspectives (push factor) and the absorption of importing country perspectives (pull factor)	World Development Indicators, World Bank, www.worldbank.org

Source: WDI, World Bank

Appendix 5. Indicators of International Logistics Index (ILI)

INTERNATIONAL LOGISTICS INDICATORS	REASON	SOURCE
1. Quality of port infrastructure (underdeveloped=1, developed=7); The Quality of Port Infrastructure measures business executives' perception of their country's port facilities. Data are from the World Economic Forum's Executive Opinion Survey, conducted for 30 years in collaboration with 150 partner institutes. The 2009 round included more than 13,000 respondents from 133 countries. Sampling follows a dual stratification based on company size and the sector of activity. Data are collected online or through in-person interviews. Responses are aggregated using sector-weighted averaging. The data for the latest year are combined with the data for the previous year to create a two-year moving average. Scores range from 1 (port infrastructure considered extremely underdeveloped) to 7 (port infrastructure considered efficient by international standards). Respondents in landlocked countries were asked how accessible are port facilities (1 = extremely inaccessible; 7 = extremely accessible)	The Quality of port infrastructure reflects the higher capacity of the logistics both for domestic and international logistics. In the international logistics, the higher this indicator the higher the capacity of logistics that could show the competitiveness of the logistics of each	World Development Indicators, World Bank, www.worldbank.org

	country	
2.Liner shipping connectivity index (maximum value in 2004 = 100); Liner Shipping Connectivity Index captures how well countries are connected to global shipping networks. It is computed by the United Nations Conference on Trade and Development (UNCTAD) based on five components of the maritime transport sector: number of ships, their container-carrying capacity, maximum vessel size, number of services, and number of companies that deploy container ships in a country's ports. For each component a country's value is divided by the maximum value of each component in 2004, the five components are averaged for each country, and the average is divided by the maximum average for 2004 and multiplied by 100. The index generates a value of 100 for the country with the highest average index in 2004. .The underlying data come from Containerization International Online.	The higher this indicator the higher the capacity of logistics (to capture how well countries are connected to global shipping networks) that could show the competitiveness of the logistics of each country to the world	World Development Indicators, World Bank, www.worldbank.org
3. Burden of customs procedure, (1=extremely inefficient to 7=extremely efficient); Burden of Customs Procedure measures business executives' perceptions of their country's efficiency of customs procedures. The rating ranges from 1 to 7, with a higher score indicating greater efficiency.	This indicator show that the lower burden of custom procedure, the higher of the logistics efficiency or the higher the index the higher the efficiency of logistics of each country.	World Development Indicators, World Bank, www.worldbank.org
4.Container port traffic (TEU: 20 foot equivalent units); Port container traffic measures the flow of containers from land to sea transport modes., and vice versa, in twenty-foot equivalent units (TEUs), a standard-size container. Data refer to coastal shipping as well as international journeys. Transshipment traffic is counted as two lifts at the intermediate port (once to off-load and again as an outbound lift) and includes empty units.	This indicator could show the capacity of the international logistics. This could reflect the “economies of scale” of the trade in this economy. The higher the better logistics capacity of	World Development Indicators, World Bank, www.worldbank.org

	each country	
5. Telephone lines (per 100 people); Telephone lines are fixed telephone lines that connect a subscriber's terminal equipment to the public switched telephone network and that have a port on a telephone exchange. Integrated services digital network channels ands fixed wireless subscribers are included.	This indicator show the capacity of medium for information both of the provider and user of the logistics and it has potential to improve the efficiency of their connection in domestic and international. From the perspectives of international logistics, the higher this indicator the higher the capacity of logistics that could connect each country with the world	World Development Indicators, World Bank, www.worldbank.org
6.Internet users (per 100 people); Internet users are people with access to the worldwide network.	This indicator could reflect the connectivity among user and provider of logistics and it has potential to improve the efficiency of their connection in both domestic and international. From	World Development Indicators, World Bank, www.worldbank.org

	international logistics perspectives, the higher this indicator the higher the capacity of logistics that could make this country connected with the other countries/ economies	

Source: WDI, World Bank