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ORIGINAL ARTICLE

Infrastructure connectivity and regional economic integration in East Asia: Progress and challenges

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ABSTRACT

Intra-regional trade serves as a key growth engine for East Asian economies. Accompanying the rapid growth of bilateral and intra-regional trade ties, the East Asian economies are becoming increasingly connected and interdependent. Infrastructure connectivity plays a crucial role in bridging different areas of the East Asian region and enabling them to reap the full socioeconomic benefits of economic cooperation and integration. Nevertheless, further improvement of infrastructure in the region faces major challenges due to the lack of effective mechanisms for coordination and dialogue on regional integration through funding infrastructure projects, as well as the serious trust deficit among member states that has arisen from the on-going territorial and historical disputes.

Keywords: *East Asia; regional economic integration; infrastructure connectivity; China; trust deficit*

1. Introduction

Accompanying the rapid growth of bilateral and intra-regional trade ties, the East Asian economies are becoming increasingly connected and interdependent. Market-driven trading and economic interdependence among East Asian economies has derived from the emergence and expansion of an intra-regional production network within the region, with China serving as the final production hub.

Given the sluggish progress of global trade liberalization negotiations and uncertainty of the global economic outlook after the financial crisis in 2008/2009, the East Asian countries have strong incentives to use economic cooperation and integration as means to boost regional growth and to strengthen their own regional and global competitiveness.

Regional economic integration within East Asia has gathered pace over the years due to the regional partners taking concrete steps to increase cooperation. In particular, physical infrastructure connectivity improvement is the key determinant for achieving closer East Asian regional economic cooperation and integration in the future. Drawing on the development experience of China and other advanced East Asian economies, enhancing physical connectivity—and primarily transport

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development—will boost regional economic growth and promote closer regional integration. Brooks' study demonstrates this:

"The competitiveness of each country's production depends on the other countries in a production network as well as on the efficiency of the trading links among them. They thus have a strong incentive to cooperate with each other, particularly on improving physical and soft infrastructure to reduce the costs of trading between them." (Brooks, 2016, p. 191)

Geographical economic theories suggest that the long distance between two locations increases transport costs, which then negatively impacts on bilateral trade flows (Brakman *et al*., 2001; Overman *et al*., 2003). Hence, high transportation costs act as a key barrier to the growth of trade flows and impede local industrial and economic take-off. Transportation and other infrastructure improvement is the key to unleash untapped trade and economic growth potential. Geographical economic theorists have produced a number of studies identifying the contribution of transportation improvements in increasing bilateral trade and investment (Redding and Venables, 2001; Yu, 2011; Amiti and Javorcik, 2008). As demonstrated from the Chinese case, infrastructure investment also helps to promote regional economic integration by redistribution of industrial and economic activities (Qin, 2016).

East Asia has to speed up physical infrastructure improvement by addressing both hard and soft infrastructure issues in order to further promote closer intra-regional economic integration. Nevertheless, future development of inter-regional infrastructure connectivity faces daunting challenges due to the trust deficit among member states, and the lack of effective mechanisms for coordination and dialogue on regional integration through funding infrastructure projects. Whilst commitments by both the Japanese and Chinese to increase investment in infrastructure development are good for the East Asian countries in the short-term, how could the unchecked Sino-Japan contest on infrastructure construction and financing impede regional connectivity improvement and generate other adverse effects for East Asia in the long term? What is the current status of infrastructure connectivity improvement in East Asia and what progress has been made so far? What are the major challenges faced by East Asia in pursuing further infrastructure connectivity improvement and realizing closer regional economic integration?

This paper intends to provide a focused and in-depth analysis to address these questions. This paper will first provide detailed analysis on the current status of physical connectivity improvement and progress made so far; it will then discuss the major challenges faced by East Asia in further promoting infrastructure connectivity improvement.

The research design and methods adopted in this article were based on the analysis of secondary documents and statistical materials, previous scholarly works, and newspaper articles. Building on these studies, in this article, the author intends to address the above-mentioned questions and make a policy contribution to the understanding of the political economy of regional infrastructure construction and financing, and regional economic integration in East Asia.

To develop the arguments for the author' analysis, this paper is organized as follows: Section 2 will discuss connectivity enhancement as a prerequisite for East Asian regional economic integration. Section 3 will assess the status of physical connectivity improvement and infrastructure financing in the region. Section 4 will specifically address the issue of the Sino-Japan contest in

the Asian infrastructure sector. In Section 5, the author will analyze the main challenges impeding further regional connectivity improvement and closer regional integration. Finally, Section 6 will provide conclusions.

2. Enhancing connectivity as prerequisite for regional economic integration in East Asia

Due to the region's increasing global clout, the center of gravity of the world's economy is shifting to East Asia. Economic growth in East Asia[1] has benefited significantly from its intra-regional trade of goods (*e.g.* raw materials, intermediate components, and semi-finished products) and investment linkages among regional partners over the years. This phenomenon is highlighted by the case of China, where average growth rates of exports and imports of goods and services were 14.7% and 14.1% between 2000 and 2013, respectively. The corresponding figures for the six Southeast Asian countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam) were 6.7% and 7.1%, respectively, during the same period (World Bank, 2016). All Northeast Asian economies (Japan, China, Republic of Korea, Hong Kong, and Taiwan) are important foreign investors for ASEAN (Association of Southeast Asian Nations), and they rank as the top ten sources of foreign direct investment (FDI) inflows in ASEAN in 2015 (Table 1).

