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## **Infrastructure and Regional Cooperation**

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**Abstract**

Continuing Asia's extraordinary transformation will require increasing attention on regional connectivity and logistic systems. The article focuses on the role of cross-border infrastructure in the process of regional integration in developing Asia. Given that most cross-border infrastructure projects are very complex, actions will need to be taken by various stakeholders—Asian governments, the private sector, civil society organizations, and multilateral institutions—in connecting Asia.

**JEL Classification:** O18, L9, N7

**Table of Contents**

Asia's Extraordinary Transformation	1
Trade, Investment, and Production Networks in Asia	2
Logistics, Infrastructure, and Software	5
Cross-Border Infrastructure and Economic Development	7
Lessons from Major Cross-Border Infrastructure Investments in Asia	9
The GMS Northern Economic Corridor and Trade and Transit Harmonization	10
The Nam Theun 2 Hydropower Project	12
Pacific Cooperation for Aviation and Information Communications Technology	12
Indonesia-Singapore Gas Transmission	13
Lessons Learned	14
A Framework for Cross-Border Infrastructure	15
Political Dimensions	15
Economic and Financial Dimensions	16
Institutional and Software Dimensions	17
Conclusion: The Future of Cross-Border Infrastructure in Asia	17
Governments	18
The Private Sector	19
Civil Society	19
Multilateral Institutions	19
References	21

As late as 1750, Asia occupied an important position in the global economy, not only in population and production but also in trade, capital formation, productivity, and competitiveness (Sakakibara and Yamakawa, 2003).<sup>1</sup> During the 15th–17th centuries, Asia played a key role in ensuring the global division of labor. Intra-Asian trade, involving exclusively Asian merchants, ships, and goods, was well developed long before Europeans arrived in the region.

Several Japanese historians claim that the economic growth of Asian countries was led by intra-Asian trade (Akita, 1999) and that the economic success of Japan in the late 20th century, as well as that of the newly industrialized economies (NIEs), originated in this intra-Asian trade (Sugihara, 1990). Asians developed capabilities to adapt Western cultural elements to suit Asian domestic markets, such as making goods smaller and cheaper or neater and cleaner.

The focus of most of the analytic work on regional cooperation has been on trade and investment, including issues such as tariff and nontariff barriers to trade and foreign direct investment (FDI). With the emergence of global and regional production networks, aspects of transport and logistics have begun to attract greater attention of policy makers, academics, and experts.

This article focuses on the role of cross-border infrastructure in the process of regional integration in developing Asia.<sup>2</sup> The article is organized as follows. The first section sets the context, examining Asia's phenomenal growth in trade and investment over the past two and half decades. It describes how Asia—particularly East Asia—has become a dominant part of international production networks and supply chains.<sup>3</sup> The second section reviews four case studies of cross-border infrastructure in Asia. This exercise reveals that most cross-border infrastructure projects and programs are very complex and that there is a need for a comprehensive framework to deal with inherent challenges facing cross-border infrastructure. The third section offers a conceptual framework with which to address political, economic and financial, and institutional challenges for cross-border infrastructure development. It emphasizes that the “software” component is inseparable from the “hardware” component if cross-border connectivity is to be improved. The fourth section identifies key actions that need to be taken by various stakeholders—Asian governments, the private sector, civil society organizations, and multilateral institutions—in connecting Asia.

## Asia's Extraordinary Transformation

Economic performance in developing Asia—defined as all 43 developing member countries of the Asian Development Bank (ADB)—has been impressive over the past few decades. The region has grown at an average annual rate of 7 percent since 1980. Poverty has declined rapidly: 300 million fewer people were living in poverty in 2003 than in 1990 (ADB, 2005a). The strong growth of exports and FDI has been an important driver for most Asian economies.

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<sup>1</sup> Asia in the modern age includes the People's Republic of China, India, Japan, and key Southeast Asian economies.

<sup>2</sup> *Cross-border infrastructure* is defined as any international infrastructure cooperation initiative between two or more countries to strengthen cross-border connectivity.

