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Infrastructure Financing, Public-private Partnerships, and Development in the Asia-Pacific Region

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INFRASTRUCTURE FINANCING, PUBLIC-PRIVATE PARTNERSHIPS, AND DEVELOPMENT IN THE ASIA-PACIFIC REGION

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1. INTRODUCTION

This study discusses the contribution of infrastructure financing, with specific emphasis on the public-private partnership (PPP) mode of financing, to sustainable development in the Asia-Pacific region. The "post-2015 development agenda" refers to the development agenda for global action and cooperation that will advance development aid picking from the achievements of the Millenium Development Goals by 2015.

In defining the economies considered part of the Asia-Pacific region, we adopt the list of economies that the UNESCAP covers in its annual *Statistical Yearbook for Asia and the Pacific*. Table 1 list those economies with comparisons of their gross domestic product (GDP) per capita.

Table 1. GDP per capita of Asia-Pacific economies in 2012 and 2013

		GDP per capita, PPP (current international $)	
		2012	**2013**
1	Afghanistan	1,927.14	1,946.19
2	American Samoa	-	-
3	Armenia	7,421.82	7,776.29
4	Australia	42,872.05	43,543.81
5	Azerbaijan	16,174.10	17,143.48
6	Bangladesh	2,773.66	2,948.01
7	Bhutan	7,266.85	7,404.74
8	Brunei Darussalam	72,953.87	71,776.65
9	Cambodia	2,840.64	3,041.08
10	China	10,950.00	11,906.51
11	Cook Islands	-	-
12	DPR Korea	-	-
13	Fiji	7,434.00	7,750.43
14	French Polynesia	n.a.	n.a.
15	Georgia	6,822.98	7,176.44
16	Guam	-	-
17	Hong Kong, China	51,176.19	53,215.94
18	India	5,140.98	5,411.62
19	Indonesia	9,014.34	9,561.13
20	Iran	16,525.63	15,590.15
21	Japan	35,413.93	36,449.06
22	Kazakhstan	21,892.61	23,211.31
23	Kiribati	1,803.40	1,855.83
24	Kyrgyzstan	2,921.48	3,212.93
25	Lao PDR	4,459.98	4,822.02
26	Macao, China	127,742.70	142,599.24
27	Malaysia	22,314.64	23,338.01
28	Maldives	11,289.82	11,656.74

		GDP per capita, PPP (current international $)	
		2012	**2013**
29	Marshall Islands	3,737.87	3,901.00
30	Micronesia (F.S.)	3,489.43	3,394.65
31	Mongolia	8,446.35	9,434.96
32	Myanmar	-	-
33	Nauru	-	-
34	Nepal	2,156.35	2,244.80
35	New Caledonia	32,194.25	34,825.71
36	New Zealand	-	-
37	Niue	-	-
38	Northern Mariana Islands	-	-
39	Pakistan	4,415.05	4,601.69
40	Palau	15,041.95	15,095.99
41	Papua New Guinea	2,424.76	2,539.08
42	Philippines	6,113.37	6,535.88
43	Republic of Korea	31,821.71	33,139.58
44	Russian Federation	23,504.00	24,114.09
45	Samoa	5,795.04	5,768.99
46	Singapore	75,951.67	78,763.38
47	Solomon Islands	2,022.11	2,068.96
48	Sri Lanka	9,014.85	9,738.12
49	Tajikistan	2,362.08	2,512.25
50	Thailand	13,983.39	14,393.53
51	Timor-Leste	2,076.44	-
52	Tonga	5,219.36	5,304.21
53	Turkey	18,186.04	19,020.07
54	Turkmenistan	12,684.26	14,004.16
55	Tuvalu	3,551.44	3,645.16
56	Uzbekistan	4,789.18	5,168.29
57	Vanuatu	2,954.45	2,990.92
58	Viet Nam	5,000.71	5,294.44

Source: World Bank, *World Development Indicators.*

Notes:

1. GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars based on the 2011 ICP round.
2. Based on the ESCAP list, the Asia-Pacific region consists of 58 economies coming from the following sub-regions:
    a) East and North-East Asia: China, DPR Korea, Hong Kong (China), Japan, Macao (China), Mongolia, Republic of Korea
    b) South-East Asia: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam

c) South and South-West Asia: Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka, Turkey
d) North and Central Asia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Uzbekistan
e) Pacific: American Samoa, Australia, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia (F.S.), Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

Based on these data, the ten poorest economies in terms of GDP per capita in 2013 are: Kiribati, Afghanistan, Solomon Islands, Nepal, Tajikistan, Papua New Guinea, Bangladesh, Vanuatu, Cambodia, and Kyrgyzstan. [1] Their GDP per capita range between PPP$1,855.83 and PPP$3,212.93. The ten richest are: Macao (China), Singapore, Brunei Darussalam, Hong Kong (China), Australia, Japan, New Caledonia, Republic of Korea, Russian Federation, and Malaysia. Their GDP per capita range from PPP$23,338.01 to PPP$142,599.24.

This paper presents data from 2005 onwards, as far as the data sources will allow, since this is the year wherein most economies have data on development and financing indicators. The exception is electrification, which starts with 2008 data and official development assistance to PPPs, which starts with 2006 data.

The rest of this paper is structured as follows: Section 2 continues the characterization of the Asia-Pacific economies in terms of trends in infrastructure development based on certain indicators. It also presents regional and sectoral trends in financing infrastructure development, with special emphasis on PPPs. Section 3 presents literature providing some evidence linking infrastructure financing, more specifically the PPP procurement method, to an increase in the level of development. Section 4 discusses emerging sources of infrastructure finance in the region. Section 5 summarizes the key messages from the study and provides concluding remarks.

2. TRENDS IN INFRASTRUCTURE DEVELOPMENT AND FINANCING MODALITIES

We characterize the level of infrastructure development in the region by looking at connectivity, access and quality indicators. The level of connectivity of citizens to each other can be gauged in terms of domestic transport and information and communications technology (ICT) indicators. Their level of connectivity to the rest of the world is suggested by global transport indicators such as the liner shipping connectivity index as well as ICT indicators. The extent of access to basic infrastructure services in each Asia-Pacific economy can be gleaned from transport, ICT, water supply and electricity access indicators. Infrastructure quality in these economies is gauged through information on the available service levels and quality perception surveys like those conducted by the World Economic Forum for its annual *Global Competitiveness Report*.

We analyze trends in infrastructure financing by looking at the official development assistance (ODA) flows which are specifically used to support infrastructure connectivity,

[1] From the UNESCAP website, the least developed economies in the region are: Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People's Democratic Republic, Myanmar, Nepal, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu.

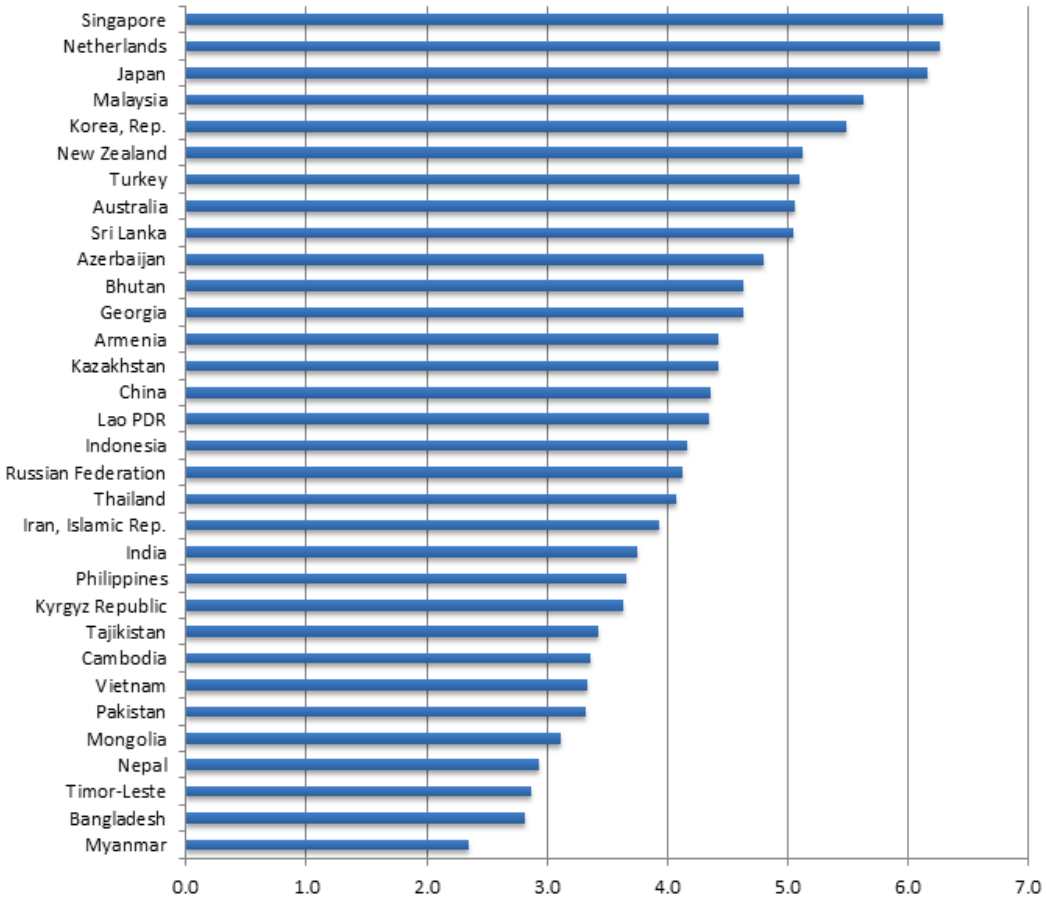
access and quality in the Asia-Pacific region. As PPP finance is a growing source of funds for infrastructure development, we also look at trends in PPP finance as well as portions of ODA flows that went into PPPs.

2.1. Trends in Infrastructure Development in the Region

This section reports the average experts' responses to the survey question "How would you assess general infrastructure (e.g., transport, telephony, and energy) in your country?" in the 2014 *Global Competitiveness Report.* Figure 1 summarizes the overall perception on the quality of infrastructure in different Asia-Pacific economies.

The average score for the region is 4.3 (1 = extremely underdeveloped or among the worst in the world; 7 = extensive and efficient or among the best in the world). Seventeen economies are below this average. All of these 17 economies, except the Russian Federation, are developing economies.

Figure 1. Quality of overall infrastructure, 2014



Source: World Economic Forum, *Global Competiveness Report 2014.*
Note: 1 = extremely underdeveloped or among the worst in the world; 7 = extensive and efficient or among the best in the world.

Transportation

For transportation and the other infrastructure sectors, only those economies where data are available are included in determining the patterns and calculating the averages. The patterns on road density (kilometer of road per 100 sq.km. of land area) show that low density is

common in developing economies but this could also happen even in developed economies with huge land areas, such as the Russian Federation and Australia. The patterns on road density are inconclusive in describing the level of access of the population. The patterns on availability of motor vehicles for the population, however, are more revealing. Considering those economies with latest data (2011), the average is 220.67 motor vehicles per 1,000 people in 2011. There are developed economies which are below this average, but the low figure is offset by highly developed mass transport systems. People would not necessarily need motor vehicles in countries with highly developed mass transport systems. Poor countries such as Afghanistan, Myanmar, Nepal and Pakistan all have below 30 motor vehicles per 1,000 people and underdeveloped mass transport systems. Some economies exhibited negative rate of motorization during the period 2005-2011, such as New Zealand and Brunei Darussalam. The highest growth of motorization was observed in China (19.5% average per year), followed by Afghanistan, Kazakhstan, and Bhutan.

The patterns on vehicles per kilometer of road show the very high growth of number of vehicles per kilometer of road from 2005 to 2011 in China (16% growth) and Kazakhstan (14% growth), but there was negative growth in Japan, Malaysia and Brunei Darussalam. A very low vehicle density per kilometer of road can be observed in Myanmar and Bhutan, where there were as few as nine vehicles and six vehicles per kilometer of road, respectively, in 2011 (table 2).

Table 2. Summary of Transportation Infrastructure Indicators, 2011

Country	Road density (km of road per 100 sq. km of land area)	AAGR (%)	Motor vehicles (per 1,000 people), 2011	AAGR (%)	Vehicles (per km of road)	AAGR (%)
Afghanistan	n.d.	n.d.	29.29	13.70	n.d.	n.d.
Armenia	26.06	0.51	n.d.	n.d.	n.d.	n.d.
Australia	10.63	0.23[a]	702.82	1.01	19.06	2.17[a]
Azerbaijan	21.92	0.17	111.94	7.73	54.08	9.16
Bhutan	21.79	11.34	69.64	12.82	6.15	3.26
Brunei Darussalam	54.20	-1.51	355.22	-4.24	46.11	-0.95
China	42.77	3.48	68.94	19.49	22.57	16.06
Georgia	27.05	-1.25	165.65	7.37[b]	39.41	9.43[b]
Hong Kong, China	191.03	1.09	80.01	2.10	271.25	1.63
India	142.68	3.53	n.d.	n.d.	n.d.	n.d.
Indonesia	26.10	4.11	69.17	9.62	33.75	6.47
Iran (Islamic Rep. of)	13.13	4.89	n.d.	n.d.	n.d.	n.d.
Japan	89.70	0.90	587.95	0.02	221.66	-0.86
Kazakhstan	3.57	1.13	245.57	13.36	41.85	13.78
Korea, Rep.	106.04	0.54	370.38	2.48	174.05	2.45
Lao PDR	17.33	3.25	n.d.	n.d.	n.d.	n.d.

Country	Road density (km of road per 100 sq. km of land area)	AAGR (%)	Motor vehicles (per 1,000 people), 2011	AAGR (%)	Vehicles (per km of road)	AAGR (%)
Macao, China	1485.71	2.06	170.47	1.90	227.73	2.26
Malaysia	46.99	10.15	377.70	4.86	70.13	-3.19
Myanmar	5.58	3.92	7.25	4.02	9.27	0.81
Nepal	n.d.	n.d.	7.12	8.06[a]	n.d.	n.d.
New Zealand	35.19	0.19	708.28	-0.13	33.12	0.75
Pakistan	32.98	0.28	20.20	7.78	13.60	9.44
Russian Federation	6.40	4.13	n.d.	n.d.	n.d.	n.d.
Singapore	480.56	0.63	151.07	0.77	229.51	3.17
Thailand	n.d.	n.d.	171.59	6.27	n.d.	n.d.
Turkey	47.26	0.98	163.80	4.80	32.58	5.13

Source: World Bank, *World Development Indicators.*

Notes:

Road density (km of road per 100 sq. km of land area) - Road density is the ratio of the length of the country's total road network to the country's land area. The road network includes all roads in the country: motorways, highways, main or national roads, secondary or regional roads, and other urban and rural roads

Motor vehicles (per 1,000 people) - Motor vehicles include cars, buses, and freight vehicles but do not include two-wheelers. Population refers to midyear population in the year for which data are available.