Table 1. Top ten source of FDI inflows in ASEAN (US$ billion)

Country/Region	Value			Share to total inflows (percentage)		
	2013	2014	2015	2013	2014	2015
ASEAN	19.5	22.1	22.1	15.7	17.0	18.5
Europe Union	24.5	24.9	19.6	19.6	19.2	16.4
Japan	24.7	15.7	17.3	19.8	12.1	14.5
USA	7.1	14.7	12.1	5.7	11.3	10.2
China	6.4	6.9	8.1	5.1	5.4	6.8
Republic of Korea	4.3	5.7	5.6	3.4	4.4	4.7
Australia	2.5	6.2	5.1	2.1	4.8	4.3
Hong Kong, China	5.2	9.8	3.6	4.2	7.5	3.0
Taiwan, China	1.3	3.2	2.6	1.1	2.5	2.2
New Zealand	0.3	0.5	2.2	0.3	0.4	1.9
Others	28.5	19.7	21.0	22.9	15.2	17.5
Total FDI inflow to ASEAN	124.8	129.9	119.9	100.0	100.0	100.0

Source: ASEAN foreign direct investment statistics database (ASEAN, 2016)

In essence, intra-regional trade serves as a key growth engine for East Asian economies. Accompanying the rapid growth of bilateral and intra-regional trade ties, the East Asian economies are becoming increasingly connected and interdependent. This market-driven trading and economic

1. In this paper, the geographical area of East Asia covers both Northeast and Southeast Asia; it refers to the ten Southeast Asian states of Singapore, Malaysia, Thailand, Indonesia, the Philippines, Cambodia, Lao PDR, Brunei, Vietnam, and Myanmar, as well as the Northeast Asian economies of China, Japan, Korea, Hong Kong SAR (Special Administrative Region) of China, and Taiwan, China.

interdependence among East Asian economies derives from the emergence and expansion of an intra-regional production network within the region.

As shown in Figure 1, the share of intra-regional trade in the total value of external trade among East Asian economies increased from 33.6% in 1980 to 41.5% in 2000, rising further to 56.4% by 2014. These figures demonstrate that more than half of East Asia's trade is in fact with itself. To facilitate intra-regional trade flow, bilateral free trade agreements (FTA) or economic partnership agreements have proliferated in the East Asian economies over the last two decades, with more than 130 FTAs already in effect and many more in stages of preparation.

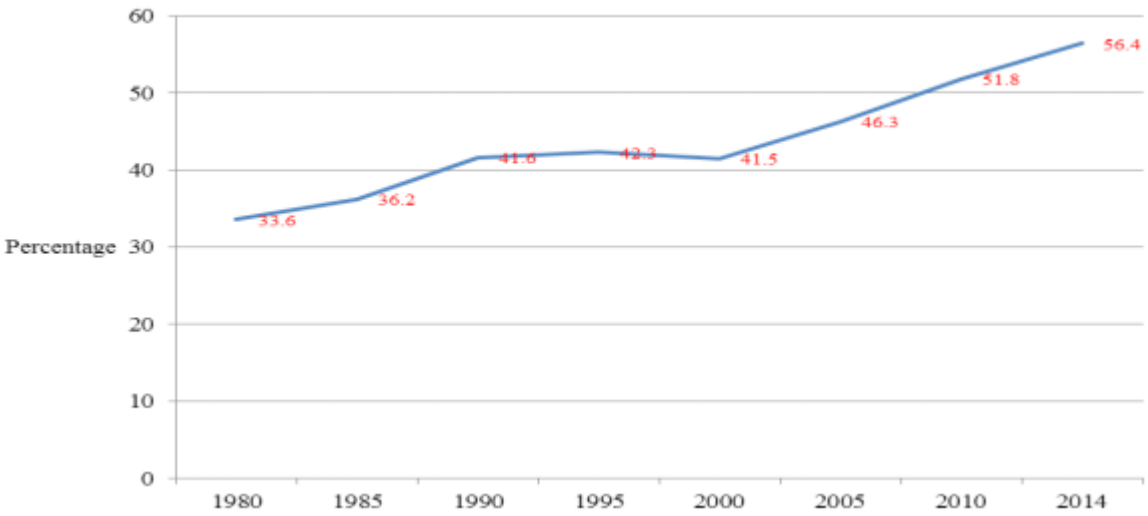

Figure 1. Intra-regional trade share in total value of East Asia's external trade.
Source: Compiled by the author

The setting up by multinational corporations (MNCs) of factories in different countries to benefit from efficient division of labor and the comparative advantages offered by those countries has led to fragmentation of production processes for parts and components. This fragmentation has contributed to the emergence and expansion of a network of intra-industry trade and intra-regional production in semi-finished products and parts among East Asian countries, with China as a final production-assembly base for export to consumer markets in the West (Sally, 2010). The wheel of the intra-regional production network in East Asia has been greased with FDI, mainly from the MNCs. Hence, East Asia has now become a key global manufacturing production powerhouse, with China as its hub and the other countries as production bases.

Following the Asian financial crisis in 1997/1998, the East Asian countries embarked on close trade, investment, financial, and economic cooperation, and later started to discuss formal institutionalization of such cooperation. Given the sluggish progress of global trade liberalization negotiations and uncertainty of the global economic outlook after the financial crisis in 2008/2009, the East Asian countries have strong incentives to use cooperation and economic integration as means to maintain regional growth and stability, and to strengthen their own regional and global competitiveness.

The process of increasing East Asian economic integration[2] through intra-regional connectivity improvement is picking up momentum, particularly in relation to the integration of the Chinese economy within East Asia and beyond. China has now replaced Japan as the economic and industrial powerhouse for the region and beyond, and is not only the driver of the intra-regional production network within East Asia but also the largest trading nation in terms of its world merchandise trade share (Table 2 and Table 3).

Table 2. World merchandise exports by region and selected economy (Percentage)

	1948	1953	1963	1973	1983	1993	2003	2014
World (US$ billion)	59	84	157	579	1838	3688	7380	18494
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
North America	28.1	24.8	19.9	17.3	16.8	17.9	15.8	13.5
Europe	35.1	39.4	47.8	50.9	43.5	45.3	45.9	36.8
Asia	14.0	13.4	12.5	14.9	19.1	26.0	26.1	32.0
China	**0.9**	**1.2**	**1.3**	**1.0**	**1.2**	**2.5**	**5.9**	**12.7**
Japan	0.4	1.5	3.5	6.4	8.0	9.8	6.4	3.7
Six East Asian traders	3.4	3.0	2.5	3.6	5.8	9.6	9.6	9.6

Note: Based on reference to six East Asian traders: Hong Kong SAR, Malaysia, Republic of Korea, Singapore, Taiwan, and Thailand (World Trade Organization, 2015, p. 42)

Table 3. World merchandise imports by region and selected economy (Percentage)