<sup>3</sup> East Asia includes 15 economies, including the 10 members of the Association of Southeast Asian Nations (ASEAN) (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam); People's Republic of China; Hong Kong, China; Japan; the Republic of Korea; and Taipei, China. Emerging East Asia excludes Japan.

## Trade, Investment, and Production Networks in Asia

Over the past two decades, developing Asia's exports to the world have grown 12.5 percent a year, rising from \$162 billion in 1980 to \$2.3 trillion in 2005 (IMF, 2006). The region now accounts for a quarter of world exports. In recent years this strong export growth has been marked by a rapid increase in intraregional trade, which rose from 35 percent of total trade in 1980 to 55 percent in 2005 if Japan is included and from 22 percent to 45 percent of total trade if Japan is excluded. This share is higher than in the North American Free Trade Agreement (NAFTA) region, although it remains somewhat lower than the share in the original European Union (EU)-15 (table 1).

**Table 1. Importance of Intraregional Trade, by Region, 1980–2005**  
(percent of total trade)

Region	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005
East Asia (including Japan)	34.6	37.1	43.0	51.7	51.9	51.5	53.4	54.5	55.1	54.5
Emerging East Asia	22.1	27.5	32.8	39.0	40.4	40.7	43.0	43.7	44.1	44.7
Asian NIEs	6.4	6.5	11.9	15.5	15.5	14.9	15.5	15.0	14.4	13.5
ASEAN	17.9	20.3	18.8	23.9	24.5	23.9	24.3	23.8	23.8	24.0
NAFTA	33.8	38.7	37.9	43.1	48.8	49.1	48.4	47.3	46.4	45.0
European Union-15	60.7	59.8	66.2	64.2	62.3	62.2	62.5	63.0	62.2	60.1

East Asia = Japan and emerging East Asia; Emerging East Asia = Asian NIEs and ASEAN; Asian NIEs = newly industrialized economies; ASEAN = Association of Southeast Asian Nations; NAFTA = North American Free Trade Agreement

Source: Computed from IMF, Direction of Trade Statistics; CEIC databases (Table 1 in Kawai 2007).

The initial growth in trade that was sparked by Asia's NIEs—Hong Kong, China; the Republic of Korea; Singapore; and Taipei, China—and then by the middle-income members of the Association of Southeast Asian Nations (ASEAN) has continued as the People's Republic of China (hereafter PRC) has become an important player in regional and global trade. As a result of its robust trade growth, the PRC now accounts for 30 percent of regional trade. Recently, there has been a surge in Asian trade from other exporters, such as India and Viet Nam.

Much of this increase has been the result of rapid trade liberalization in these economies since the 1980s—particularly since the 1990s—within the World Trade Organization (WTO) and Asia-Pacific Economic Cooperation (APEC) frameworks. Most economies not only reduced tariffs and nontariff barriers but also simplified customs rules and regulations (Dollar and Kraay, 2001). Notable is the fact that the expansion of East Asian trade has been accompanied by a rapid rise in FDI, reflecting liberalization of FDI regimes in the region's economies and global strategies of multinational corporations (MNCs). MNCs began to establish production networks across East Asia through FDI, generating trade in capital goods, parts, components, and semifinished and finished manufactures across East Asia.

FDI inflows to developing Asia rose more than 28 times between 1980 and 2005. In 2005 East Asian economies accounted for more than 59 percent of all FDI inflows in developing economies (UNCTAD, 2006). Today, one of the most important destinations of FDI remains the PRC: from a meagre \$57 million in FDI in 1980, the PRC attracted more than \$60 billion in 2005. Furthermore, in addition to middle-income ASEAN members, low-income countries such as Cambodia and Viet Nam have also begun to attract FDI (table 2). Most FDI in Asia has been in new, greenfield investments concentrated in manufacturing, though there has also been an increase in cross-border mergers and acquisitions, largely in services.

The European Union, Japan, and the United States have been active investors in East Asia, forming production networks and supply chains. In the past 15 years, the four Asian NIEs have emerged as important sources of FDI in ASEAN and the PRC. Hong Kong, China is the largest investor in the PRC. More recently, middle-income ASEAN countries, such as Malaysia and Thailand, have actively invested in low-income ASEAN members and the PRC.