Vehicles (per km of road) - Vehicles per kilometer of road include cars, buses, and freight vehicles but do not include two-wheelers. Roads refer to motorways, highways, main or national roads, secondary or regional roads, and other roads. A motorway is a road specially designed and built for motor traffic that separates the traffic flowing in opposite directions.

a – Covered period, 2007 to 2011

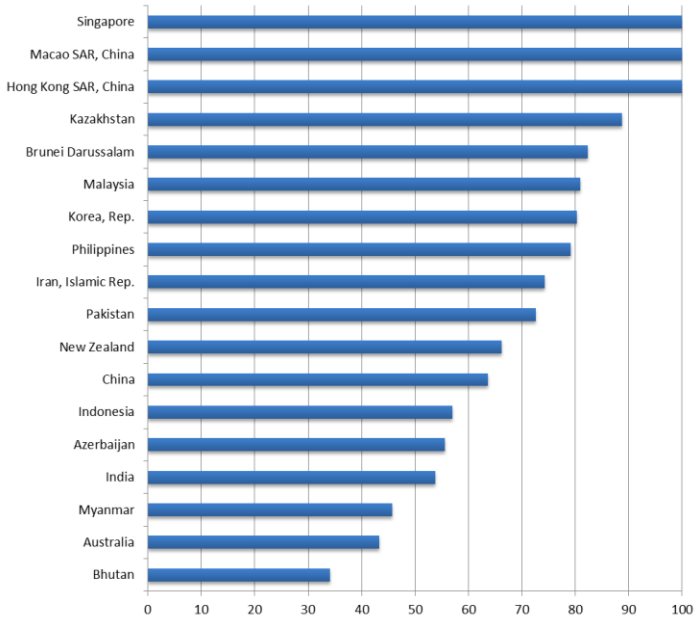
b – Covered period, 2006 to 2011

AAGR – Average Annual Growth Rate from 2005 to 2011

n.d. – no available data

In the Asia-Pacific region, the 2011 average of paved roads as a percentage of the aggregate road lengths in the network is 71 percent. Below the average are New Zealand, China, Indonesia, Azerbaijan, India, Myanmar, Australia, and Bhutan. The low paved road ratio in New Zealand and Australia may be explained by the low population density in the countryside (the “outbacks”). Singapore, Macau and Hong Kong are city states have a high paved road ratio for mobility of the population concentrated in these city states (figure 2).

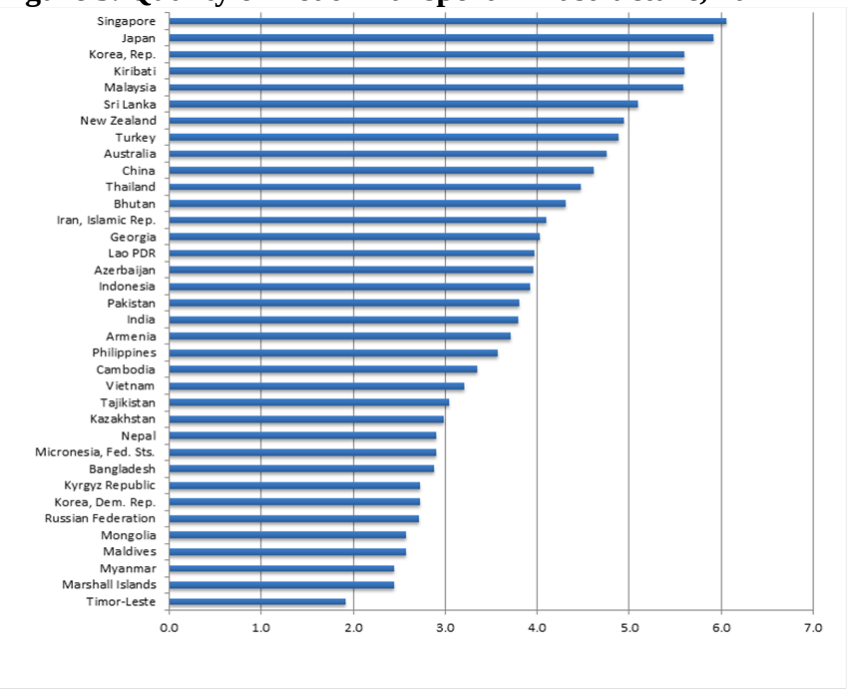
Figure 2. Paved Roads as percent of total roads, 2011



Source: World Bank, *World Development Indicators.*(except for the Philippines).
Notes: 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.
No available data from the WDI for the Philippines; thus, Philippine government data is used. Paved roads, as defined by the Philippines' Department of Public Works and Highways (DPWH), are those whose surface type consists of asphalt and concrete.

The average quality of road infrastructure in the region has a score of 3.8, with 17 economies below this average score. Most of those below the average are developing economies (see figure 3).

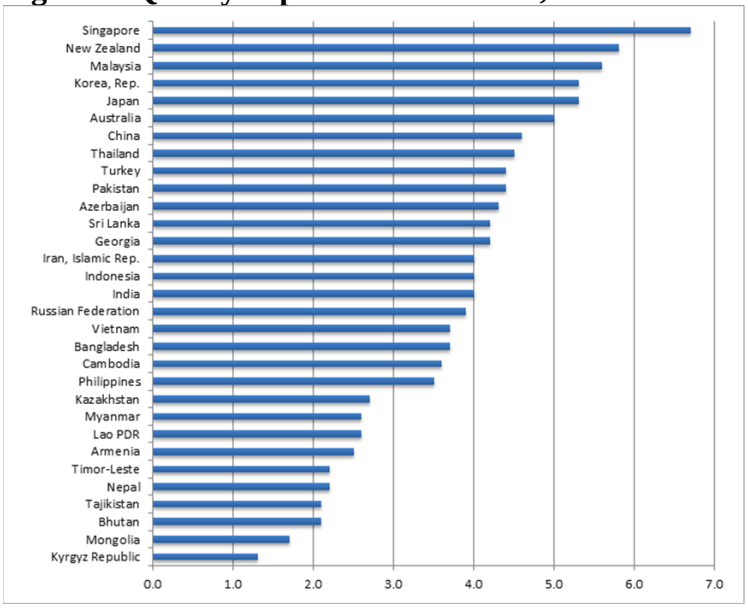
Figure 3. Quality of Road Transport Infrastructure, 2014



Source: World Economic Forum, *Global Competiveness Report.*
Note: Quality of roads: (1 = extremely underdeveloped—among the worst in the world; 7 = extensive and efficient—among the best in the world)

With respect to the quality of port infrastructure, the average score for the region is 3.8 (1 = extremely underdeveloped or among the worst in the world; 7 = extensive and efficient or among the best in the world). Below the average are 14 economies (see figure 4 below), all of which are developing economies.

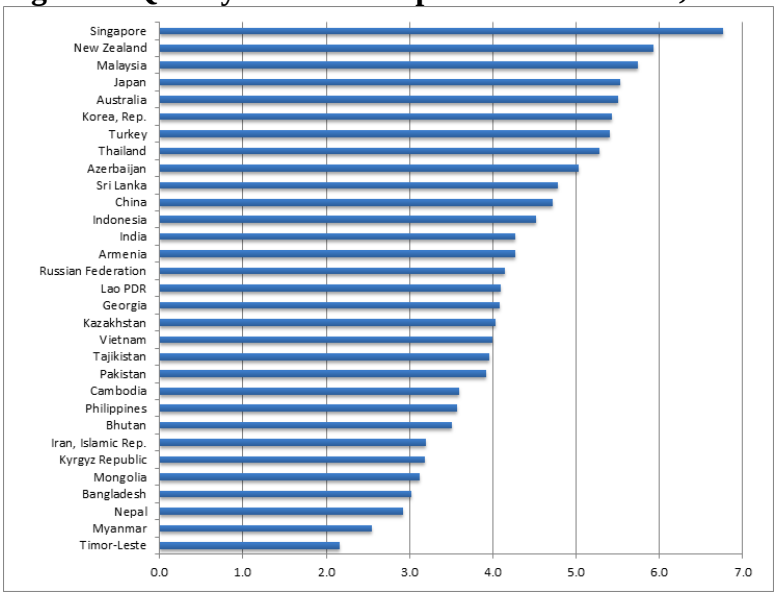
Figure 4. Quality of port infrastructure, 2014



Source: World Economic Forum, *Global Competiveness Report.*
Note: Quality of port infrastructure: (1 = extremely underdeveloped or among the worst in the world; 7 = extensive and efficient or among the best in the world)

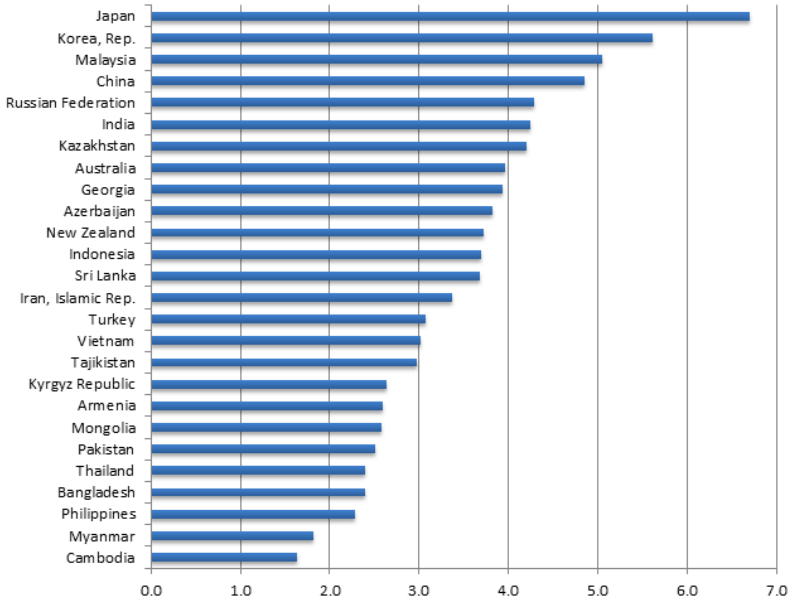
The average quality of air transport infrastructure is scored as 4.3 and below the average are 17 economies, most of which are developing economies (see figure 5 below). With respect to the quality of rail transport infrastructure, below the average of 3.5 score are 13 economies, most of which are developing economies (see figure 6 below).

Figure 5. Quality of Air Transport Infrastructure, 2014



Source: World Economic Forum, *Global Competiveness Report*
Note: Quality of air transport infrastructure: (1 = extremely underdeveloped—among the worst in the world; 7 = extensive and efficient—among the best in the world)

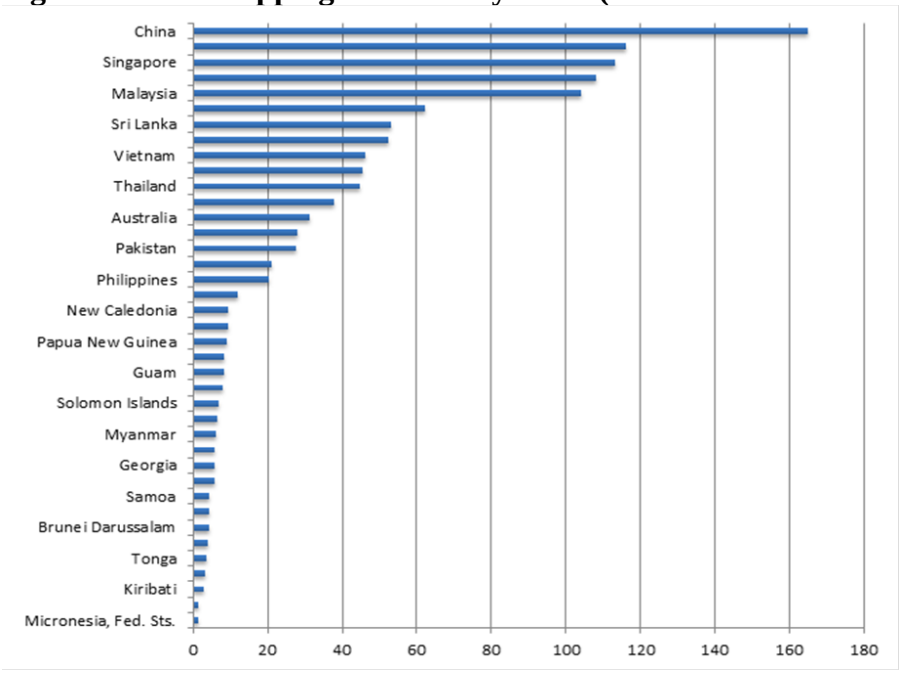
Figure 6. Quality of Rail Transport Infrastructure, 2014



Source: World Economic Forum, *Global Competiveness Report*
Note: Quality of railroad infrastructure: (1 = extremely underdeveloped—among the worst in the world; 7 = extensive and efficient—among the best in the world)

The liner shipping connectivity index shows a very wide disparity among Asia-Pacific economies (see figure 7). The higher the index, the more connected an economy is via shipping to the rest of the world. China has the highest index at 165 and the Micronesia Federated States has the lowest index.

Figure 7. Liner shipping connectivity index (maximum value in 2004 = 100), 2014



Source: World Bank, *World Development Indicators.*
Note: Liner shipping connectivity index (maximum value in 2004 = 100) - The 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 Containerisation International Online.

Information and Communication Technology

Recent data on ICT development show a wide digital divide among the population in the Asia-Pacific region as many developing economies are below the average of the access indicators. However, trends show that they try to upgrade their access to ICT and are on a catch-up mode (table 3).

Table 3. Summary of ICT Infrastructure Indicators, 2013

Country	Telephone lines (per 100 people)	AAGR (%)	Mobile cellular subscriptions (per 100 people)	AAGR (%)	Fixed broadband Internet subscribers (per 100 people)	AAGR (%)
Afghanistan	0.31	102.85[a]	70.66	39.86	5.90	21.72
American Samoa	18.13	0.38	n.d.	n.d.	n.d.	n.d.
Armenia	19.43	-0.18	112.42	34.42	46.30	31.26
Australia	44.34	-1.32	106.84	2.20	83.00	3.51
Azerbaijan	18.67	4.86	107.61	19.33	58.70	28.23
Bangladesh	0.69	-0.98	74.43	36.19	6.50	50.91
Bhutan	3.51	-4.49	72.20	37.86	29.90	29.22
Brunei Darussalam	13.58	-6.28	112.21	7.41	64.50	7.39
Cambodia	2.78	35.35	133.89	42.33	6.00	44.40
China	19.27	-3.94	88.71	14.59	45.80	23.39
Fiji	7.97	-6.53	105.60	19.78	37.10	20.31
French Polynesia	19.87	-0.66	85.58	7.76	56.80	12.88
Georgia	27.65	10.17	115.03	20.29	43.10	27.74
Guam	40.58	-0.24	n.d.	n.d.	65.40	6.83
Hong Kong SAR, China	63.11	1.74	237.35	8.47	74.20	3.37
India	2.32	-7.83	70.78	31.33	15.10	25.93
Indonesia	12.30	9.34	125.36	25.10	15.82	20.32
Iran, Islamic Rep.	38.33	3.55	84.25	27.41	31.40	18.46
Japan	47.99	0.61	117.63	5.61	86.25	3.22
Kazakhstan	26.71	5.08	184.69	22.75	54.00	43.75
Kiribati	8.79	8.31	16.61	48.08	11.50	14.11
Korea, Dem. Rep.	4.74	1.52	9.72	141.84[a]	n.d.	n.d.
Korea, Rep.	61.57	2.43	111.00	3.93	84.77	1.80
Kyrgyz Republic	8.31	-0.61	121.45	35.41	23.40	10.49