	1948	1953	1963	1973	1983	1993	2003	2014
World (US$ billion)	62	85	164	594	1883	3805	7696	18641
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
North America	18.5	20.5	16.1	17.2	18.5	21.3	22.4	17.7
Europe	45.3	43.7	52.0	53.3	44.1	44.5	45.0	36.4
Asia	13.9	15.1	14.1	14.9	18.5	23.5	23.5	31.5
China	**0.6**	**1.6**	**0.9**	**0.9**	**1.1**	**2.7**	**5.4**	**10.5**
Japan	1.1	2.8	4.1	6.5	6.7	6.4	5.0	4.4
Six East Asian traders	3.5	3.7	3.2	3.9	6.1	10.2	8.6	9.4

Note: Based on reference to six East Asian traders: Hong Kong SAR, Malaysia, Republic of Korea, Singapore, Taiwan, and Thailand (World Trade Organization, 2015, p. 43)

East Asian regional economic integration has gathered pace over the years due to the regional partners taking concrete steps to increase cooperation in a wide range of fields including finance, trade, investment, and infrastructure development. The last decade has seen substantial growth of regional integration in East Asia (Kim and Lee, 2012). The realization of the China–ASEAN Free Trade Area in January 2010, which is the largest free trade area in the world in terms of population covered, is widely perceived as a milestone to accelerate regional economic integration in East Asia.

2. In this paper, regional economic integration refers to all agreements, arrangements, and mechanisms to facilitate economic cooperation, to improve intra-regional connectivity, and to promote a free trade area, free trade agreements, close economic partnership, comprehensive economic agreements, and economic community, *etc.*

With ASEAN as the cornerstone, the creation of the ASEAN Economic Community (AEC)[3] is providing the impetus for promoting economic integration and regionalism among East Asian countries. The ASEAN plus Three (China, Japan, and Korea) grouping, which was formed in Malaysia in 1997, is expected to pave the way for East Asian regional economic integration in the future.

Among the initiatives adopted by regional members such as China and the ASEAN countries to promote closer regional economic integration, China's "One Belt, One Road" (OBOR) initiative stands out as one of the most influential and important. However, against the backdrop of the insufficient provision of transport and other critical infrastructure facilities in the region, East Asia has to speed up infrastructure improvement through attracting more domestic and foreign investment to the infrastructure sector in order to further promote closer intra-regional economic integration.

3. Status of connectivity improvement and infrastructure financing in East Asia

Physical infrastructure connectivity has hard and soft components, which both contribute to realization of efficient and smooth flow of goods, service, capital, technology, and people. Hard infrastructure refers to a comprehensive network of expressways, railroads, ports, airport, power plants, energy supply, and electricity and ICT (information and communications technology) infrastructure; while soft infrastructure refers to institutional quality, trade facilitation mechanisms, state trade and investment policies, efficient and speedy custom procedures, and border controls. Hard and soft infrastructures are thus both vital to effectiveness and reliability of regional connectivity.

Infrastructure connectivity plays a crucial role in bridging different areas of the East Asian region and enabling them to reap the full socioeconomic benefits of cooperation, which is particularly relevant to the mountainous areas that lack access to major markets and production bases. In the case of East Asia, well-functioning ports with easy access are the key to enhancing intra-regional connectivity, as maritime trade accounts for most of the intra-regional and international trade within the East Asian economies in terms of both trade volume and value.

East Asia is a heterogeneous region with enormous socioeconomic and cultural diversity and inequality among its member states. Regarding disparity in economic development, on the one hand, Japan, Republic of Korea, Singapore, Hong Kong, and Taiwan belong to the advanced economies; on the other hand, China, Malaysia, Thailand, and Indonesia are the emerging economies; and Laos, Cambodia, and Myanmar are the few least-developed nations in the region.

As shown in the Global Competiveness Index published by the World Economic Forum, whilst Singapore has world-class infrastructure, quite a number of East Asian countries rank very poorly on international infrastructure performance, particularly Vietnam, Cambodia, the Philippines, and Myanmar (Table 4). In relation to physical connectivity, these countries are facing the daunting challenge of totally inadequate highways and railroads, outdated or uncompleted seaport and airport

3. AEC refers to a single market for movements of goods, people, services, and capital, targeted for achievements by 2015.

facilities, as well as lack of cross-regional road and railroad links or a reliable power supply. These difficulties have impeded the growth of trade flows across East Asia and stunted local economic growth potential. Notably, inadequacy of port capacity and roads poses a major constraint to intra-regional and inter-regional trade expansion in Southeast Asia.

Many ASEAN member states are facing serious financial difficulty in raising the significant amounts of capital to fund the required infrastructure projects. According to a study by the Asian Development Bank (ADB) in 2010, Asia will need nearly US$8 trillion in capital investment for infrastructure construction between 2010 and 2020, of which 68% is required for new infrastructure capacity, while 32% is for replacement and maintenance (Table 5).

Table 4. Infrastructure performance of East Asian economies in the 2015–2016 Global Competitiveness Index

Country	Quality of overall infrastructure	Quality of roads	Quality of railroad infrastructure	Quality of port infrastructure	Quality of air transport infrastructure	Quality of electricity supply
China	51	42	16	50	51	53
Japan	7	8	1	22	25	21
Republic of Korea	20	17	10	27	28	38
Taiwan, China	21	10	11	19	26	28
Hong Kong SAR	3	5	3	5	3	2
Singapore	4	3	8	2	1	3
Malaysia	16	15	13	16	21	36
Brunei Darussalam	39	35	n/a	49	55	59
Indonesia	81	80	43	82	66	86
Thailand	71	51	78	52	38	56
Vietnam	99	93	48	76	75	87
Cambodia	102	94	100	83	100	108
Lao PDR	78	83	n/a	130	94	72
Philippines	106	97	84	103	98	89
Myanmar	135	136	96	123	132	118

Notes: Comparison was based on the ranking of 140 countries/economies; data for Brunei Darussalam were based on the 2013–2014 ranking of global competitiveness index only (Schwab, 2015)

From the soft infrastructure perspective, with the exception of countries such as Singapore, Japan, and Hong Kong SAR, many East Asian economies have performed quite poorly in the Global Competiveness Index of institutions, particularly Thailand, Vietnam, Cambodia, and Myanmar (Table 6). Moreover, according to the World Bank's world development indicators, although East Asian economies came out quite well on simplification of custom procedures and compliance with export and import requirements compared to South Asia, Middle East, and Africa, there is still much room for improvement in relation to port efficiency and elimination of red-tape bureaucracy in customs clearance, since evidently the OECD economies' performance is nearly twice higher than those for the East Asian economies (Table 7).