A web of FDI activities by global multinational corporations and regional firms, together with advances in information and communications technologies, have led to the growth of regional production networks and well-functioning supply chains in such sectors as textiles, electronics, and automobile parts.<sup>4</sup> A key contributor to Asia's industrial upgrading has been the participation of local enterprises in regional networks set up by MNCs. Through their roles as suppliers of parts and components, and as purchasers of specialized processing equipment, these local firms gain access to important production technology, process and management know-how, and global distribution systems. East Asia has thus been able to create a virtuous cycle of regional trade and investment through the medium of production networks (UNCTAD, 2005).

It is now recognized that there is no unique "correct" way to integrate economies with global and regional markets, as the speed and the primary drivers of integration vary across regions. The early architects of the European Union saw economic interdependence—rather than military coordination—as the most important factor for political cooperation. EU member countries sought to create a single market by policy-driven convergence of market rules. Strong regional institutions were created and granted powers in fields such as education, health, taxation, labor, employment, and transportation. Private sector activities—trade and investment—helped, but it was really the governments and their economic policies that drove the integration process in Europe. Creation of supranational institutions deepened this process further.

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<sup>4</sup> The discussion on production networks draws on Carruthers, Bajpai, and Hummels 2003; Fujita and Hisa 2004; and Kawai 2005.



**Table 2. Foreign Direct Investment Stocks in Selected Economies, 1980–2005  
(percent of GDP)**

Economy	Direction	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005
Brunei Darussalam	Inward	0.4	0.8	1.1	12.4	89.8	106.0	127.0	161.0	135.9	145.2
	Outward	—	—	—	6.3	10.3	11.0	11.3	10.4	8.7	8.7
Cambodia	Inward	1.8	1.6	2.2	10.8	46.9	50.7	50.9	49.9	47.2	45.6
	Outward	—	—	—	4.2	5.7	6.2	6.2	6.2	5.8	4.8
China	Inward	0.4	2.0	5.4	14.4	17.9	17.5	17.1	16.2	14.9	14.3
	Outward	—	0.3	1.2	2.5	2.6	3.0	2.9	2.6	2.4	2.1
Hong Kong, China	Inward	73.2	75.2	59.4	50.1	275.4	257.5	208.2	239.2	277.6	299.9
	Outward	0.5	6.6	15.7	55.6	234.9	216.5	191.6	213.0	246.5	264.7
Indonesia	Inward	6.5	6.7	7.7	10.2	16.5	10.8	4.1	5.0	4.4	7.7
	Outward	0.0	0.1	0.1	2.9	4.6	***	***	***	—	5.0
Japan	Inward	0.3	0.3	0.3	0.6	1.1	1.2	2.0	2.1	2.1	2.2
	Outward	1.8	3.2	6.6	4.5	5.8	7.2	7.6	7.8	7.9	8.5
Korea, Rep. of	Inward	2.1	2.3	2.1	1.9	8.1	9.6	9.2	9.0	8.1	8.0
	Outward	0.2	0.5	0.9	2.1	5.8	6.8	6.5	6.5	5.8	4.6
Lao PDR	Inward	0.3	0.0	1.5	11.9	32.1	33.1	33.1	30.6	26.6	24.5
	Outward	—	—	—	0.4	1.6	1.6	1.5	1.4	1.2	1.0
Malaysia	Inward	21.1	23.7	23.4	32.3	58.6	38.6	38.9	40.4	39.3	36.5
	Outward	0.8	4.4	6.1	12.4	23.6	9.5	10.7	11.4	11.7	34.0
Myanmar	Inward	0.0	0.0	1.6	5.3	9.3	8.1	7.6	7.8	7.9	43.6
	Outward	—	—	—	—	—	—	—	—	—	—
Philippines	Inward	3.9	8.5	7.4	8.2	16.9	14.5	15.3	15.2	14.9	14.4
	Outward	0.5	0.6	0.3	1.6	2.1	1.0	1.0	1.5	1.9	2.1
Singapore	Inward	52.9	73.6	82.6	78.2	123.1	143.1	157.3	160.2	150.2	158.6
	Outward	31.7	24.8	21.2	41.8	62.1	85.1	98.6	100.1	94.5	94.1
Taipei, China	Inward	5.8	4.7	6.1	5.9	5.7	13.5	10.0	13.0	12.8	12.1
	Outward	31.4	21.4	19.0	16.1	21.5	25.2	27.3	29.3	29.9	28.1
Thailand	Inward	3.0	5.1	9.7	10.5	24.4	28.9	30.1	33.3	29.7	33.5
	Outward	0.0	0.0	0.5	1.4	1.8	2.3	2.0	2.1	2.1	2.3
Viet Nam	Inward	32.9	24.8	25.5	34.5	65.7	69.9	73.7	71.8	66.3	61.2
	Outward	—	—	—	—	—	—	—	—	—	—