Country	Telephone lines (per 100 people)	AAGR (%)	Mobile cellular subscriptions (per 100 people)	AAGR (%)	Fixed broadband Internet subscribers (per 100 people)	AAGR (%)
Lao PDR	10.37	26.63	68.14	25.10	12.50	39.93
Macao SAR, China	27.97	-3.52	304.08	13.07	65.80	8.26
Malaysia	15.26	-1.26	144.69	8.45	66.97	4.08
Maldives	6.54	-6.14	181.19	12.94	44.10	26.16
Marshall Islands	n.d.	n.d.	n.d.	n.d.	11.70	14.80
Micronesia, Fed. Sts.	9.70	-2.34	30.32	10.88	27.80	11.21
Mongolia	6.19	0.02	124.18	24.11	17.70	11.93[c]
Myanmar	1.00	0.00	12.83	63.08	1.20	43.91
Nepal	2.98	5.69	76.85	74.38	13.30	41.52
New Caledonia	33.14	4.02	93.76	6.03	66.00	9.32
New Zealand	41.06	-0.23	105.78	2.71	82.78	3.53
Northern Mariana Islands	42.71	2.09	n.d.	n.d.	n.d.	n.d.
Pakistan	3.50	0.69	70.13	31.00	10.90	7.02
Palau	34.72	-1.78	85.79	13.85	n.d.	n.d.
Papua New Guinea	1.91	7.84	40.98	54.99	6.50	18.11
Philippines	3.20	-2.52	104.50	12.57	37.00	27.20
Russian Federation	28.34	0.21	152.84	7.87	61.40	19.04
Samoa	n.d.	n.d.	n.d.	n.d.	15.30	20.90
Singapore	36.35	-1.50	155.92	6.04	73.00	2.27
Solomon Islands	1.36	-1.87	57.57	60.95	8.00	32.46
Sri Lanka	12.72	9.33	95.50	24.21	21.90	36.74
Tajikistan	5.18	2.91	91.83	48.45	16.00	64.48
Thailand	9.04	-2.12	140.05	14.79	28.94	8.54
Timor-Leste	0.26	1.54	57.38	42.78	1.10	35.11
Tonga	29.43	10.12	54.59	7.96	35.00	27.83
Turkey	18.09	-5.32	92.96	4.70	46.25	14.68
Turkmenistan	11.49	4.01	116.89	64.21	9.60	32.72
Tuvalu	14.68	6.04	34.43	12.51	37.00	24.37[c]
Uzbekistan	6.91	0.05	74.31	50.90	38.20	35.59
Vanuatu	2.17	-5.17	50.34	30.29	11.30	10.50
Vietnam	10.13	0.20[b]	130.89	35.84	43.90	16.72

Source: World Bank, *World Development Indicators.*

Notes: 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 and fixed wireless subscribers are included. Mobile cellular subscriptions (per 100 people) - Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provide access to the public switched telephone network. Post-paid and prepaid subscriptions are included. Fixed broadband Internet subscribers (per 100 people) - Fixed broadband Internet subscribers are the number of broadband subscribers with a digital subscriber line, cable modem, or other high-speed technology.

a – covered period, 2009 to 2013
b – covered period, 2006 to 2013
c – covered period, 2007 to 2013
AAGR – average annual growth rate from 2005 to 2013
n.d. – no available data

With respect to 2013 teledensity, expressed as number of telephone lines per 100 people, 31 economies are below the average of 17.69 telephone lines per 100 people. But Cambodia and Lao PDR exhibit very high average annual growth rates from 2005 to 2013, with growth rates of 35 percent and 27 percent, respectively.

Mobile cellular density is an average of 100.25 mobile cellular subscriptions per 100 people in 2013. Twenty-six economies are below this average. The patterns differ for developed vis-a-vis developing economies. Many developed economies exhibited very low mobile cellular density growth rates and this is because these economies already have high mobile cellular density to begin with with most of them having more than 1:1 ratio (that is cellular subscriptions outnumbering the population). In contrast, most developing economies experienced high mobile cellular density growth, at two-digit growth levels, with Nepal experiencing the fastest average annual growth at 74 percent in 2005-2013.

The average fixed broadband internet subscription in the region is 36.4 subscriptions per 100 people in 2013 and 26 economies have subscriptions below this average. Most economies experienced high density growth, at two-digit growth levels, with Tajikistan experiencing the fastest growth at 64 percent.

Electricity

The electric power consumption in the region is 3,286.25 kWh per capita in 2011 and 22 economies had consumption levels below this average. The consumption patterns show that those economies which exhibited the highest average annual rates of increase (i.e., Cambodia at 16 percent, Vietnam at 11 percent, and China at 11 percent) were also those which are experiencing high economic growth (Table 4).

The level of electrification in the region shows that seven economies have woefully low access to electricity, with electrification levels of 75 or less. This means that in those seven economies one or more than one in four people do not have access to electricity in their households in 2012. The lowest electrification rate is in North Korea, where for every four North Koreans, three do not have access to electricity.

Table 4. **Summary of Energy Infrastructure Indicators**

Country	Electric Power Consumption (kWh per capita), 2011	AAGR (%)	Electricity Access (% of population), 2012
Armenia	1,754.65	2.60	n.d.
Australia	10,712.18	0.40	n.d.
Azerbaijan	1,705.42	-5.46	n.d.
Bangladesh	258.62	7.13	60.0

Country	Electric Power Consumption (kWh per capita), 2011	AAGR (%)	Electricity Access (% of population), 2012
Brunei Darussalam	8,506.51	0.21	100.0
Cambodia	164.39	16.33	34.0
China	3,297.97	10.78	100.0
Georgia	1,917.99	1.88	n.d.
India	684.11	6.80	75.0
Indonesia	679.70	5.11	76.0
Iran, Islamic Rep.	2,648.84	4.21	n.d.
Japan	7,847.80	-0.75	n.d.
Kazakhstan	4,892.91	3.36	n.d.
Korea, Dem. Rep.	739.34	-1.51	26.0
Korea, Rep.	10,161.95	4.50	n.d.
Kyrgyz Republic	1,641.64	1.07	n.d.
Laos	n.d.	n.d.	78.0
Malaysia	4,246.47	6.83	100.0
Mongolia	1,576.86	3.42	90.0
Myanmar	110.24	7.11	32.0
Nepal	105.50	5.06	76.0
Netherlands	7,035.67	0.11	n.d.
New Zealand	9,398.67	-0.48	n.d.
Pakistan	449.25	-0.02	69.0
Philippines	646.96	1.85	70.0
Russian Federation	6,485.96	1.92	n.d.
Singapore	8,404.23	-0.20	100.0
Sri Lanka	490.25	3.53	89.0
Tajikistan	1,713.79	-3.67	n.d.
Thailand	2,315.99	3.26	99.0
Turkey	2,709.26	5.03	n.d.
Turkmenistan	2,443.86	2.93	n.d.
Uzbekistan	1,625.97	-0.85	n.d.
Vietnam	1,073.28	10.80	96.0

Source: Electric Power Consumption extracted from World Bank, *World Development Indicators.* Electrification data: International Energy Agency - World Energy Outlook database

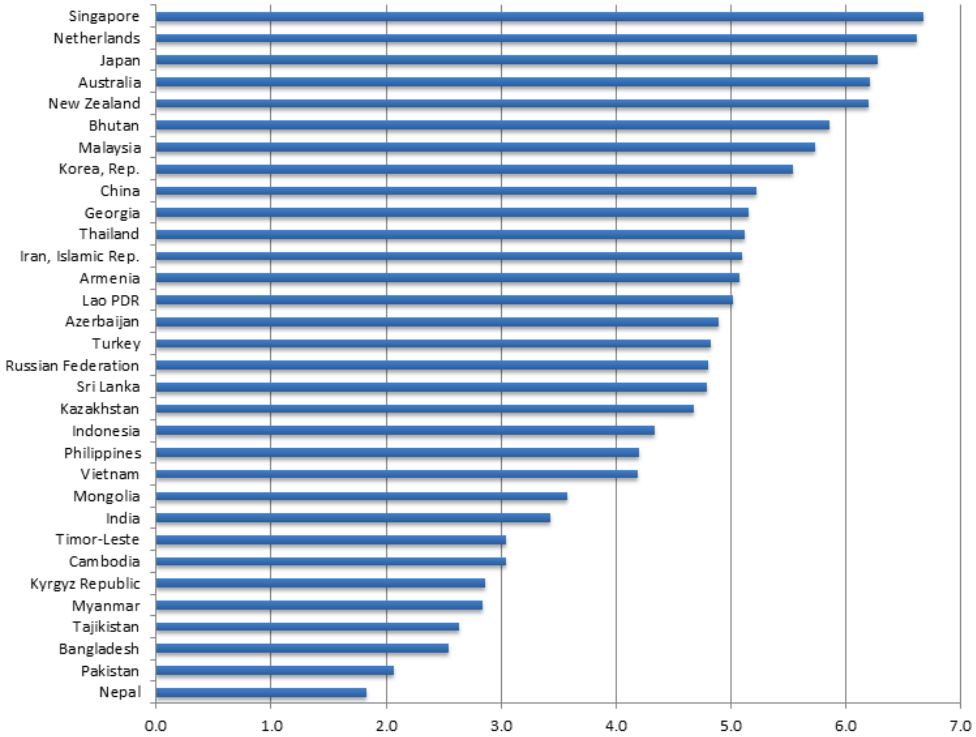
Note: ● Electric power consumption (kWh per capita) - Electric power consumption measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants.

● Access to electricity (% of population) - Access to electricity is the percentage of population with access to electricity. Electrification data are collected from industry, national surveys and international sources.

n.d. – no available data; AAGR – average annual growth rate, 2005 to 2011

With respect to the quality of electricity supply in 2014, the average reliability score in the region is 4.5 (1 = not reliable at all; 7 = extremely reliable) and 13 economies are below this average quality. is in Nepal with a score of 1.8 has the worst reliability of electricity supply (figure 8).

Figure 8. Quality of Electricity Supply, 2014



Source: World Economic Forum, *Global Competiveness Report*.
Note: Quality of electricity supply: (1 = not reliable at all; 7 = extremely reliable)

Water and Sanitation

Access to safe water is measured in terms of access to an improved drinking water source, which include piped water on premises (piped household water connection located inside the user's dwelling, plot or yard) and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection). In eight economies, access to improved water source as of 2012 remains very low, where for every ten people, three or more people have no access to improved water source. These economies are: Tajikistan, Lao PDR, Cambodia, Turkmenistan, Timor Leste, Kiribati, Afghanistan, and Papua New Guinea. The worst situation is in Papua New Guinea, where for every ten people, six do not have access to an improved water source.

Access to adequate sanitation, on the other hand, is measured in terms of access to improved sanitation facilities, which include flush/pour flush (to piped sewer system, septic tank, pit latrine) toilets, ventilated improved pit (VIP) latrines, pit latrines with slab, and composting toilets. In 2012, 21 economies have very low access to improved sanitation facilities. These have access rates of 75 percent or less, meaning, for every four people, only three or less have

access to improved sanitation facilities. The worst situation is also in Papua New Guinea where only 18.7 percent of the population, or less than two people for every ten people, have access to improved sanitation facilities (table 5).

Table 5. Summary of Water and Sanitation Infrastructure Indicators, 2012

Country	Improved water source (% of population with access)	Improved sanitation facilities (% of population with access)
Afghanistan	64.2	29
American Samoa	100	62.5
Armenia	99.8	90.5
Australia	100	100
Azerbaijan	80.2	82
Bangladesh	84.8	57
Bhutan	98.1	46.9
Cambodia	71.3	36.8
China	91.9	65.3
Fiji	96.3	87.2
French Polynesia	100	97.1
Georgia	98.7	93.3
Guam	99.5	89.8
India	92.6	36
Indonesia	84.9	58.8
Iran, Islamic Rep.	95.9	89.4
Japan	100	100
Kazakhstan	93.1	97.5
Kiribati	66.8	39.7
Korea, Dem. Rep.	98.1	81.8
Korea, Rep.	97.8	100
Kyrgyz Republic	87.6	91.8
Lao PDR	71.5	64.6
Malaysia	99.6	95.7
Maldives	98.6	98.7
Marshall Islands	94.5	76.2
Micronesia, Fed. Sts.	89	57.2
Mongolia	84.6	56.2
Myanmar	85.7	77.4
Nepal	88.1	36.7
New Caledonia	98.5	100
New Zealand	100	79.7
Northern Mariana Islands	97.5	47.6
Pakistan	91.4	100
Papua New Guinea	39.7	18.7
Philippines	91.8	74.3
Russian Federation	97	70.5

Country	Improved water source (% of population with access)	Improved sanitation facilities (% of population with access)
Samoa	98.5	91.6
Singapore	100	100
Solomon Islands	80.5	28.8
Sri Lanka	93.8	92.3
Tajikistan	71.7	94.4
Thailand	95.8	93.4
Timor-Leste	70.5	38.9
Tonga	99.3	91.3
Turkey	99.7	91.2
Turkmenistan	71.1	99.1
Tuvalu	97.7	83.3
Uzbekistan	87.3	100
Vanuatu	90.7	57.9
Vietnam	95	75

Source: World Bank, *World Development Indicators.*

Notes:
- Improved water source (% of population with access) - Access to an improved water source refers to the percentage of the population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).
- Access to improved sanitation facilities refers to the percentage of the population using improved sanitation facilities. The improved sanitation facilities include flush/pour flush (to piped sewer system, septic tank, pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet.

2.2. Trends in Infrastructure Financing in the Region

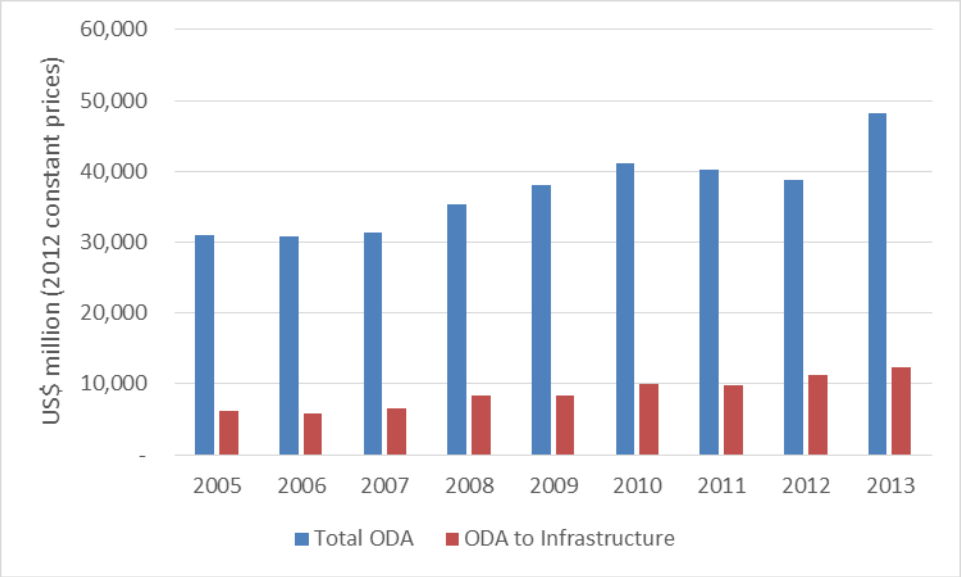
We analyze below the development finance flows to infrastructure projects in the form of ODA to the infrastructure sector and PPP financing regardless of source. We exclude domestic public resources from the analysis as there are no widely available data on government infrastructure spending for many economies in the UNESCAP list.

2.3. Trends in ODA flows

We adopt the definition of ODA by the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD). OECD-DAC defines ODA as grants or loans which are: (a) undertaken by the official sector; (b) with promotion of economic development and welfare as the main objective; (c) at concessional financial terms (if in the form of a loan, having a grant element of at least 25 per cent). This definition excludes grants, loans and credits for military purposes as well as transfer payments to private individuals (e.g., pensions, reparations, or insurance payments).