Table 5. Overall infrastructure investment needs for connectivity by major sectors (2010–2020) (US$ billion)

Sector/Subsector	New capacity	Replacement and maintenance
Energy	3,176.4	912.2
Telecommunications	325.3	730.3
Transport	1,761.6	704.4
Airports	6.5	4.7
Ports (sea and inland waterway)	50.2	25.4
Railways	2.7	35.9
Roads	1,702.1	638.3
Total	5,263.4	2,346.9

Source: ADB (2009); Bhattacharyay (2010)

Table 6. Overall Global Competitiveness Index of East Asian economies in the 2015–2016

Country	Overall Global Competitiveness Index 2015–2016		GDP per capita (US$)	Global Competitiveness Index 2015–2016 (rank out of 140)		
	Rank (out of 140)	Score (1–7)		Institutions	Infrastructure	Innovation
Singapore	2	5.7	56,319	2	2	9
Japan	6	5.5	36,332	13	5	5
Hong Kong SAR	7	5.5	39,871	8	1	27
Taiwan, China	15	5.3	22,598	27	12	11
Malaysia	18	5.2	10,804	23	24	20
Republic of Korea	26	5.0	28,101	69	13	19
China	28	4.9	7,589	51	39	31
Thailand	32	4.6	5,445	82	44	57
Indonesia	37	4.5	3,534	55	62	30
Philippines	47	4.4	2,865	77	90	48
Vietnam	56	4.3	2,053	85	76	73
Lao PDR	83	4.0	1,693	71	98	108
Cambodia	90	3.9	1,081	111	101	122
Myanmar	131	3.3	1,221	133	134	132

Note: Comparison was based on the ranking of 140 countries/economies (Schwab, 2015)

Enhancing connectivity by addressing both hard and soft infrastructure issue is the key determinant for achieving closer East Asian regional economic cooperation and integration. However, it constitutes the most difficult part of a regional integration process that will require enormous amounts of long-term investment.

Given that many ASEAN countries remain among the world's least-developed countries, they have to source different channels to meet their huge infrastructure financing needs, including government budgets, regional cooperation funds (*e.g.* the China-ASEAN Cooperation Fund), commercial banks, private investment in the form of public-private partnerships (PPP), and multilateral development institutions and capital market initiatives.

Table 7. Comparison of border trade costs by regions, 2014

Region	Documents to export (number)	Time to export (days)	Cost to export (US$ per container)	Documents to import (number)	Time to import (days)	Cost to import (US$ per container)
East Asia and Pacific	5.76	18.68	867.90	6.5	19.83	901.76
South Asia	8.12	33.4	1922.87	9.4	34.4	2117.75
Europe and Central Asia	5.45	17.59	1663.29	6.2	18.31	1822.21
Latin America and Caribbean	5.64	16.70	1287.27	6.7	18.49	1665.92
Middle East and North Africa	5.95	19.0	1140.33	8.0	23.14	1271.61
Sub-Saharan Africa	7.57	30.5	2,200.70	8.9	37.6	2930.94
OECD	3.94	10.79	1084.19	4.4	10.04	1119.96

Source: World Bank (2016)

China has offered huge investment in the region for projects related to infrastructure and energy supply over the years. In 2014 alone, investment on infrastructure and energy sectors totaled US$100.2 billion and accounted for nearly 60% of China's total investment to East Asia (American Enterprise Institute and the Heritage Foundation, 2005-2016). In his remarks at the 19th ASEAN plus Three Summit held in Vientiane in September 2016, Li Keqiang, China's Premier, reaffirmed that:

"China supports ASEAN in formulating the Master Plan on ASEAN Connectivity 2025 and stands ready to strengthen synergy between the Belt and Road Initiative and the master plan so as to promote, on that basis, overall connectivity within East Asia. China will work with other parties to make full use of such financing platforms as the AIIB and the Silk Road Fund to secure greater financial support for connectivity projects in Asia, especially in ASEAN countries." (State Council of PRC, 2016)

To address the factors impeding trade and investment flows, and accelerate the construction of large-scale cross-border infrastructure projects, China has led the establishment of a new multilateral development institution (MDI), namely the Asian Infrastructure Investment Bank (AIIB), of which almost all East Asian member states are founding members. The initial capital base of the bank is US$100 billion, with China's stake of US$29.78 billion making it the largest stakeholder. The bank's charter, the Articles of Agreement, came into force in December 2015 and the AIIB commenced operations in January 2016. This newly established MDI surely will provide fresh capital funds and help to resolve the region's infrastructure development needs.

Although the capacity of AIIB to accelerate intra-regional connectivity projects in Asia is open to question, initial signs are promising for the bank. In June 2016, the AIIB announced its first batch of four self-financed or co-financed projects worth US$509 million, located in Pakistan, Bangladesh, Indonesia, and Tajikistan. China will become deeply involved in strategic infrastructure development projects and domestic economic development in other Asian countries through AIIB loans and grants.

The Beijing-based AIIB will work towards becoming a "lean, clean and green" MDI. By learning from the best practices of other existing MDIs, it will develop its own ways of doing business.

Regardless of China's motivation to establish the AIIB, the developing countries in the region will stand to benefit enormously from the AIIB, Silk Road Fund, and other multilateral development institutions. With the backing of the AIIB operations, the OBOR initiative will help China to forge close ties with Asian countries and eventually achieve regional integration by boosting infrastructure connectivity, cross-border capital, trade, and investment flows.