Note: — Not available or not separately reported. \*\*\* Negative accumulation of flows.

Source: UNCTAD online database from 1980 to 2003; World Investment Report 2005 (Annex table B.3) for 2004; World Investment Report 2006 (Annex table B.3) for 2005 (Table 2 in Kawai 2007).

East Asia's integration also started with the formation of regional institutions—ASEAN being one of the most important ones. This organization has, however, remained relatively weak: the political will that was so important in European integration was not present in the support provided to ASEAN by its members because of their inherent preference for national sovereignty. Compared with Europe, Asian economies had very different per capita incomes, industrial structures, market infrastructures, institutional and human capacities, and

governance standards. As a result, Asia has chosen not to establish strong regional institutions that drive the integration process. East Asian integration has been driven largely by the private sector, assisted by strong market forces in trade and investment. This integration was strengthened by MNCs and Asian business houses, without much direct institutional support from regional governments.<sup>5</sup>

This market-driven integration has added pressures to distribution structures requiring complex logistics services. Rising demand for logistics is changing the conventional perspective of comparative advantage, implying that logistics and transportation are more closely integrated with supply chains than previously thought. What seems evident from the East Asian experience is that not only does a combination of abundant skilled labor, capital investment, and advanced technology but also transportation and logistics support determine the sustainability of decentralized production systems. Most East Asian economies invested significant amounts of resources in industrial and social infrastructure to improve connectivity within networks and with external markets, which such decentralized production systems demanded. These responses focused on improving national connectivity with foreign partners to serve the needs of outward-oriented industrialization.

### Logistics, Infrastructure, and Software

Several complex factors determine overall transport and logistics costs. In the United States average transit time fell from 40 days in 1950 to about 10 days in 1980—one of the important factors in reducing logistics cost (Rodrigues, Bowersox, and Calantone, 2005). Technological advances have reduced overall logistics costs for the United States but not for the PRC, Europe, or India (table 3). In the PRC and India, land transport costs remain high, as a result of inadequate national transport and communications infrastructure, uncompetitive transport and logistics sectors, and high fuel costs. Developing countries have yet to create efficient multimodal transportation networks and significantly improve the efficiency of existing road or rail systems.<sup>6</sup> Unlike tariff and other trade barriers, domestic transport and logistics costs—key determinants of where production activities gravitate—vary widely across countries. Given the costs of logistics, a number of developing countries in Asia are actually closer to industrial countries in terms of economic distance than to their regional neighbors.

**Table 3. Logistics Costs, by Region, 1997–2002**

Economy	1997		2000		2002	
	\$ billion	% of GDP	\$ billion	% of GDP	\$ billion	% of GDP
China	718	16.9	975	17.7	1,052	17.9
Europe	884	12.2	1,100	12.8	1,229	13.3
India	236	15.4	433	17.0	487	17.4
North America	1,035	11.0	1,240	10.6	1,203	9.9

Source: Rodrigues, Bowersox, and Calantone 2005.

The deficiencies of Central Asian transport systems—high costs coupled with the low quality of transport and logistics services—have meant that 16–19 percent of the total value of

<sup>5</sup> For this reason, East Asian exporters have made broad-based gains in competitiveness in local markets against many major nonregional suppliers (ADB, 2003).