In the Asia-Pacific region, the cumulative share of ODA to the infrastructure sector is about 23 percent of the total ODA in 2005-2013. Annual shares have historically ranged between 19 percent and 29 percent (see figure 9).

Figure 9. Total ODA and ODA to the infrastructure sector, 2005-2013



Source: OECD dataset.

The growth of ODA to the infrastructure sector in the Asia-Pacific region outpaces overall ODA growth in the region. In 2005-2013, gross disbursements of total ODA grew at an average annual rate of 6 percent. In constrast, ODA flows to the infrastructure sector grew at a yearly average of 9 percent during the same period. Among infrastructure subsectors (see **Table 6** below), the ODA flows to the water and sanitation sector grew most rapidly. Global commitments to meet MDG goals are important factors in the growth of ODA flows to water and sanitation. ODA to the communications sector declined in 2005-2013, which is probably because private funds flow to the sector have been increasing. Private investments to the sector is fueled by rising demand, rapid technological advancements made by many private sector companies, and the decision of governments to let the private sector take the lead in ICT development in their respective countries.

Table 6. Growth of ODA to the infrastructure sector, Asia-Pacific

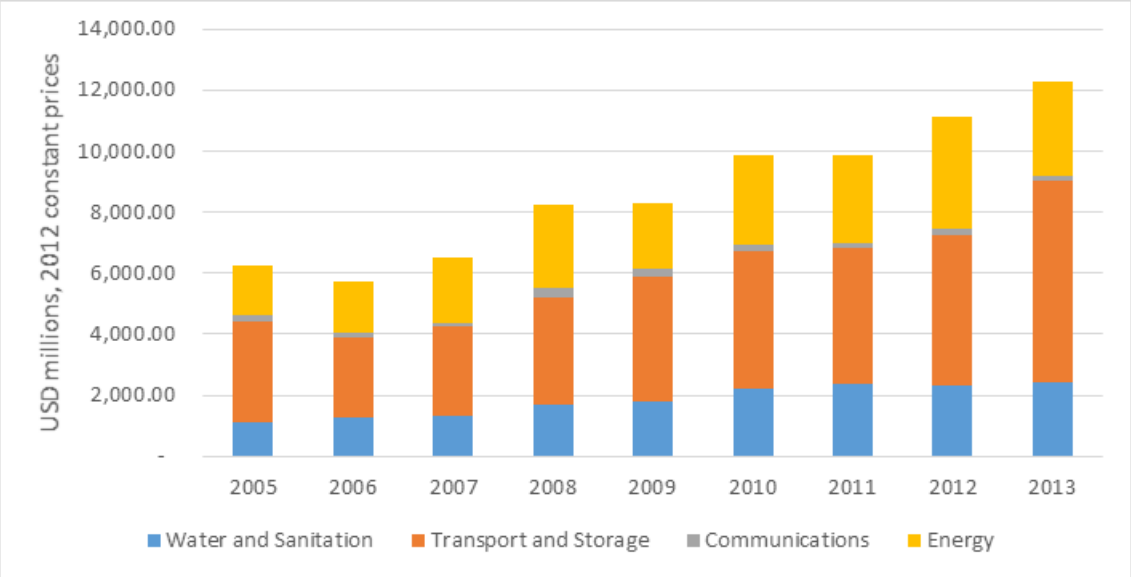
	Average annual growth, 2005-2013
Water and Sanitation	10%
Transport and Storage	9%
Communications	-3%
Energy	8%
Total	9%

Source: OCED dataset

Nevertheless, the composition of ODA flows to the infrastructure sector has been fairly stable with the transport and storage sector having the highest share annually (with a cumulative share of 47 percent in 2005-2013), followed by the energy sector (29% cumulative share), water and

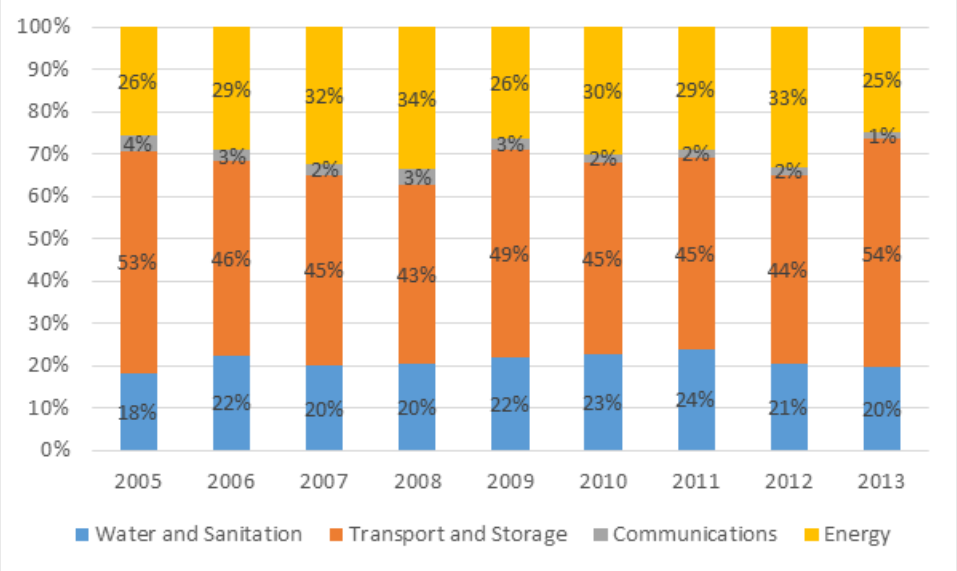
sanitation sector (21 percent cumulative share), and the communications sector (2% cumulative share). Figure 10 shows the levels of ODA flows to the infrastructure sector in 2005-2013 while figure 11 shows the yearly sectoral composition during the period.

Figure 10. ODA flows to the infrastrucure sector, 2005-2013



Source: OECD dataset.

Figure 11. Sectoral composition of ODA flows to the infrastructure sector, 2005-2013

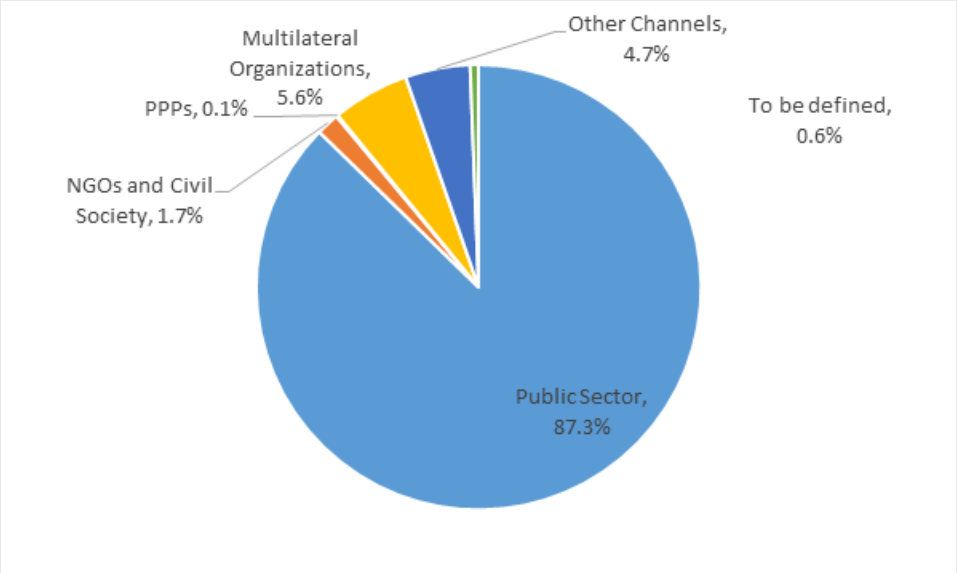


Source: OECD dataset.

ODA has also been used to complement PPPs in infrastructure. Data show that ODA flows are coursed mostly through the public sector but some of the ODA flows also found their way

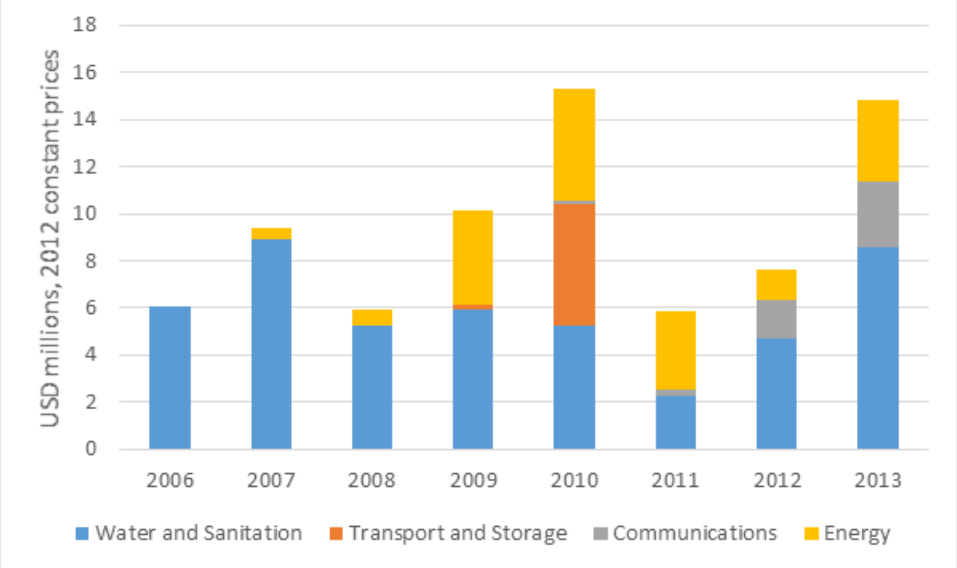
to PPPs, albeit in relatively small amounts (figure 12). Nevertheless, the growth of ODAflows to PPPs is high, at 14 percent on the average annually from 2006 to 2013. Trends show that ODA flows to PPPs focus mostly on water and sanitation in 2006, but subsequently thereafter, the flows became more diversified and covered other infrastructure sectors as well (figure 13 and figure 14). This expresses the willingness of multilateral and bilateral sources and governments to tap private sector expertise in providing infrastructure apart from efforts by traditional public sector partners.

Figure 12. ODA Composition by type of channel, 2013



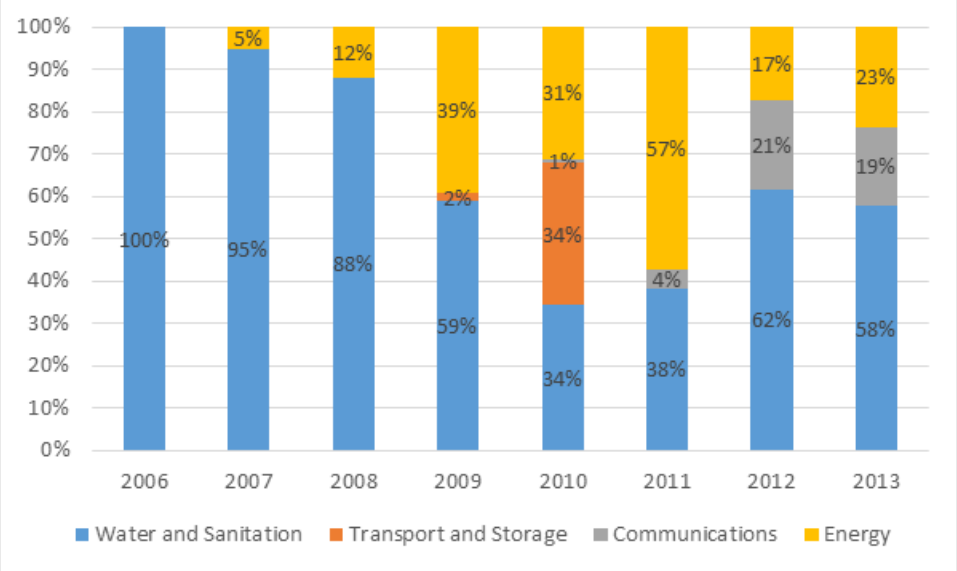
Source: OECD dataset.

Figure 13. Levels of ODA flows to PPPs in the Asia-Pacific, 2006-2013



Source: OECD dataset.

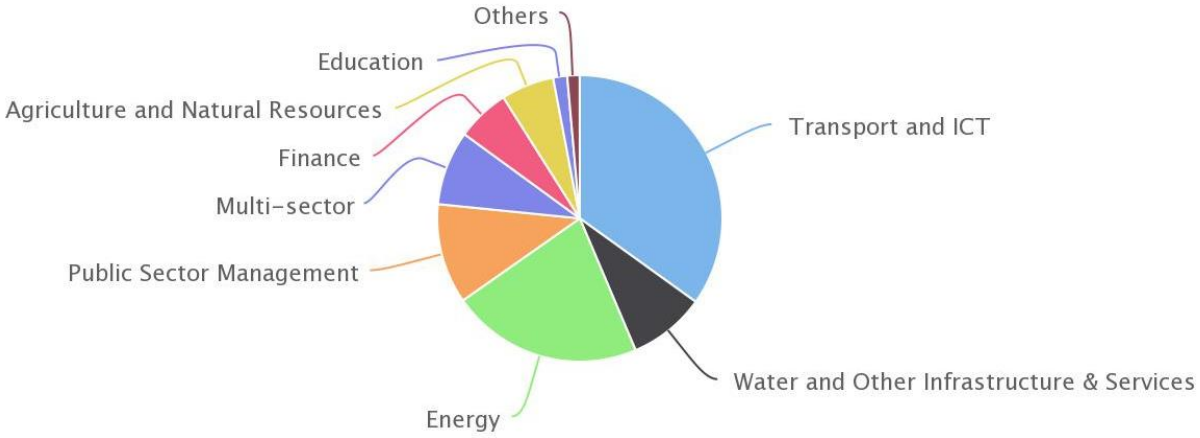
Figure 14. Sectoral composition of ODA flows to PPPs in the Asia-Pacific, 2006-2013



Source: OECD dataset.

A major source of development finance in the region is the Asian Development Bank (ADB). The breakdown of its outstanding loans as of end-year 2013 shows that most of its lending activities are in the infrastructure sector. Almost 66 percent of ADB loans went to the infrastructure sector. Loans to the transport and ICT sector are largest at 34.9 percent of the total, followed by loans to the energy sector at 21.7 percent, and loans to water and other infrastructure and services at 8.7 percent (figure 15). The rest of ADB loans went to non-infrastructure areas: public sector management, agriculture and natural resources, education and others.