China, Japan, and Korea are strengthening intra-regional and inter-regional connectivity with the ASEAN countries by developing a comprehensive network of physical infrastructure through pursuing the Master Plan on ASEAN Connectivity (MPAC)[4] adopted in 2010, the ASEAN-Japan Friendship and Partnership Scheme, and the "One Belt, One Road" (OBOR) initiative. The MPAC and OBOR initiatives constitute the main frameworks for improving physical connectivity among the East Asian member states. In addition, to promote intra-regional connectivity and integration among the ASEAN countries, in December 2013, Japan pledged to provide ¥2 trillion in the form of overseas direct assistance to fund projects related to infrastructure construction, healthcare, and poverty reduction facilities (Mission of Japan to ASEAN, 2015).

China, Japan, and Republic of Korea all have huge international reserves and domestic savings. In particular, China had US$5,313 billion in domestic savings in 2013 and US$3,405 billion in international reserves in 2015 (Table 8). All three countries have developed competitive strength for infrastructure construction. In relation to maritime transport, according to the World Shipping Council (2016), seven Chinese ports of Shanghai, Shenzhen, Hong Kong, Ningbo-Zhoushan, Qingdao, Guangzhou, and Tianjin were among the world's top ten container ports in 2014. Aided by its rapid development of maritime trade and world class port infrastructure, China has now emerged as the largest trading power, regionally as well as globally.

Table 8. Gross domestic savings and international reserves of Northeast Asian Countries (US$ billion)

Country	Gross domestic savings (2014)	Gross international reserves (2015)
China	5,313.4	3,405.2
Japan	771.0	1,233.1
Republic of Korea	475.3	366.7

Source: World Bank (2016)

China, Japan, and Republic of Korea have been able to mobilize their strong financial and infrastructure construction capacity to finance infrastructure development in the ASEAN market through the MPAC initiative. The impact of infrastructure investment by China, Japan, and Korea is reflected both in the direct capital return of such investment and indirect return through increasing their companies' access and opportunities for improvement in business activities within the ASEAN market.

However, the East Asian countries still lack effective mechanisms for coordination and dialogue on regional integration through funding infrastructure projects. As demonstrated from the case of the Jakarta–Bandung high-speed railroad in Indonesia, Japanese and Chinese construction companies are engaged in intense competition over project bidding and potential domination of the infrastructure sector, rather than working in a cooperative and complementary manner.

4. MPAC aims to improve connectivity among the ASEAN member states, as well as with non-ASEAN members, under three pillars: physical connectivity, institutional connectivity, and people-to-people connectivity.

4. The Sino-Japan contest in the Asian infrastructure sector

The two leading powers in Asia, China and Japan, have been both engaged in fierce rivalry for regional leadership, competing with each other in multi-dimension since 2010. The high-speed railway and other infrastructure sectors are a vivid case in point. Sino-Japan confrontation on regional infrastructure financing and construction is deepening (Yu, 2016).

Both China and Japan have initiated proactive high-speed rail diplomacy in Asia by implementing a number of policy measures to secure infrastructure contracts for their national champions as well as to support exports abroad of their high-speed railway products and related technology. The Chinese and Japanese governments have already committed enormous diplomatic and financial resources to this end.

The Japanese Prime Minister Abe views exports of high-speed railway and other infrastructure products and associated technology feature as a key part of his administration's policy agenda to boost a stagnating Japanese economy afflicted by shrinking domestic consumption demand and population ageing. Since he became prime minister for the second time in 2012, Abe has repeatedly given his assurance to Japanese infrastructure companies that the Japanese government will provide full policy and financial support for their export-seeking endeavors. The Japanese government has taken a leading and coordinating role in promoting high-speed rail projects and negotiating contracts across the Asian countries over the last several years.

In May 2015, shortly after the proposal to establish the China-backed AIIB, which targets infrastructure-financing business in Asia, Prime Minister Abe announced that Japan would commit to the US$110 billion "Partnership for Quality Infrastructure" scheme for Asian infrastructure projects (MOFA, 2015a), in an effort widely perceived as an attempt to counterbalance the rising Chinese prominence in the region. Instead of competing with China by undercutting on cost, Japan focuses on the provision of better quality Japanese infrastructure technology and reliability, as well as its superior safety record compared to China's.

With its well-established regional networks, rich expertise, and strong capacity in Asian infrastructure, as well as the powerful Japan-backed Asian Development Bank, Japan is powerful regarding its traditional dominance of infrastructure development in Asia and Southeast Asia in particular. Historically, Japan has committed to forging close economic, political, and people-to-people relations with the Southeast Asian nations since the enunciation of the Fukuda Doctrine in 1977 (Hwee, 2006).

Moreover, the quality and reliability of Japanese infrastructure technology is renowned and appreciated throughout the region. In contrast, the quality of Chinese-built infrastructure has been questioned frequently by some regional countries, for example Indonesia[5]. In fact, Japanese construction firms have had a deep impact in the region for decades, such as in Thailand, Cambodia, Laos, Vietnam, Indonesia, and the Philippines.

Nevertheless, despite China being a newcomer to financing and building infrastructure projects in Asia, its growing presence in the region is hard to ignore and Japan is facing serious competition

5. "Competition between China and Japan should benefit Indonesia," Oxford Business Group, available at https://www.oxfordbusinessgroup.com/analysis/competition-between-china-and-japan-should-benefit-indonesia (accessed 11 January 2017).

from China. Having overtaken Japan as the largest economy in Asia and the second largest economy in the world since 2010, China has started to challenge the dominant position of Japan in Asian infrastructure construction and related infrastructure financing sectors (roads, ports, railways, power plants, airport, telecommunications, *etc.*) and has become the largest trading partner for ASEAN since 2009.

Although Japan has had a long track record of financing infrastructure and has maintained a strong economic presence in Asia for decades, with the inevitable rise of China as a regional and global economic power, the increasing presence of Chinese firms in the region and beyond, as well as the operations of the AIIB, will undeniably dilute the dominant influence of Japan in the Asian infrastructure financing and construction sectors in the future.

In the face of Japanese competition, China has certain unique advantages in the region. First, in relation to its geographic proximity, China borders several ASEAN countries including Vietnam, Laos, and Myanmar. This facilitates the Chinese firms' direct access to local infrastructure markets and allows China to exercise diplomatic and financial leverage over smaller neighboring countries. Second, it has built and managed the world's largest and longest high-speed rail network for a number of years. This provides proof of the quality and safety of China's high-speed railway system and related train, rail track, control, and operational and maintenance systems, as well as China's ability to export its high-speed rail know-how abroad. Third, state-owned construction enterprises such as the China Railway Corporation, with unlimited cash funding from the Chinese government, are the leading players for expanding the Asian infrastructure markets. Meanwhile, the many foreign privately-owned companies with strict budget constraints find it hard to compete.