<sup>6</sup> In efficient multimodal transportation networks, goods move from one mode of transport to another seamlessly, without storage or human handling in between.

exports and imports is absorbed by transport costs.<sup>7</sup> In particular, the cost and availability of transport permits and visas for vehicle operators to travel cross-border are a major barrier in Central Asia, hampering regional connectivity: in addition to various other charges, such as road taxes, axle load charges, insurance, and visa charges, it can cost as much as \$400 for a driver from a non-Commonwealth of Independent States (CIS) country to enter Uzbekistan.<sup>8</sup> A multicountry study shows that a 20 percent reduction in logistics costs would increase the trade to gross domestic product (GDP) ratio by more than 10 percent in Cambodia, the PRC, and the Lao People's Democratic Republic; by more than 15 percent in Mongolia; and by more than 20 percent in Papua New Guinea (Carruthers and Bajpai, 2002).

So far, these costs have not affected the overall competitiveness of Asian products, because some production clusters are located near ports and in coastal areas. Nonetheless, maintaining competitiveness will become a major challenge in the years to come, as manufacturing firms move inland, because of congestion and other factors. It is estimated that in the PRC, inland provinces such as Shaanxi would have to incur additional land transportation costs of more than \$1,500 per 20-foot equivalent unit (TEU) of electronic goods to transport to Qingdao for export. Though no comprehensive databases are available on the land transport costs of traded goods, several studies provide location-specific information. Almost 63 percent of the cost of transporting goods from Chongqing in the PRC to the west coast of the United States is incurred before arriving at the port for export (Carruthers and Bajpai, 2002) (box 1).

### Box 1. Regional Trade Expansion and Its Impact on Logistics

During the 1960s and 1970s, the Republic of Korea had one of the most competitive manufacturing sectors in the world, based on cheap, highly skilled labor. However, as labor costs increased, Korea gradually lost its international competitiveness. With the emergence of China as a dominant low-cost producer with strong logistics systems, some of Korea's manufacturing-based industries shifted to China. From a small base of \$42 million in FDI in 1991, China accounted for nearly 38 percent of all Korean FDI outflows (\$2.2 billion) in 2004. Several vertically integrated production networks were created. As much as possible, Korean enterprises attempted to retain high value-added activities locally. As a result, there was a significant impact on freight flows between China and Korea. China, which accounted for only 2.9 percent of Korean trade in 1991, became the most important trade partner in 2004, accounting for 16.6 percent of Korean trade.

Given its geographical proximity, the Yellow Sea Rim area became one of the most important components of bilateral supply chains. Container throughput for the Yellow Sea ports (Qiangdao, Tianjin, and Dalian) increased more than 15 times between 1990 and 2003—a period during which global flows increased only 1.7 times. Korean port throughput increased 5.4 times as a result of regional trade and Chinese transshipment at Korean ports. In 2000 a regionally specialized container shipping service started; by 2003 six freight-only lines created a logistics network to cater to regional trade. This regional network of Yellow Sea ports increased its share of trade from 22.6 percent in 1994 to 32.2 percent in 2004. Along with several other similar examples, this indicates that regional connectivity and logistics improvements have been handled largely within a bilateral structure of trade and production networks.

Source: Lee and Rodrigue 2006.

Given these logistics and transport challenges, there is potential for improving regional cross-border infrastructure to reinforce regional production and trade. Most of the initial

<sup>7</sup> A recent study (ADB, 2006b) indicates that regional cooperation in trade, transport, and customs transit in the Kyrgyz Republic would yield a potential cumulative gain for the period 2006–15 of \$2.1 billion at 2002 prices.

<sup>8</sup> Actual transport costs and time are often much higher than the “ideal world” costs (UNDP, 2005). The “ideal world” condition is based on balanced transport flows, competitive markets for transport services, smooth border crossings, low transit fees, and no visa problems or unofficial payments.

production networks were supported by national governments, which invested in national infrastructure in their countries, with appropriate port linkages to the global and regional economy. The East Asian economies—the NIEs, middle-income ASEAN countries, and more recently the PRC and Viet Nam—have invested significant capital resources, building necessary national infrastructure to support these production networks. These networks enjoyed an initial comparative advantage, but there is not guarantee that this advantage will be maintained, as the efficiency of East Asia’s logistics lags that of other regions (ADB and others, 2005). Overall, quality and quantity of infrastructure in Indonesia, the Philippines, Thailand, and to some extent Malaysia may already be inadequate to remain competitive. With differing factor prices, technology levels, workforce capabilities, and logistics costs, most global investors will have much wider choices regarding the location of future production clusters or expanding existing ones.