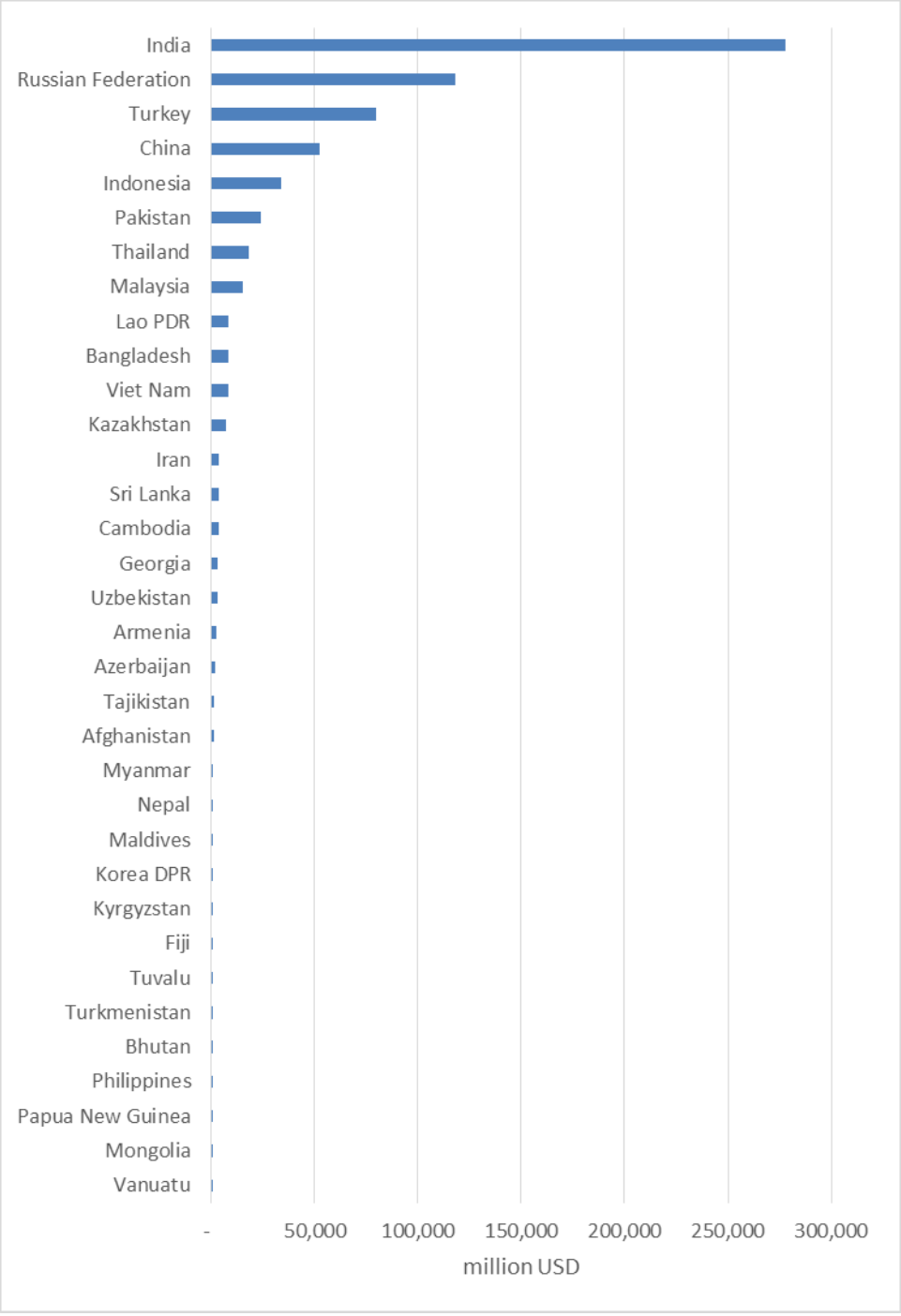
Figure 15. Breakdown of Outstanding Loans by ADB as of 31 December 2013



Source: Asian Development Bank.

Turning to private investments in infrastructure (figure 16, table 7), India was most successful in attracting private monies to infrastructure, followed by the Russian Federation with about half of India's infrastructure with private participation, and Turkey with about a third. National-level patterns on total infrastructure investments with private participation show that India is taking the lead in terms of promoting and attracting private investments. Most of the developing countries in the Asia-Pacific region have relatively insignificant private participation in infrastructure.

Figure 16. Infrastructure Investments with Private Participation, 2005-2013 (million USD)



Source: World Bank.

Table 7. Infrastructure Investments with Private Participation, 2005-2013 (million USD)

	2005-2009	2010-2013	Total
India	118,279	159,542	277,821
Russian Federation	59,401	58,399	117,800
Turkey	35,248	44,666	79,914
China	36,375	15,869	52,244
Indonesia	18,136	15,411	33,547
Pakistan	19,637	4,466	24,103
Thailand	8,458	9,567	18,025
Malaysia	7,176	8,052	15,228
Lao PDR	3,337	4,813	8,150
Bangladesh	4,535	3,457	7,992
Viet Nam	3,630	4,313	7,943
Kazakhstan	3,940	3,051	6,991
Iran	2,014	1,596	3,610
Sri Lanka	1,626	1,756	3,382
Cambodia	1,432	1,893	3,325
Georgia	2,468	685	3,153
Uzbekistan	1,520	1,589	3,109
Armenia	1,741	480	2,221
Azerbaijan	1,407	319	1,726
Tajikistan	1,080	320	1,400
Afghanistan	1,211	176	1,387
Myanmar	556	170	726
Nepal	289	412	701
Maldives	49	514	563
Korea DPR	427	47	474
Kyrgyzstan	138	135	273
Fiji	173	72	245
Bhutan	219	-	219
Turkmenistan	158	61	219
Tuvalu	158	61	219
Papua New Guinea	150	-	150
Philippines	150	-	150
Mongolia	-	120	120
Vanuatu	41	-	41

Source: World Bank.

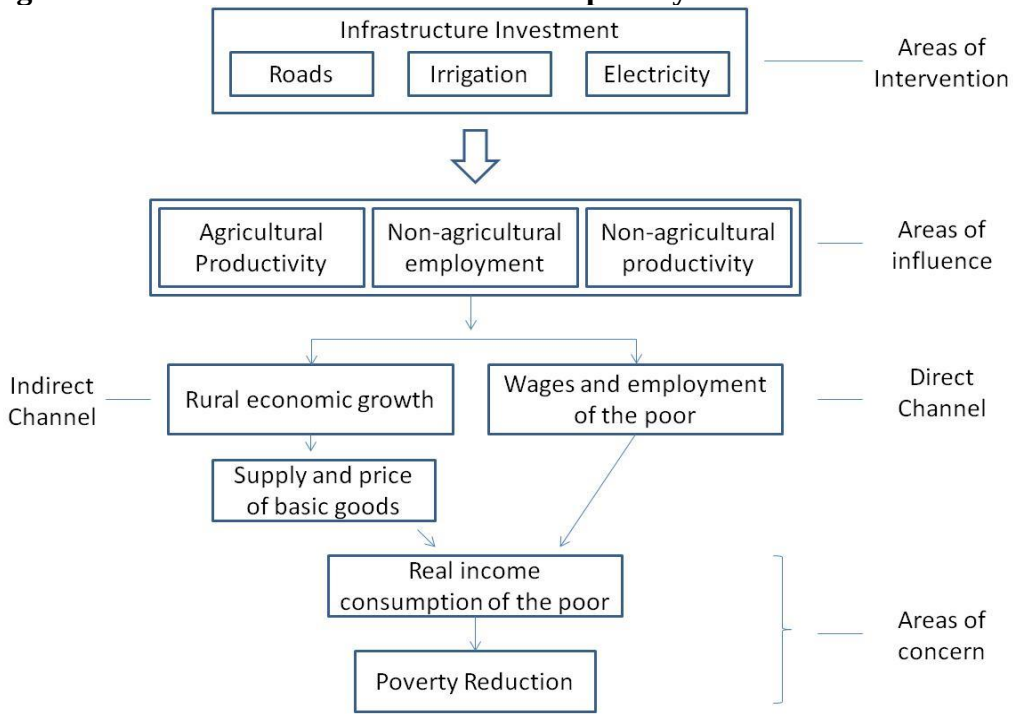
3. INFRASTRUCTURE FINANCING, PPPS AND COUNTRY DEVELOPMENT AGENDAS

3.1. Infrastructure, Growth and Poverty Reduction

The public sector has been the traditional provider of infrastructure in many developing countries and it has utilized ODA to complement public sector resources (tax revenues and public borrowing) in financing infrastructure. However, there has recently been a growing interest in tapping private resources and expertise in providing infrastructure. The main drivers of this phenomenon seems to be the conviction that public-private partnerships (PPPs) could be a significant mechanism for addressing the lack of infrastructure in many of those developing countries. Certain infrastructure such as toll roads, power plants, mass rail transport are amenable to private construction, operation and maintenance, which has relieved governments with the burden of provision and has freed public resources that would otherwise have been used for infrastructure, to meet other societal needs. Infrastructure financing through PPPs could be used to address country development agendas, especially in providing necessary infrastructure. This section draws from the literature to discuss the link between infrastructure financing, PPPs and country development agendas.

Literature confirms the close link between infrastructure development and economic growth. Dissou and Didic (2013) argue that, in general, infrastructure has substantial impacts on economic growth but these may vary across countries, over time, and even within infrastructure subsectors (see also Estachea and Garsous, 2012). These authors suggest that infrastructure positively affects economic growth through increased labour productivity and reduced production and transaction costs. Figure 17 shows how infrastructure investment may lead to poverty reduction. Studies have shown that investments in roads and irrigation infrastructure have positive contributions to economic growth and poverty reduction.

Figure 17. Links between infrastructure and poverty reduction

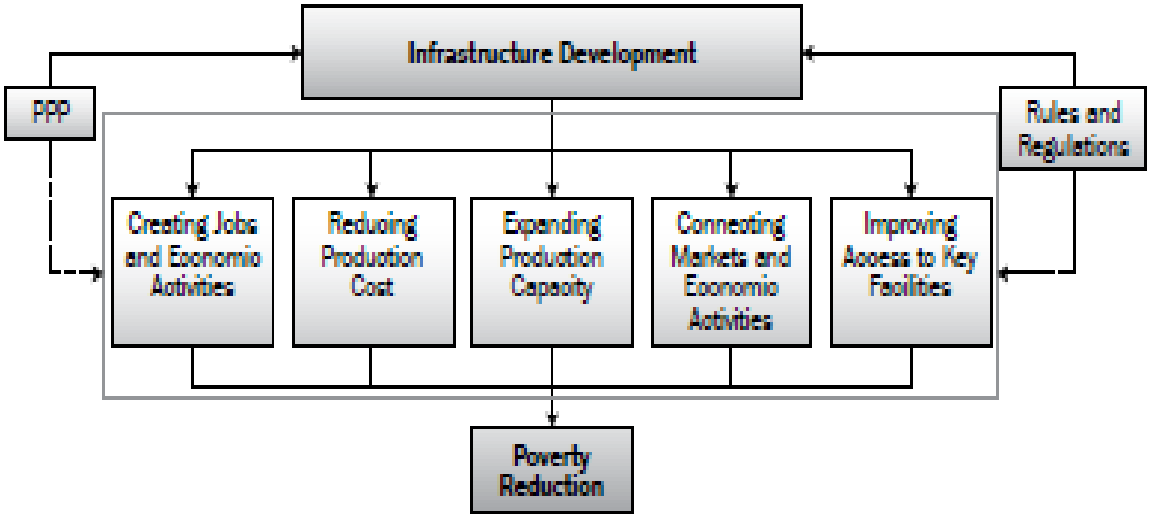


Source: Ali and Pernia (2003).

Results of Egert, Kozluk and Sutherland's (2009) study suggest that long-term positive impact on growth may be obtained from infrastructure investments, particularly in power and telecommunications sectors. In China, sustained high economic growth is largely attributed to its massive investments in physical infrastructure since the early 1990s. Sahoo, Dash, and Nataraj (2010) found that there is a unidirectional causality from infrastructure development to output growth using available data from 1975 to 2007. Meanwhile, Llanto (2013) showed the favorable impacts of infrastructure on Philippine agricultural productivity. Philippine regions with higher infrastructure investments were seen to have higher economic growth, as well.

Over the years, several studies have shown that quality infrastructure serves as the backbone of a strong economy, as well as a significant catalyst to reduce poverty. Jones (2004) empirical findings indicate that a compelling evidence showing that infrastructure investment (i.e. water and sanitation and roads sectors) is critical in attaining growth that at the same time, benefits the poor in East Asia and the Pacific. Given this, the author notes that higher pro-poor growth would necessitate higher levels of infrastructure spending in the region. Lack of necessary economic infrastructure, such as those covered in water, transportation, housing, and energy sectors hinders the government from attaining inclusive growth and may also exacerbate poverty especially in areas which are in dire need of such infrastructures (Geest and Nunez-Ferrer, 2011). Figure 18 illustrates how infrastructure development may lead to poverty reduction. In this framework, PPPs are included as a mechanism to provide infrastructure.

Figure 18. Framework on Infrastructure for Inclusive growth and Poverty Reduction



Note: PPP = public–private partnership.
Source: Developed by the author.

Source: ADB (2012).

3.2. Infrastructure Needs in Asia-Pacific Region

Infrastructure development in Asia has greatly contributed to poverty reduction (a decrease of the number of poor people from 903.4 million in 2005 to 754 million in 2008, based on USD1.25 per day poverty line), while rapid economic growth, i.e. increase in GDP per capita

from USD2,490 in 2000 to USD5,489 in 2009 can be greatly attributed to the infrastructure development in the region (ADB, 2012a). Addressing the remaining massive infrastructure gaps would result in substantial improvement both in human and economic development in the region.

In 2009, the ADB and ADBI reported that Asia needs to raise an approximate amount of USD8 trillion in overall national infrastructure for the period 2010 to 2020 or equivalent to USD730 billion per year (68% for new capacity; 32% for maintaining and replacing existing infrastructure[2] (Wignaraja, 2013). Moreover, Asia needs an additional USD290 billion for specific regional projects on transport and energy infrastructures (ADB and ADBI, 2009). Table 8 and Table 9 present estimates for Asia-Pacific.

Table 8. Top 10 Asian Countries' Infrastructure Investment Needs, 2010-2020

Countries	USD Billions
PRC	4,368
India	2,172
Indonesia	450
Malaysia	188
Pakistan	179
Thailand	173
Bangladesh	145
Philippines	127
Viet Nam	110
Kazakhstan	70

Source: Wignaraja (2013)

Table 9. Infrastructure Needs in Asia and the Pacific, by Sector, 2010-2020 (USD million)

Sector/Subsector	New capacity	Replacement	Total
Energy (electricity)	3,176,437	912,202	4,088,639
Telecommunications	**325,353**	**730,304**	**1,055,657**
Mobile phones	*181,763*	*509,151*	*690,914*
Landlines	*143,590*	*221,153*	*364,743*
Transport	**1,761,666**	**704,457**	**2,466,123**
Airports	*6,533*	*4,728*	*11,261*
Ports	*50,275*	*25,416*	*75,691*
Railways	*2,692*	*35,947*	*38,639*
Roads	*1,702,166*	*638,366*	*2,340,532*
Water and Sanitation	**155,493**	**225,797**	**381,290**
Sanitation	*107,925*	*119,573*	*227,498*
Water	*47,568*	*106,224*	*153,792*
Total	**5,418,949**	**2,572,760**	**7,991,709**

Source: ADB and ADBI (2009).

[2] http://www.adbi.org/files/2013.09.04.cpp.wignaraja.asian.infrastructure.dev.way.forward.pdf

As shown in Table 9 above, the bulk of infrastructure needs are in the transport sector, amounting to around USD 2,466.1 billion. This is followed by the telecommunications sector which needs USD 1,055.7 billion and USD 381.2 billion for the water and sanitations sector. It is noted that traditional financing, i.e. public sector tax revenues and borrowings may not be sufficient in addressing these infrastructure gaps. It is, thus, important to explore ways by which private sector investments could find their way into infrastructure development. This is where PPPs properly structured and managed could significantly contribute. As the experience of countries in the Asia-Pacific region that have tapped substantial private investment in infrastructure would indicate, it is equally important to have appropriate laws and regulations governing infrastructure procurement e.g., clear, transparent and facilitating infrastructure procurement methods, and an enabling political and regulatory environment to encourage private participation, at the minimum.

Meanwhile, Box 1 shows various other estimates of the ADB (2012) of some of its developing member countries' infrastructure needs as of 2012. It is apparent that India is the country which needs one of the highest amounts of infrastructure funding.