Southeast Asia provides a vivid case in point. After fierce Sino-Japan competition to construct the Jakarta–Bandung high-speed rail line in Indonesia, China finally won the bid for this US$5 billion project in September 2015. This was symbolic, as the Jakarta–Bandung high-speed rail line forms a part of China's grand plan to build the Pan-Asian Railway Network (PARN), which would cross several Southeast Asian countries through different routes connecting Kunming in China and Singapore. The PARN was envisioned and endorsed by both the ASEAN Master Plan for Connectivity and China's OBOR initiative.

With over 600 million population and US$2.3 trillion economy, South East Asia offers a huge and emerging market and promising arena for both Japanese and Chinese companies. Hence, a number of high-speed railway and other big-ticket infrastructure projects are at the planning stage or under consideration to accommodate the rapid urbanization within this region. In order to unleash the greater economic potential of this region, Southeast Asia has to improve physical connectivity via consistent infrastructure construction.

China has the upper hand over Japan in securing high-speed rail line projects in Southeast Asia due to its relatively short delivery time for project construction, and the all-out and coordinated approach which is backed by strong financial and diplomatic support. In terms of financial support, backed by China's over US$3 trillion in foreign exchange reserves, Chinese companies can export their high-speed rail products to the region with favorable conditions consisting of low construction costs, low interest rates, and exceptionally long grace periods on loans provided by Chinese banks.

In terms of diplomatic support, Xi Jinping, China's President, and Li Keqiang, China's Premier, and other senior Chinese officials regularly promote China's high-speed railway (HSR) expertise on their state visits abroad, as well as at their official meetings with foreign leaders in Beijing. Pavlićević and Kratz (2016) rightly point out:

"As Chinese and Japanese leaders are personally vested in promoting HSR exports, their credibility is to a significant extent tied to whether the efforts to secure HSR projects abroad are successful."

In addition to give a further push for the domestic high-speed rail sector, China has sponsored exhibitions and other public diplomatic events promoting its high-speed rail technology throughout the region.

Regarding exports of its high-speed rail products abroad, China has the flexibility to supply a variety of high-speed rail products and expertise, with specific operational models of different speed capacity and technology types to accommodate the preferences, budget situations, and bank loan options of the host countries. The Chinese companies are also willing to share their expertise and know-how related to the high-speed railway to the host companies by transferring certain technologies and setting up train and parts manufacturing plants as part of their bids for projects.

Given the product model options available and the favorable financial conditions, host countries with tight fiscal positons find it hard to refuse these Chinese proposals, as no other regional and global competitors can seriously match them. The bid for the Jakarta–Bandung high-speed rail project is a vivid case for demonstration.

The infrastructure sector, particularly the advanced and high value-added high-speed railway business, has become a new promotional brand for China (Yu, 2014). It will showcase China's ascendancy on indigenous technological innovation and project it as a modern and technologically-oriented economy. The driving force for its completion for Asian infrastructure financing and construction is China's emergence as a significant regional and international player for global infrastructure industry.

Export of China's transport and other infrastructure products abroad will not only create new business opportunities for the infrastructure construction and related industrial companies at home and for the Chinese policy banks such as the State Development Bank, but also, more importantly, it will help China to tackle its excessive domestic production overcapacity and allow it the space to move up the industrial value chain by pursuing domestic industrial upgrading.

Compared to the Chinese approach, the bid for the Jakarta–Bandung high-speed rail project has exposed the weakness of the Japanese in promoting exports of high-speed rail and other large-scale infrastructure abroad. However, the Japanese government has quickly learned its lesson and readjusted its policies to strengthen the export competitiveness of its infrastructure products. In November 2015, the Japanese government initiated "Follow-up Measures on the Partnership for Quality Infrastructure" to detail the policy changes proposed to support the export-seeking efforts of Japanese companies. For example, the Japan Bank for International Cooperation will be encouraged to undertake high-risk projects by taking "further risks by exempting the requirement to ensure certainty of repayment for each project, while maintaining the principle of securing sufficient revenue to cover its expenses as a whole." (MOFA, 2015b) Moreover, Japan will

accelerate the official procedures for Japanese Official Development Assistance Loans related to the Partnership for Quality Infrastructure (PQI). By readjusting the PQI programme and strengthening its export competitiveness for infrastructure products vs. China, Japan intends to demonstrate its determination and ability to compete with China for regional dominance in infrastructure financing and construction.

Although the international tender for the proposed Kuala Lumpur–Singapore high-speed rail line has yet to begin, both Japan and China have eye on this lucrative project, and they have already started a bidding contest. For example, high-level delegations of senior transport officials and senior management from both Chinese and Japanese rail companies and banks visited Malaysia and Singapore in May 2016 for roadshow promotion and lobbying, respectively.

The Southeast Asian countries recognize the potential contribution made by the high-speed railway and other critical infrastructure for improving overall local business and living environment, boosting economic growth, and accelerating industrialization through absorbing technological know-how and attracting foreign investment. The Asian countries have welcomed initiatives from both Japan and China to support their infrastructure development, at least for now. Southeast Asian nations have been offered much needed investment for connectivity-related infrastructure construction by these two Asian powers. They have benefited from this intensifying infrastructure competition between two Asian powers so far, by accelerating their infrastructure development and improving their economic development perspective overall.

The developing Asian countries could benefit from the ever-more favorable terms and conditions brought by such "race-to-bottom" competition between Japan and China. For example, Indonesia gained very favorable conditions for the Jakarta–Bandung high-speed rail project that did not involve committing government budget or the burden of high debt repayments. Nevertheless, if left unchecked, the Sino-Japan economic rivalry and bilateral trust deficits could become impede cross-regional connectivity improvement and act as a force driving regional disintegration in the future. These arguments will be detailed in the next section.

5. Main remaining challenges to regional connectivity improvement and closer regional integration

To build on its growing confidence as a rising global power, China is seeking to export its infrastructure products and associated technology throughout the East Asian region; meanwhile, Japan is determined to maintain its regional leadership position in infrastructure development and other economic aspects. The abovementioned high-speed railway and other infrastructure sectors are a reflection of both the trust deficit and broader competition between Japan and China for regional supremacy.

From the long-term perspective, the first major challenge to further development of inter-regional infrastructure connectivity as the foundation for closer regional economic integration could be the fierce Sino-Japan contest over infrastructure construction and financing in the region.

In the cases of China's "One Belt, One Road" initiative and Japan's "Partnership for Quality Infrastructure" program, both countries have aggressively pushed forward their own high-profile visions for improving regional connectivity in Asia. However, if left unchecked, the fierce rivalry

between Japan and China could bring various adverse consequences for the recipient countries that could impede regional connectivity improvement in East Asia. There are five major reasons for demonstration.

First, the fierce Sino-Japan competition over bidding for the regional infrastructure construction could result in some projects being ill-conceived and badly planned. There has been criticism that certain costly projects have been or will be built in less-populated, less-developed areas or mountainous areas with hostile geographic conditions, for example the proposed high-speed rail lines in Indonesia and Thailand (Minter, 2016).

Some infrastructure construction projects under the OBOR initiative seem to be driven more by political and strategic considerations at the expense of commercial profits and accommodating the real demands of recipient countries. Vivid demonstration of this point is provided by the case of Mahinda Rajapaksa International Airport, located in Sri Lanka and financed and built by Chinese state companies. It is reported that this project is not commercially viable due to limited flight traffic demand, and it is now incurring huge losses (Pattanaik, 2015).

Given the enormous investment commitment, it makes no commercial sense to construct such advanced and expensive projects in developing countries with tight fiscal budgets. For example, voices are increasingly being raised by Indonesian and foreign scholars, environmental groups, and the media questioning the necessity for Indonesia to build the expensive US$5 billion Jakarta–Bandung high-speed rail line (Hermansyah, 2016), given the current economic development stage of Indonesia, its poor financial situation, and the need to prioritize tasks of poverty reduction and environmental protection.

The rush to push forward infrastructure construction could result in some projects not being financially or commercially viable in the long-term perspective. Given the high construction costs of such projects, this will increase the loan repayment burden on the less developed and therefore poorer recipient countries.

Also, in order to win the bids for infrastructure projects in high-risk host countries in East Asia, Japanese and Chinese companies and banks both have to cut corners by lowering diligence standards on financial and other investment risk management (including political, security, environmental, operational, and currency risks in the host countries). This could expose the construction companies to various increased risks while also creating a huge financial burden for the Japanese and Chinese companies involved, along with potential financial loss due to the uncertainty of the long-term return on their investment.

Second, without proper pre-feasibility studies and due diligence, the rush by Japanese and Chinese firms to bid for infrastructure construction projects could result in some projects being poorly designed. This could not only compromise the construction quality of such projects, but also could cause potential waste to the host countries eventually.

Also, the availability of huge amounts of Chinese and Japanese capital can increase the risk of local malpractice and the possibility of high-ranking officials of the recipient countries engaging in bribery and corruption. A number of cases of corruption have been reported in the Philippines and other developing Southeast Asian countries, involving local government officials and linked earlier to Chinese companies.

Third, the fierce Sino-Japan rivalry over Asian infrastructure construction and financing could draw the East Asian countries, Southeast Asian countries in particular, into a battle between these two major powers, resulting in these countries having to choose on which side to lean. On whichever side the developing country comes down, it will surely upset the losing rival.

Given the economic size of China and Japan, and their powerful status, this could trigger resentment or even affect their relations with the losing rival. For the developing countries, this scenario could have unwanted and potentially damaging effects on their political and economic interests. For example, the Indonesian government's decision to grant the Jakarta–Bandung high-speed rail project to Beijing in late 2015 triggered strong disappointment in Tokyo (Suzuki, 2015).

Last but not least, as the Japanese and Chinese high-speed rail systems use quite different types of construction, it is possible that railway networks could be incompatible and therefore inefficient if the various countries across the region choose to adopt different systems. In turn, this could damage the prospects for broader cross-regional infrastructure connectivity in the future.

The proposed Kuala Lumpur–Singapore high-speed rail project has already sparked such concerns. According to a Singapore's Straits Times report, construction of this project could involve use of both the Chinese and Japanese types of construction. The Malaysian side, for cost consideration, could choose Chinese companies to construct the rail line in its own territory, while in its territory the Singaporean side could opt for construction by Japanese companies due to quality and operational safety consideration (Lopez, 2016). That scenario could result in connection difficulties and system incompatibility when the line needs to be built across the border between the two sides. This would inevitably reduce the efficiency of this high-speed rail transport system, and have an adverse effect on rail travel time between Singapore and Kuala Lumpur.

Another main obstacle for forging a shared vision of East Asian economic integration is the serious trust deficits among East Asian countries. Taking into account the on-going maritime and territorial disputes surrounding the East China Sea and South China Sea, as well as the revival of historical issues of Japanese imperialism and atrocities during World War II, it is apparent that rivalries among the East Asian countries are both fierce and enduring. As reflected by the relations between China and Japan, Japan and Korea, China and the Philippines, and China and Vietnam, these countries view each other's strategic intentions with deep suspicion (Yip, 2001). For example, according to the Global Attitudes Survey by Pew Research Center in spring 2016, both Japan and China's positive view of the other nation had decreased from 2006 to 2016; while both countries' negative view of the other nation had increased during the same period (Figure 2 and 3).