Box 1. Approximated Infrastructure Requirements in ADB Developing Member Countries

India: Goldman Sachs estimates that India will require $1.7 trillion in financing during 2010-2020 to meet its infrastructure needs.
Source: Goldman Sachs. 2009. India can Afford Its Massive Infrastructure Needs. *Global Economics Paper*. 187 (September).

Malaysia: $20 billion for 52 proposed public-private partnership projects for 2011-2015, or $5 billion per year.
Source: Government of Malaysia. 2011. *Tenth Malaysian Plan, 2011-2015.* Kuala Lumpur.

Viet Nam: $167 billion in proposed infrastructure investment for 2011-2020, with $65 billion per year.
Source: Government of Viet Nam, Ministry of Planning and Investment estimates.

Indonesia: $211 billion in proposed infrastructure investment for 2011-2015, with $105 billion to be sourced from the private sector or approximately $4.2 billion per year.
Source: Government of Indonesia. 2011. *Master Plan for Acceleration and Expansion of Economic Development, 2011-2025*. Jakarta.

Thailand: $48 billion for 2009-2012, with $4.9 billion to be sourced from the private sector or approximately $1.6 billion per year.

Source: Government of Thailand. 2009. Stimulus Package No. 2 Program. Bangkok.

Source: Lifted from ADB (2012).

3.3. Public Procurement and Financing of Infrastructure

Procurement and financing of infrastructure have traditionally been the domain of the public

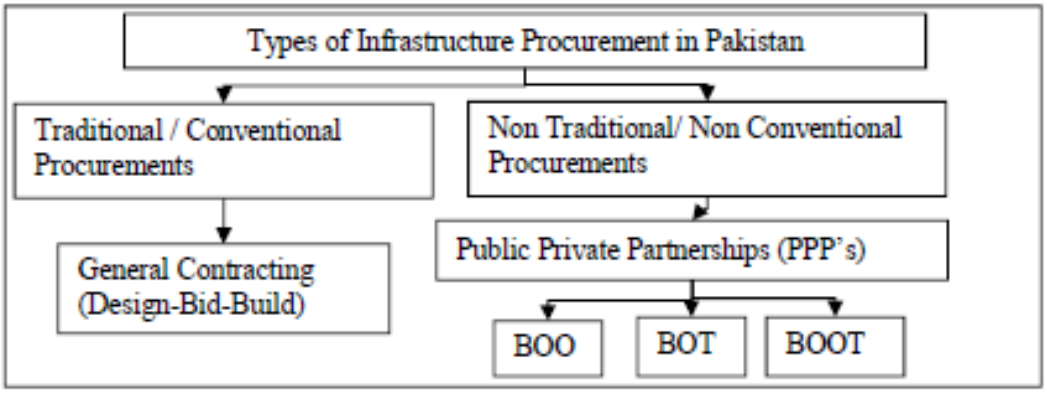
sector. As defined by the ADB, "procurement is the process by which a government constructs infrastructure, supplies schools and clinics, and contracts professional services" (Rothery, n.d.). Procurement methods, particularly for infrastructure differ across countries in the region. Some countries still rely largely on public procurement but there is a growing interest in utilizing PPP schemes to provide and finance infrastructure.

Below are the profiles of procurement methods of some of the the countries in Asia Pacific such as Armenia, China, Pakistan, Philippines, and Vietnam.

Similar to most democratic countries, Armenia is governed by the Constitution (i.e.laws and regulations) which recognizes the separation of the legislative, executive and judicial branches. According to the ADB (2011a) report, the procurement of goods and services account for 4.5% of its GDP and 16.8% of its total budget in 2010. The Law on Procurement (LoP), which was adopted in December 2010, transferred the procurement system from a semi-centralized system to centralized one. Notably, the private sector conducts all infrastructure-related civil works in Armenia. They are chosen based on "tenders as state procurement of services, rather than PPP". Today, the Armenian government is committed to strengthening the PPP model as a means to finance infrastructure. A variety of PPP models is being used in most of its economic infrastructure sectors such as in energy, telecommunication, transport, postal service, water distribution, and networks (TRACECA, n.d.).

In Pakistan, the infrastructure procurement method may be classified into two general approaches: traditional and non-traditional procurements (figure 19). Under the non-traditional method, Build-Operate-Oen (BOO) is the one recommended for procuring thermal power projects; meanwhile, the Build-Operate-Own-Transfer (BOOT) was once used for a hydropower project. But in general, Build-Operate-Transfer (BOT) is the most commonly used method for infrastructure projects in Pakistan (Khalfan and others, 2013).

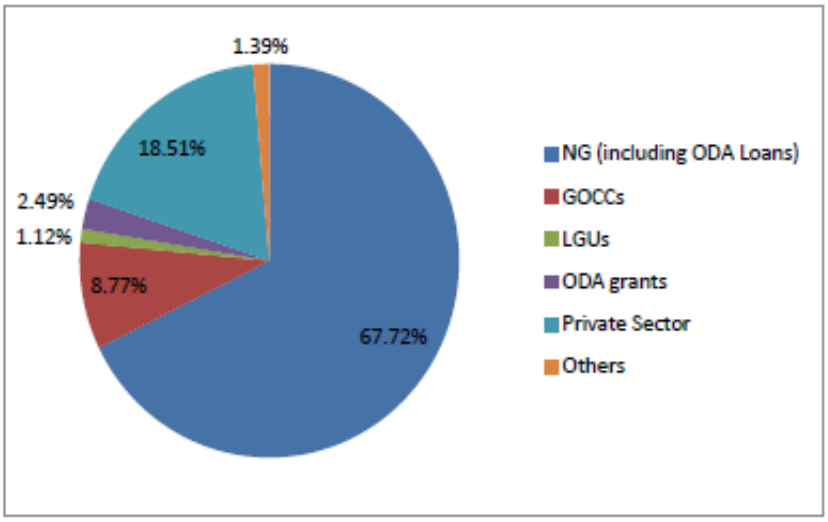
Figure 19.



Source: Noor, Khalfan and Maqsood (2012).

Like in the case of many countries in the region, the Philippine government serves as the single largest procuring entity in the country. It allocates large chunks of the domestic revenues to spend for goods and services for its projects. (ADB, 2011b). As shown in Figure 20 below, bulk of the aggregate infrastructure investment targets for the period 2011 to 2016 will be provided by the national government (67.72%) but with a sizeable amount to be provided by the private sector.

Figure 20. Investment Targets by Funding Source, 2011-2016



Source: Public Investment Program 2011-2016 (as of May 31, 2012).

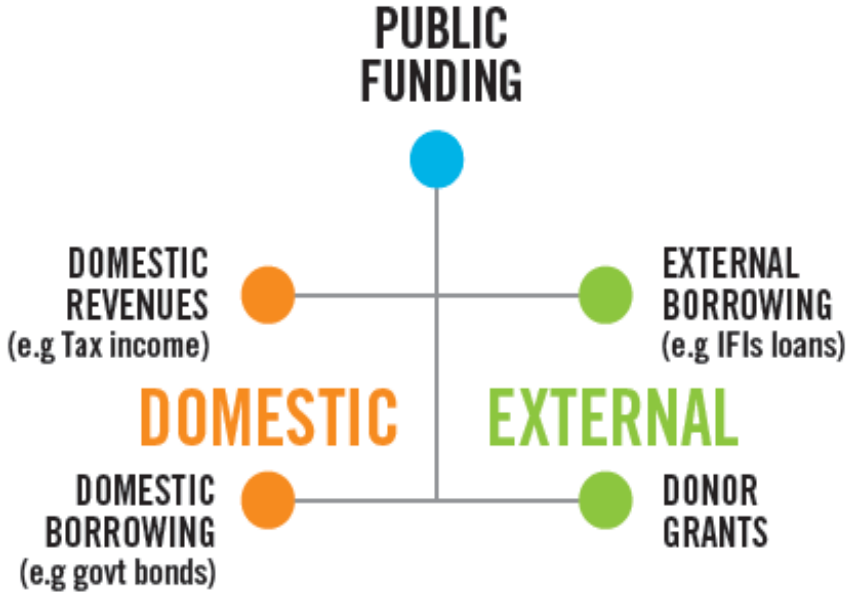
PPP as a procurement method in the Philippines was reinvigorated in 1990 when the country experienced serious problems on electrical power shortage (Llanto and Navarro, 2014).

In the case of China, government procurement excludes procurements made by state enterprisesFrom 3.1billion Yuan in 1998, the amount of "government procurement" had increased to 842.2 billion Yuan in 2010 (ADB, 2011c). Also, majority of the procurement expenditure in 2010 went to physical infrastructure (453.66 billion RMB); the second largest portion was allocated to goods (317.6 billion RMB), and finally, to services (70.91 billion RMP). However, it must be noted that despite such large amounts for construction, it does not fully take into account other state expenditures such as the Beijing-Shangha High Speed Railway system and Three-Gorges Dam which were procured by state-owned enterprise. Under the Government Procurement Law (GPL), procurement may be done through the following methods: 1) public tender; 2) private tender or tender by invitation; 3) competitive negotiation; 4) single-source procurement; 5) inquiry; and, 6) other methods approved by the State Council regulatory authority for government procurement (Zhang, 2010). The GPL also requires the use of domestic sources for public procurement except for certain instances (e.g. unavaibality of required goods, projects, or services) Majority of its infrastructure financing is sourced from three channels such as direct budget investment from fiscal resources (i.e. central, provincial, and local level financing, off-budget fees), borrowing and market-based financing (Sahoo, Dash, and Nataraj, 2010).

Likewise, public procurement in Vietnam covers the bulk of the share of public expenditures which are mostly allocated to sectors such as water and sanitation, education, healthcare and infrastructure. The Tender Law which was imposed in 2013 provides for the following procurement methods: 1) open competitive bidding which is required for most of the procurements, without restriction on number of participants; 2) designated competitive bidding which is restricted through direct invitation to at least five candidates in certain circumstance, as specified in the law; 3) appointed bidding which is used in special circumstances (e.g. requiring urgent action) and in instances wherein a procurement is below a certain financial threshold; and 4) other methods may be used, however subject to the Prime Minister's approval, if none of the abovementioned methods are viable (Hai and Watanabe, 2014).

According to ESCAP (2013), infrastructure financing in Asia-Pacific region remains largely dependent on traditional sources of financing such as domestic tax revenues, external and domestic borrowings and donor grants (figure 21). There seems to be a growing need for access to other innovative means of financing to augment the infrastructure gaps in the region. One of the recurring recommendations to address this concern is the inclusion of the private sector through pure financing, provision of technical capacity building activities, or both. In this light, the PPP model is gaining more popularity especially among developing countries where governments seek for the potentially higher level of technical capacity, efficiency and resources that the private sector could offer.

Figure 21. Traditional Sources of Financing

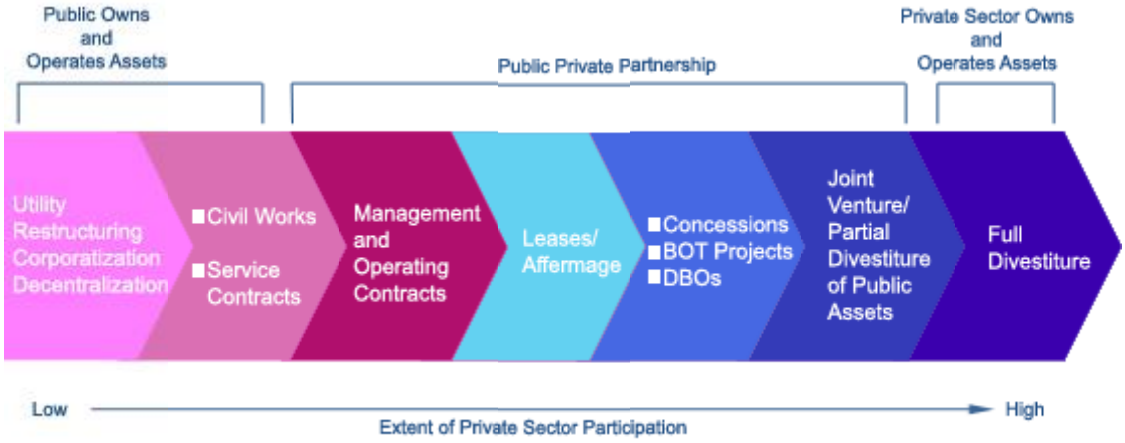


Source: ESCAP (2013).

3.4. PPP as an Emerging Infrastructure Financing Scheme

The concept of public-private partnership earned substantial popularity in the US and UK during the early 1980s when both governments saw the potential of the private sector in fulfilling their thrust to reduce public sector spending, delegate certain responsibilities to "private for-profit sector", and encourage voluntary collaboration for the provision of public goods (Mitchell-Weaver and Manning, 1992). In the latter years, the US started to involve other partners, as well, such as civic organisations and private non-profit firms, in financing / operating public sector projects (Jütting, 1999). Since then, the PPP model has been adopted in different countries, especially among the developing economies. It has also taken various forms depending on the allocation of risks and agreement on operations and financing undertaken by the public and private sector (figure 22).

Figure 22. Types of Public-Private Partnership Agreements



Source: Public-Private Partnership in Infrastructure Resource Center (PPIRC), World Bank.

Today, the PPP scheme is being widely used in financing development projects especially those in the physical infrastructure sector involving long-term investments and longer project phases. These projects cover the following subsectors: power generation and distribution, water and sanitation, refuse disposal, pipelines, hospitals, school buildings and teaching facilities, stadiums, air traffic control, prisons, railways, roads, billing and other information technology systems, and housing (Felsinger, 2011).

3.5. Rationale for Using PPP

In its report, the ESCAP (2013) lays down the three key essential and unique features which justify the importance of PPP model especially in developing countries where government budget is limited (see box 2).

Box 2. Why Opt for PPPs?

- "Access to private sector capital": With the increased access to private sector financing, the government budget is significantly relieved by an amount that is large enough to finance other equally important development projects (e.g. anti-poverty programs). Aside from this, there are certain infrastructure projects that may be extremely costly for the government to solely finance but are highly critical to the country's development; private sector intervention have the potential to make such projects feasible. Nonetheless, accurate and unbiased estimations of future payments to the private concessionaire are highly necessary to ascertain that all of the parties involved will attain the optimal benefits from the construction and operation of the PPP project.

- "Better allocation of risks": Another unique feature that highlights the importance of PPPs in meeting the growing demand for infrastructure is the ability of the involved parties to better, if not efficiently, allocate risks depending on the comparative advantage of the players and the project characteristics (UNESCAP 2013). For instance, the public sector may be more efficient in handling regulatory risks (e.g. land acquirement process, construction permits); meanwhile, the private sector may be more apt in managing risks

involved in the construction and operational risks. In general, both parties aim reduction of costs up to its optimal level without forsaking the public interest.

- "Efficiency gains": If constructed carefully, PPP contracts allow for efficiency gains since they put more focus on the outputs (i.e. service that will be provided), and less on the inputs (i.e. "detailed specification of the infrastructure"). Such characteristic of PPP contracts provide the necessary flexibility to the private sector partner to allow them to utilize or conduct their service in the most efficient way. This also helps address the issue on "short-termism" which is commonly related to major infrastructure projects.

Source: ESCAP (2013).

The World Bank Institute (2014) listed down the unique features of PPPs that allows for improving the value of money used in funding infrastructure needs. These are the following: 1) whole-of-life costing which allows a single party to handle the "design, build, operate, and maintain" stages of the project thus incentivizing them to complete the whole project in the least costly means possible; 2) risk transfer / allocation 3) focus on service delivery; 4) innovation; 5) asset utilization; 6) mobilization of additional funding, and; 7) accountability.