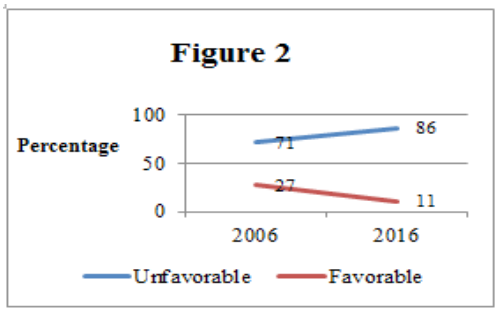

Figure 2. Japanese views of China.
Source: Pew Global Attitudes Survey, spring 2016

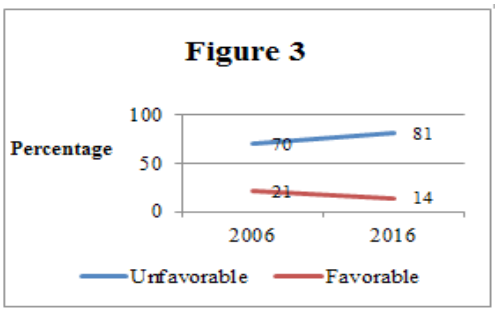

Figure 3. Chinese views of Japan.

Despite much fanfare during the last decade among East Asian countries over the need to pursue closer regional cooperation and integration, nationalist sentiment over territorial sovereignty and national unity has concurrently reached a peak in China, Japan, and Korea. It is therefore proving increasingly difficult for these three major powers to cast off their historical baggage in the interests of strengthening mutual trust.

The East Asian countries have reached consensus on the need to develop the East Asian economic community through improving connectivity and promoting cooperation on trade, economic investment, and people-to-people exchange. Nevertheless, fearing the rise of a regional hegemon, no country in the East Asia would wish to see single power such as China or Japan using the process of East Asian economic integration to gain domination of the region. Consequently, despite the leaders of China, Japan, and Republic of Korea agreeing to launch trilateral free trade agreement negotiations in 2012, this very much remains a paper vision, with little real progress made so far. As Choo and Lim (2015) rightly point out:

"Notably, however, the failure of regional integration to bear fruit is only apparent in Northeast Asia. Despite the numerous suggestions towards regional cooperation, various systemic and anthropological differences have deterred not only the effort for a Korean-Sino-Japanese FTA, but also Northeast Asian regionalism."

For Japan, China is important market and trade partner; for China, Japan is important source of foreign investment and key economic partner. As they are economically interdependent and indispensable neighbors to each other, both countries have to pursue friendly relations and forge collaboration and cooperation. Sadly, these two leading Asian powers still perceive each other very negatively, and both Japan and China lack the emotional readiness to promote common prosperity throughout the region and forge a shared East Asian community.

It is undeniable that collaboration and cooperation between Japan and China have been in decline in economic, development finance, and many other aspects over the last several years. Evidently, the Sino-Japan rivalry for infrastructure construction, and in the diplomatic and military arena, demonstrates more and more of a zero-sum nature rather than healthy competition, which is a cause for concern to the region. In fact, it adds fuel to the already crisis-ridden bilateral relationship between Japan and China due to the historical and territorial disputes and the anti-Japan nationalism in China (He, 2007).

In terms of the process of East Asian regional integration, on the one hand, significant progress has been made on sub-regional integration in Southeast Asia, as reflected in the implementation of the ASEAN Economic Community; on the other hand, the apparent failure to achieve sub-regional integration in Northeast Asia is mainly due to a lack of mutual trust between the major powers of China and Japan.

This factor was, is, and will continue to be a major political obstacle to attempts by East Asia economies to forge close economic cooperation and integration. Achieving such goals depends on the East Asian countries establishing a climate of mutual trust and forging a shared vision of the political, economic, and security future for the region.

Last but not least, the South China Sea (SCS) issue has in particular negatively affected bilateral relations between China and certain ASEAN claimant states. From the Southeast Asian countries' perspective, China has taken a very assertive foreign policy stance toward neighboring small countries, particularly regarding the territorial and maritime disputes in the SCS. China is consequently putting enormous pressure on Singapore to play a more pro-China role in downplaying the SCS disputes and the differences between China and other ASEAN claimant states. The OBOR initiative has fueled concern among many Southeast Asia countries about the security risks of economic overdependence on China. Hence, Southeast Asian countries are cautious of becoming economically over-dependent on China as they fear being forced to adopt a pro-China foreign policy stance.

Security and economic concerns will make countries such as Vietnam and the Philippines, which have on-going territorial disputes with China over the SCS, unwilling to fully participate in China's OBOR initiative or allow the involvement of Chinese companies in large-scale projects in their territories. China's perceived assertiveness in foreign policy, particularly in relation to territorial disputes in the South and East China Sea, is unfortunately helping to create a negative state image for China abroad. This is not supportive of China's ambition to be perceived as a responsible and friendly power in the region and beyond.

6. Conclusion

Evidently, quite a number of East Asian countries rank very poorly on international infrastructure performance. In relation to physical connectivity, these countries are facing the daunting challenge of totally inadequate highways and railroads, outdated seaport and airport facilities, as well as lack of cross-regional road and railroad links or a reliable power supply. Against this backdrop, both Japan and China have competed fiercely on providing public goods and seeking leadership in the region by unveiling ambitious initiatives and significantly increasing investment in Asia's infrastructure sector.

Japanese and Chinese firms and banks are financing and building many large-scale transportation and other infrastructure projects. Both Japan and China's endeavors and initiatives will have profound implications for the Asian infrastructure arena in decades to come, and their endeavors will reshape the Asian infrastructure landscape. Nevertheless, the East Asian countries still lack effective mechanisms for coordination and dialogue on regional integration through funding infrastructure projects.

The high-speed railway and other infrastructure sectors are a reflection of both the trust deficit and broader competition between Japan and China for regional supremacy. If left unchecked, the Sino-Japan economic rivalry and bilateral trust deficits could impede cross-regional connectivity improvement and act as a force driving regional disintegration in the future.

The prospects for achieving deeper East Asian region economic integration are mixed and should be regarded with cautious optimism. There is still a very long way to go before an East Asian regional integration can become a reality. To promote shared visions for Asian infrastructure development and accelerate the connectivity-related infrastructure projects in East Asia, both

Japan and China have to work out and establish a joint working committee or certain forms of collaboration mechanism in the field of regional infrastructure financing and development.

If China, Japan, and Korea were to set up effective mechanisms for coordinating infrastructure financing, this would not only accelerate intra-regional infrastructure construction within East Asia and Southeast Asia in particular, but would also allow efficient and sustainable use of their capital resources in the region.

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