3.6. PPP model and Sustainable Development

Indeed, private sector participation through PPPs may prove to be appropriate and useful in fulfilling sustainable development projects. For instance, upon conducting preliminary investigation of PPP cases in Australia, Sweden, and Morocco, Colverson and Perera (2011) found that the main advantage of using the PPP model in attaining sustainable development is that the private sector largely contributes in achieving better infrastructure and reduce cost and time used during the construction and operation phases. In the case of the project to construct a desalination plant in the State of Victoria, Australia, proponents showed ways by which an experienced PPP jurisdiction sought to integrate environmental considerations into a large infrastructure projects.

With careful project preparation and planning, project risks (e.g. timeframe, finance, planning permits, and community consultations) are significantly distributed between the public and private sectors. PPP model also provides for increased investment in public infrastructure since the government would have more resources in financing other infrastructure projects. The stepping in of the private sector would stimulate economic activity, generate more jobs and opportunities for public investment. Likewise, the private sector benefits from reduced risk, secure and long-term investment that are assured under contract with the government. (Colverson and Perera, 2011).

The experience with successful PPP projects in funding and sustaining development projects have encouraged governments in developing countries to engage in such arrangements. Other types of PPP arrangement may take the form of information-sharing mechanisms, jointly-run projects for research and innovation, and government interventions to support private sector development. An example of a successful PPP is the Nam Theun 2 Project which is the biggest hydropower project in Lao PDR costing around USD1.2 billion or approximately one-third of the country's GDP. The Nam Theun 2 Power Company (NTPC), an example of collaboration between regional department and the Private Sector Operations Department, is owned by

various players: the Electricite de France (35% shareholding), the Lao PDR government (25%), and Italian-Thai Development (15%). This project also received support from the ADB amounting to USD20 million in public sector loan to the government, USD50 million private sector loan to NTPC, and USD50 million political risk guarantee to NTPC (ADB, 2012b). The duration of the concession is 25 years in which the Lao government is expected to receive as much as USD2 billion as future revenues (i.e. royalties, dividends, taxes) to fund its poverty reduction programs.

A case study on the build-transfer-operate projects for port conducted by Kim, J., Kim, J.H., and Choi (2011) use a survey of private participants in port projects (concessionaires), experts who conducted research and provided advices, as well as those involved in evaluating the PPP approach. The survey revealed the following: 1) From 1994 to 2008, transport volumes at ports increased by 4.9% per year on average, accompanied by a steady rise in public investments every year; also, private investment has been required to develop or expand port facilities during the same period; 2) the amount of private investments peaked in 2009 before declining gradually in 2015; the said decline is expected because most of the port development projects are planned to be developed by 2011. On efficiency effects of PPP projects: 1) By comparing the PPP projects with the turnkey-based government projects, the study estimated that W648.7 billion (USD 0.58 billion) was saved, and; 2) By comparing with the government projects using an alternative bidding method, the study estimated that W342.3 billion (USD 0.31 billion) was saved. The only major issue was that cargo throughput was hard to predict due to its high sensitivity to market conditions. In general, the PPP scheme has been shown to be a viable and profitable alternative to infrastructure financing and provision, which may be attributed to the government's effective support to implement the PPP model.

Marin (2009), with information on more than 65 PPPs for urban water utilities serving a total population of about 100 million, assessed the performance of those PPP projects and identified the net improvements achieved under those partnerships. The main findings of the study show that private operators have the potential to improve project efficieny in terms of quality and operations. Given this, impacts on access to financing has been largely indirect as motivated by the strong link between better management and increased investment (e.g. clients become more willing to invest, thus allowing the efficient private operator to expand services). One of the most important area of concern is the incorporation of social goals in the water PPP projects. The author recommended the following: 1) that water PPP projects need to be made pro-poor by taking into account the cost of social goals in the preparation of the PPP projects; 2) "the cost of social goals must be recognized in the design of PPP projects"; 3) "subsidizing of access for the poor should be considered"; 4) "separation of customer tariffs from the remuneration of the operator can have advantages"; and 5) "the wide-ranging impact of PPPs on labor must be better addressed". Marin (2009) also noted the need for transparency in regulationswhich was also deemed as the basic foundation of successful PPPs by Sambrani (2014)[3]. . Some of the successful PPP projects on urban water utilities are evident in Western and Central Africa, e.g., Cote d'Ivoire Hybrid Affermage/Concession (since 1950) and Semegal Affermage (Fall, M. et al. 2009).

Based on the two PPP case studies in Colombia (i.e. Cartegena Water Supply, Sewage, and Environmental Management project) and Canada (i.e. Vancouver landfill project), Hamilton and Holcomb (2013) found that indeed the PPP model play an important role in meeting the

[3] This study explores the case of the Greenfield Bangalore International Airport, India wherein total investment amounts to INR19.3 billion (USD0.31 billion) under Build-Own-Operate-transfer (BOOT) scheme.

challenge of sustainable development. In the case of the Cartegana Water Supply, participation of the private sector water firm had significantly helped in providing the necessary management practices and skills to improve operational efficiency and effectiveness. The PPP projects also brought about substantial social and economic benefits such as increased reliability for current customers, increased access to about 35,000 additional households wherein majority are poor, significant reduction in water leaks, hiring of local social workers, community relations specialists and conctructions workers which allowed for the improvement of the company-community relationship.

In the case of the Vancoucver Landfill project, Hamilton and Holcomb (2013) found that the private sector expertise and technology have helped transform waste into energy commercially. This project has created employment for about 300 persons and is expected to annual revenues amounting to USD 300,000 approximately which will compensate for the operating costs. The authors highlighted that the PPP enabled the transformation of an expensive environmental program into a more effective and revenue-generating environmental program. Notably, it was also able to: 1) reduce greenhouse gas emissions by 200,000 tonnes per year of carbon dioxide equivalents which translates to the emissions volume of 40,000 automobiles; 2) "capture about 500,000 GJ of energy a year, the energy requirement for 3,000 to 4,000 households"; and 3) allowed for 20% decrease in CanAgro's annual natural gas use. Finally, they mentioned that good governance and political commitment are also critical success factors for PPPs.

The Partnerships in Environmental Management for the Seas of East Asia (2009) explored the case of the Sabang Sewerage Collection and Treatment System of Puerto Galera. One of the key findings is that PPP serves as an alternative delivery mechanism especially when the counterpart player in the government have limited technical and financial capacity, and management capability. Another example is the case of the national highways of India, as studied by Verougstraete and Kang (2014). The successful components of that specific PPP project is the contract streamilining or the use of Model Concession Agreement (MCA) and the construction of a viability gap funding which aims to fill the gap between the project's cost and expected revenue stream.

The growing importance of PPP as an alternative mode of addressing the financing infrastructure needs of the Asia and the Pacific region is not only evident in the abovementioned case studies but also in the persistent efforts of various governments to include this in their development strategy for the infrastructure sector. For instance, recognizing the important role of PPP in financing infrastructure projects, the Indonesian government established the PPP Center that would specifically handle the project preparations and auctions. This initiative is a fulfilment of the Ministry of Finance's commitment during the 2013 APEC meeting in Bali. There are two ongoing PPP projects as of October 2014 – 1) Central Java Power Plant (SJPP) in Batang; and 2) Mine South Power Plant in South Sumatera (Investor Daily 2014). As indicated in the 3rd Medium Term Development Plan 2015-2019, the Indonesian government aims to achieve the following goals on basic needs: 1) 100 percent household and rural electrification ratio; 2) 100 percent access to clean and safe water sources; and 3) fulfilment of housing needs with supporting infrastructure and long-term housing financing system. Furthermore, the government is pushing for the utilization of nuclear energy for electricity generation. The government intends to achieve these goals through infrastructure development with an overarching theme of competitiveness (Indra 2014). Priority investment needs is estimated around IDR 5,452, trillion (USD 477 billion). One of the identified strategies of the government is to improve partnerships between government, community, private sector, bilateral and multilateral.

As such, the Indonesian government considers the following as critical factors in achieving PPP success: 1) Have credible sponsors (developer and equity financier) with adequate local, technical, and financial resources, and; 2) "Lenders with expertise which can provide long-term funding at an appropriate time". Indra (2014) further emphasizes that PPPs represent an innovative way for the governments to collaborate with the private sector in providing high-quality delivery of public services and in helping close the infrastructure funding gaps. The Indonesian government is committed to improve the investment climate and further explore the means by which it can encourage the private sector and the CSOs in establishing adequate infrastructure necessary for the development of their country.

Another case in point is the approach to PPP by the Government of Thailand. On April 4, 2013, the new PPP Act ('Private Investments in State Undertakings B.E. 2256 (2013)') in Thailand was implemented, replacing the old 'Public Participation in State Undertaking Act B.E. 2535 (1992)'). The new PPP Act aims to streamline the approval process of the projects through the PPP Policy Committee, headed by the Prime Minister of Thailand. The Committee is the responsible entity for the setting up of the five-year strategic plan and in approving the PPP projects. Meanwhile, the State Enterprise Policy Office (SEPO) acts as the PPP secretariat office. It is expected to prepare a draft national PPP strategic plan (i.e. five-year investment and policy plan) which covers list of priority sectors, pilot projects, and investment budgets, provide recommendations on feasibility of the proposed projects, and provide information / database on PPP schemes. The previous PPP law covers only investment projects which exceed one billion baht. However, according to the ERIA (2014a) report, the PPP Committee is now given the authority to consider project which are below the said amount. The new PPP Act also requires the host agent to hire external consultants to conduct a feasibility study. The Ministry of Finance (MOF) also created a Private Investment Promotion Fund which will provide 'seed money' for new investment projects. The new PPP Act provides for the following (Larkin, 2014): a) Comprehensive institutional and regulatory framework; b) Methodology for the allocation of risk and / or project evaluation; c) Value for Money (VfM) Analysis; d) Contract Management; and e) A Central Agency – SEPO under the MOF to monitor investments.

Recently, the ERIA (2014a) reported that the Thai government published a 2-trillion loan Bill (~USD 67 billion) to cover its investment plans for infrastructure (majority are mega-infrastructure projects) for the period 2014-2020. Nonetheless, the government recognizes the need for PPP projects, not only in terms of providing additional infrastructure financing source, but also in terms of efficient execution and management of projects. According to the report by Rojanavanich (2014), the total project value of PPP in the next six years (2014-2019) may amount to more than 1.7 trillion baht (USD 57 billion), as per Ministry of Transportation.

3.7. Important Factors for Succesful PPPs

The processes involved in the whole model are innately complex and as mentioned earlier, need high technical capacity, not only for the construction phase but also for the preparation stage which may prove to be the most crucial part in the whole PPP process. This was one of the issues that were pointed out by Verougstraete and Kang's (2014) in their assessment of the development of the National Highways Authority of India (NHAI); compared to other countries, investment in detailed project preparation in India was significantly lower. There is also the issue on limited access to financing (both in debt and equity financing), existence of legal

disputes, and land acquisitions and related environment/forest clearance issues. Colverson and Perera (2011) enumerated the potential disadvantages of PPP based on various cases of PPP in different countries. First, PPP projects may be more costly in the long-run than standard procurement largely because of higher costs of private sector borrowing relative to government borrowing rates. Moreover, issues on accountability and transparency arise as the private sector may be more stringent in releasing data on profits, costs, or lessons learnt due to commercial confidentiality. PPPs are typically complex and long-term; hence there are only a limited / specific firms that may be induced to engage in such partnerships. Given this, the preparation stage stands to be the most crucial stage of the PPP process and needs to be carefully studied to prevent encountering unnecessary problems once the facility has been constructed and made operational.

Developing countries may not be equipped to deal with the complex nature of PPPs. A case in point to illustrate how a PPP project could encounter serious problems is a study by Ogunlana and Abednego (2009) based on a perception survey conducted among stakeholders (i.e. government – government agencies and their officials; investor – investors, lenders and insurers; contractor – contractors, subcontractors and operators) of the Yen Lenh Bridge BOT project in Vietnam. The Yen Lenh bridge, which was constructed to connect Hung Yen and Ha Nam provinces, was expected to bring about positive economic impacts since there would be no need to traverse the river separating the provinces and there would be less severe traffic jams in the alternate route near Hanoi. The study's results show that the project has serious governance issues in terms of the following: fairness, transparency, accountability, sustainability and effectiveness and efficiency.

1) On fairness: It was found out that the government officials who also have the authority within the concession company would have overly optimistic feasibility studies so as to increase the chance of getting those projects approved by their superiors. Hence, biased information was used in the formulation of project design and planning work;

2) On transparency: The result on this aspect is characterized by the "lack of understanding between stakeholders in terms of risk perception". This has resulted to varying and often conflicting approaches to mitigating these risks since their strategies were based on their own needs and capacities. The authors suggest that there should have been, in the first place, a proper and transparent exchange of information among the stakeholders regarding these differences.

3) On accountability: The accountability of the project was seen to be 'substandard', as well. Since the forecast was based on exceedingly optimistic data of future economic development and demand in the region, the predicted revenue based on amount of vehicles passing through this bridge and its positive socio-economic impact on the region was also overestimated. As expected, such projection of revenues was unmet due to insufficient traffic caused by competing transportation network around the region (which was ironically initiated by the government, as well) and poor road condition that links to the facility.

4) On sustainability: The nationwide infrastructure development plan is not well-coordinated. There exists lack of coordination between government agencies and with the private sector. Even though this is a common and known knowledge among the stakeholders, especially the government, no significant strategy (e.g. stakeholder management approach) has been implemented to address this problem. Thus, it affects

the sustainability of the project in the long run while simultaneously discouraging potential investors from investing in future PPP projects. Also, the sustainability of the project is at stake since the inefficient and ineffective construction process and corruption has resulted to poor construction quality, thus high maintaining costs.

5) On effectiveness and efficiency: The authors suggest that the "project actually needs to improve its administration practice, especially concerning its documentation process". They also mentioned the lack of historical information regarding risk sources, as mentioned by the respondents of the survey. Given this, the stakeholders find it difficult to produce accurate forecasts about future risks. The authors, thus, mentioned the need for proper project documentation.

Despite the increasing popularity of PPP scheme, several countries in the region are still unequipped to engage in such arrangements which could be attributed to lack of human and financial resources. The model is complex by nature and thus requires in-depth technical capacity from various professionals such as engineers and economists. Aside from these, the institutional framework and laws which governs the country should coincide with the demands of PPP model (e.g. policies encouraging private sector participation and at the same time, taking into consideration the welfare of the public).

Box 3 shows some of the key factors considered by UNESCAP (2013) as necessary for the success of PPPs. These factors are not necessarily present in some developing countries that are considering PPPs as an alternative method for provision of infrastructure. This indicates the need for those countries to develop internal capacity and appropriate frameworks for dealing with PPPs.

Box 3. Important Factors for Successful PPPs

- **An adequate legal and regulatory framework**: In 2000, the UNCITRAL Legislative Guide on Privately Financed Infrastructure projects was adopted, thus setting the necessary international guidelines for PPP projects. Results of a recent assessment study conducted by the European Bank for Reconstruction and Development (EBRD) on ESCAP member countries show that five out of the eleven countries evaluated scored more than 50% which was reported to be a relatively good indicator that the most of the Asia-Pacific countries have been improving their PPP models.
- **A consistent policy orientation**: The creation of an overall national strategy for PPPs might be significantly helpful in making sure that projects would remain attainable and sustainable despite changes in government administration as such long-term projects are often vulnerable to political swings.
- **PPPs are not only about procurement but also about long-term relationship management.**
- **Capacity-building should not only be limited to the central government, but more especially to local government units since such infrastructure projects are often done in cooperation in the sub-national level**.
- There is also a need for **"financial support measures"** that would encourage private investors to enter the market of PPPs. Some of the areas in which the government may intervene are on the following: land acquisition, provision of construction subsidy (e.g. viability gap fund as with the case of Indonesia), direct government payments (e.g. availability payments) for those projects which cannot be

charged by user charges, state guarantees (e.g. default guarantees, minimum revenue guarantees), subordinate debt financing, existence of project development fund to finance the preparatory stage of the project.

Source: ESCAP (2013).

4 NEW INSTITUTIONAL DEVELOPMENTS IN INFRASTRUCTURE FINANCING

Asia-Pacific economies have relied mostly on domestic resource mobilization (taxation) and traditional ODA to finance infrastructure investments. Multi-lateral donors such as the World Bank and the Asian Development Bank have provided loans and grants, including technical assistance, to Asia-Pacific economies for infrastructure development. Attracted by rising demand for quality infrastructure and expectation of high returns, private participation in infrastructure development has been made possible through different variations of PPP. PPPs have emerged as a viable, although complex, procurement method for infrastructure development. This section mentions briefly a new phenomenon in the development finance landscape that provides an alternative or a complementary financing instrument for infrastructure. The dearth of data on these alternative financing mechanisms preclude an extensive treatment but it is important to mention them here because of their huge potential in addressing the infrastructure lack in the Asia-Pacific Region (recall the brief overview of infrastructure in the region in section 2).

New institutional sources of development finance for the region have emerged recently and these are the Asian Infrastructure Investment Bank (AIIB), China's Silk Road Infrastructure Fund, the New Development Bank (NDB) (formerly referred to as the BRICS Development Bank), and the ASEAN Infrastructure Fund (AIF). The profiles of each institution are described below.

4.1. The Asian Infrastructure Investment Bank (AIIB)[4]

The AIIB aims to help augment the financing resources of Asian countries for their respective infrastructure projects. Twenty-one member countries formally launched the bank on October 24, 2014 in Beijing, China. The 21 member countries are: Bangladesh, Brunei, Cambodia, China, India, Kazakhstan, Kuwait, Laos, Malaysia, Mongolia, Myanmar, Nepal, Oman, Pakistan, the Philippines, Qatar, Singapore, Sri Lanka, Thailand, Uzbekistan and Vietnam. The prime mover of the creation of this bank is China. It provided an initial capitalization of US$ 40 billion, which is 80 percent of the authorized capital of US$ 50 billion. It is the single biggest shareholder among the 21 economies, and could practically control voting rights and decisions in the bank.

China's Ministry of Finance declared that any interested country that is committed to promoting regional development in Asia and global economic development may join the AIIB. Other countries have up to end of March 2015 to sign up as prospective founding members. Subsequently, additional countries signed up as prospective founding members and as of March

[4] Sources: Shaohui (2014); Current Affairs (2014); The Economic Times (2015); China-US Focus (2015); Department of Finance (2015).

20, 2015, there are a total of 34 prospective founding members. The additional countries are: France, Germany, Hong Kong, Indonesia, Italy, Jordan, Luxembourg, Maldives, New Zealand, Saudi Arabia, Tajikistan, United Kingdom, and Switzerland.

Negotiations for a mutually acceptable Articles of Agreement (AOA) among the prospective founding members are currently ongoing and the target is to complete the negotiations, sign and ratify the AOA, and start banking operations within 2015. The target first loan is a financing for a Pan-Asian Gas Pipeline, which is planned to connect a series of joint energy resource development areas in the South China Sea.

4.2. China's Silk Road Infrastructure Fund[5]

The investment fund aims to finance projects that will establish a modern-day "Silk Road" or infrastructures linking markets across Asian and Eurasian territories. While the AIIB will cater to more general infrastructure projects, the Silk Road Fund shall be provided to projects that would help break the connectivity bottleneck in Asia. This fund was established as part of China's efforts to revive the old Silk Road, not only to address issues on Asian connectivity but also to tap the economic potential in the Eurasian territories. However, the allocation system of the fund is still unclear (Bin, 2015).

China established the Fund in November 2014 with US$ 40 billion capitalization, which is 40 percent of the authorized capital of US$100 billion. China's huge stash of foreign exchange reserves was tapped (65 percent of the initial capital) by the Chinese government to establish the Silk Road Infrastructure Funds together with funds are coming from three major Chinese financial institutions, namely, the China Investment Corporation and the Export-Import Bank of China (15 percent), and the China Development Bank (5 percent).

The People's Bank of China does not consider the Fund a state-owned sovereign fund but an investment facility similar to a private equity fund. Investors across Asia and outside Asia are welcome to Invest in the Fund. It began operations on February 16, 2015 (The People's Bank of China 2015), and its current focus is to establish the China's Silk Road Economic Belt and the 21st Century Maritime Silk Road Initiative.

The 21st Century Maritime Silk Road Initiative envisions building roads, railways, ports and airports across Central Asia and South Asia (Jianxin and Wong, 2015). Fujian, China is supposed to be the starting point of the Maritime Silk Road and the plans include the development of a pilot economic zone to deepen cooperation between Chinese mainland and Taiwan. It was also reported that the Fund aims to invest in a new port city in Colombo, Sri Lanka and in the development of the Sohar Port and Freezone in Oman.

China was reported to invest $1.4 billion in a new port city at the Port of Colombo in Sri Lanka. Proposed plans also include expanded terminal services and a US$1 billion highway connecting the port to the northern half of the island. Under the terms of the deal, China would gain ownership of one third of the total 233 hectares (583 acres) of reclaimed land that the new port city will occupy (Bangkok Bank, 2015).

[5] Bloomberg News (2014), The Economic Times (2015), CMS HK (2015).

Chinese officials are exploring investment options to accelerate development of Oman's Sohar Port and Freezone, in order to connect east-west traffic via China's proposed "Maritime Silk Road. Located 200 kilometers northwest of the Omani capital, Muscat, it is currently home to logistics, petrochemicals and metal clusters that feed downstream industries with iron and steel, plastics and rubber, ceramics and chemicals (Bangkok Bank, 2015).

4.3. New Development Bank (BRICS Bank)

The New Development Bank (NDB) evolved from the annual summit of the BRICS group of countries (i.e., Brazil, Russia, India, China and South Africa). The BRICS members created the bank on July 15, 2014 during the Sixth BRICS Annual Summit (The Economist, 2014). The declared objective of the NDB is to provide long-term financing for infrastructure and sustainable development projects in the BRICS group as well as various developing and emerging economies. aims to finance long-term infrastructure and sustainable development projects in BRICS and various developing and emerging economies (Griffith-Jones, 2014).

The NDB is headquartered in China with India as its first president. The NDB has an initial capital funding of US$50 billion, contributed equally among the members, of which US$10 billion or 20% will serve as paid-in capital. In addition, the BRICS members established a Contingent Reserve Arrangement which aims to make available a US$100 billion emergency reserve fund for addressing short-term liquidity needs, promoting further BRICS cooperation, strengthening the global financial safety net, and complementing existing international arrangements. The bank lending limit is US$34 billion per year and lending operations are expected to start by end-2015 (BBB, 2014).

There are some commentaries suggesting that the creation of the NDB was only born out of BRICS' frustration with the existing multilateral institutions. But to some, this also shows a "difference in philosophy" as the NDB prioritizes infrastructure financing over other priorities (e.g. education, healthcare). It recognizes the vital role of infrastructure in promoting development in a country (Khana, 2014).

Lending operations is expected to start by the end of 2015,.[6] Griffith-Jones (2014) explored the features that a BRICS development bank should have to achieve its mandate:

- Scope of lending and other instruments: This has been clearly defined by the BRICS leaders in the Durban 2013 Summit Declaration as "mobilising resources for infrastructure and sustainable development projects in BRICS and other emerging economies and developing countries" (BRICS, 2013: paragraph 9).
- Capital level: In addition to the information mentioned in the second bullet (that is, US$ 50 billion initial capital funding, 20 percent paid-in capital), once the BRICS bank has been established, BRICS countries could consider making additional contributions to paid-in capital; other emerging and developing countries could be allowed to participate as members of the BRICS bank
- Geographical coverage of lending: includes BRICS members and other developing countries; however, lending to low-income countries (e.g. sub-Saharan countries) may be given greater priority by providing subsidy.

[6] Sources: Jia (2015); The Economic Times (2015)

- Links with other multilateral, regional and national development banks: The bank would foster synergies and complementarities with these type of banks. An important advantage of the BRICS banks is that it can establish close ties with national development bank at its inception.

4.4. ASEAN Infrastructure Fund (AIF)

The AIF evolved from discussions between ASEAN members and the ADB. The AIF was first signed in September 2011 by ADB and members of the ASEAN. This is intended to assist in financing the ASEAN region's infrastructure investment requirements through the utilization of regional savings, which includes foreign exchange reserves. This was incorporated in April 2012 and in 2013, became fully operational. Its primary objective is to encourage environmentally sustainable and socially inclusive investments in the region (ADB, n.d.).

The Fund was incorporated in April 2012 in Malaysia and became fully operational in 2013. It primarily aims to encourage environmentally sustainable and socially inclusive investments in the ASEAN region. Member countries or shareholders, namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam, and ADB has a total initial equity contribution of US$485.3 million, with Malaysia as the largest contributor with US$150 million. These ASEAN members have also pledged to provide US$4-billion worth of financing until 2020 and the ADB pledged roughly US$9 billion, also until 2020 (ADB, 2013). For additional capital in its operations, the AIF will issue bonds, which can be bought from the central banks of member countries, starting 2017. The AIF is organized in a way that is financially self-sustaining (ADB, n.d.).

The AIF aims to provide funds to sovereign or sovereign-guaranteed projects in the ASEAN region, amounting to approximately US$300 million per year to bankroll infrastructure investment projects in the transportation, energy, water and sanitation, environment and rural development, and social infrastructure sectors. These infrastructure projects are chosen on the basis of economic and financial viability, beneficial effects on social development as well as impact on poverty alleviation, enhancing regional cooperation and integration, and heightening participation of the private sector or public-private partnerships (PPPs) to lessen operational risks (ADB, n.d.).

The Fund financed its first project in December 2013--a 500 kV Power Transmission Crossing Project between Java and Bali, Indonesia. The financing consists of US$25 million from the AIF, US$224 million from the ADB, and US$161 million from the Indonesian government. The AIF is targeting to fund six infrastructure projects each year, to be selected based on their economic and financial rates of return and potential impacts on poverty reduction (ASEAN Briefing, 2013).

In sum, these new sources of development finance represent different types of financing institutions that may provide developing economies in the Asia Pacific with a good alternative to traditional bilateral and multilateral institutions, and to complex PPP arrangements.

It is too early to say whether those international development finance institutions (IDFIs) will be run in the same way as the traditional bilateral and multi-lateral financial institutions (World Bank and ADB) with emphasis on observance of certain international covenants, e.g.,

prohibition of child labor in factories, respect for human rights, and others, and on adherence to certain loan conditionalities inspired by the so-called Washington Consensus.

The new international financial institutions were created not by the typical developed (OECD) countries but by (i) newly emerging countries (Brazil, Russia, Indonesia, China, and South Africa) in the case of NDB-BRICS bank, (ii) a fast growing developing economy, China, which has overtaken Japan as the second largest economy in the world, after the United States, and (c) a regional economic powerhouse, the ASEAN countries with cooperation from the Asian Development Bank.

These IDFIs, especially AIIB and China's Silk Road Infrastructure Fund can give the traditional bilateral (e.g., Japan's JICA) and multilateral financial institutions (World Bank and ADB) stiff competition in financing infrastructure projects in the developing economies of Asia. They can also cover any financing shortfall if the traditional bilateral and multilateral institution can not fully finance a large infrastructure project. The huge cash hoard of China has bankrolled the three large initiatives (AIIB, China's Silk Road Infrastructure Fund and BRICs) and given the trillions of dollars of foreign exchange reserves of China, expansion of lending and influence by these three new IDFIs is not impossible. The question is how voting rights among members of these three IDFIs will be defined, and how decisions will be made and implemented given the huge asymmetry in capital contributions by members.

5 KEY MESSAGES AND CONCLUDING REMARKS

The infrastructure needs of the Asia-Pacific Region are huge and are growing in view of the increase in population and rapid urbanization in several developing economies of the region. The bulk of infrastructure investments in the Asia Pacific Region are financed by tax revenues and public borrowing.

Tax financing and borrowing from capital markets will remain to be the most significant sources of infrastructure financing for most countries in the Asia Pacific region.

Some countries have relied substantially on ODA from multilateral and bilateral sources for financing infrastructure. ODA has been used for various purposes in the region even as a significant supplementary source of financing for some countries, especially for small, island economies that are substantially dependent on ODA to finance their development expenditures. Only around 19-29 percent of ODA going to the region have been channeled to infrastructure investments.

ODA going to the infrastructure sector represents a respectable amount but would never be sufficient for addressing the huge requirements for infrastructure in the Asia Pacific region. While relatively small and declining in amount, ODA could be a more strategic financing instrument by focusing on regional public goods, e.g., financing climate change interventions, disaster risk management, public health, etc. that developing countries would not be able to finance due to resource constraints and the complex nature of such goods that require resources, good management and regional coordination to produce.

However, traditional public sector resources and ODA cannot fully cover the financing gap in infrastructure and this points to PPPs as a complementary and significant source of finance.

PPPs can be important for infrastructure projects that can earn returns high enough to meet the profit objectives and risk taking of private investors.

PPPs are a novel way of financing infrastructure especially to the larger economies in the region and the experience so far of those economies indicates that PPPs can address a substantial part of their infrastructure requirements. PPPs respond to proper risk allocations between the public sector (government) and the private investors/operators and structuring such risk allocations will require a good understanding of such risks and the corresponding risk mitigation instruments to deploy. However, they are complex type of financing instrument that would require the right policy and regulatory frameworks, institutional capacity and various instruments for risk mitigation and credit enhancement, among others. PPP financing is still relatively small in amounts except for big countries like India, China, Russia and Turkey. The larger Asia Pacific economies have taken advantage of PPPs for infrastructure development while for the smaller developing economies they are not yet a significant source of infrastructure financing. The smaller developing economies, which are not viewed as profitable investment destinations by private investors, have yet to learn how to exploit those innovative PPP schemes.

A recent phenomenon is the rise of alternative development finance institutions that have been organized by the large emerging economies such as China, Brazil, and India. New international development finance institutions (IDFIs) have emerged as an alternative source of infrastructure financing in the region. The Chinese-financed institutions with backing from the Chinese government have the financial muscle to bankroll many large Asian infrastructure projects and they have started with a few such projects. In the future, once they get their bearings right, they could be the main sources of infrastructure financing for many countries in the region given China's huge demand for raw materials to feed its industry and manufacturing. China has linked overseas loans to access to food and raw materials in Africa and it could very well do the same in Asia, e.g., Cambodia. In the absence of information, it is hard to say whether these Chinese-financed institutions will try to complement efforts by multilateral institutions (World Bank and Asian Development Bank) to meet the huge infrastructure requirements of the region or whether they will operate independently of those institutions. Collaboration, complementation and cooperation in infrastructure financing seem to be a rational pathway in view of the infrastructure gaps in many developing economies in the region. The challenge to developing economies in the region is to learn how to deal with China, the rising new economic and political power in Asia Pacific in order to tap this potentially huge source of infrastructure financing.

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