It is possible to reinforce the region’s competitiveness through regional cooperation for cross-border infrastructure, because East Asian economies are still complementary. As Arndt (2001) notes, “The basic idea is to think of the region rather than the nation as the production base and to spread component production around the region in accordance with comparative advantage.” (p. 5). Regional connectivity through cross-border infrastructure will be crucial in this case, because it supports complementarities in production across the entire region, going beyond national boundaries. Other parts of Asia—South Asia, Central Asia, and the Pacific—have even less national and cross-border infrastructure than East Asia. The need to reduce transport and logistics costs, by connecting production clusters in different countries and linking these clusters with markets, will be a major challenge for many developing countries in Asia in the next few decades.

In discussing infrastructure projects, it is important to focus on both “hardware” and “software” components. Several surveys and benchmarking studies indicate that hard infrastructure facilities are only a part of the overall determinants of cross-border connectivity. “Software” needs to be addressed to promote the smooth flow of people, services, and goods. “Software” aspects referred to here include legal, regulatory, procedural, and other supporting policy frameworks, as well as human and institutional capacities; “hardware” refers to physical infrastructure components that facilitate physical connectivity. In the power sector, for example, transmission lines and power plants represent hardware, whereas regulatory frameworks, tariff policies, power-trading agreements (grid code, settlement code, security, planning, and maintenance, among others), and harmonization of rules and regulations fall under software. Cross-border physical infrastructure can promote the movement of people, goods, services, and information only if accompanied by supporting software components that address various types of impediments related to policies, regulations, procedures, and standards.

An analysis of trade facilitation measures involving 75 developed and developing countries around the world concludes that if countries currently below the group average in relevant indicators individually cut their deficits to the mean by only 50 percent, total trade among the 75 would expand by 9.7 percent, or \$377 billion (Wilson, Mann, and Otsuki, 2004). Initiatives involving customs and trade facilitation can remove procedural barriers to the cross-border movement of people and goods, thereby increasing efficiency, reducing transport costs, and maximizing the economic benefits of cross-border infrastructure. In this sense the infrastructure software component is inseparable from the hardware component.

### **Cross-Border Infrastructure and Economic Development**

Infrastructure investment has been the bedrock of national economic development plans in many economies. National infrastructure projects are essential in connecting various production clusters and markets within a country, thereby helping integrate the national

economy. Transport infrastructure has long been considered critical, because of its ability to enlarge markets.<sup>9</sup>

Good infrastructure is now considered a major contributor to economic development in many developing economies. In most developing economies, inadequate and unstable power supply, inefficient transport systems, poor-quality roads, weak and aged railroad systems, badly equipped and congested ports and airports, unreliable communications systems, and grossly inadequate urban infrastructure raise transaction costs, curtail productivity, and often render investments unviable. Efforts to enhance investment in national infrastructure can help accelerate the pace of economic development in many of these economies (box 2).

### Box 2. Recognizing the Importance of Infrastructure

Although the use of the word *infrastructure* is relatively new, infrastructure has long played an important role in integrating markets across nations (Prud'homme 2005). Adam Smith viewed the provision of least certain types of infrastructure (good roads, bridges, navigable canals, harbors) as a clear obligation of the state and a necessity “for facilitating commerce” (Smith 1776).

Since Smith, economists have not always kept such a clear eye on the need for infrastructure investments as a requirement for development. Studies on the linkages of infrastructure to economic growth and development have been sporadic at best, despite the heavy infrastructure investment in the 19th and much of the 20th century. Even during the post–World War II period, when development economics began as a separate branch of economics, infrastructure does not appear much in economic policy discussions. Infrastructure was considered a part of capital, referred to as “social overhead capital,” and often lumped together as a source of technological change. It was largely ignored until the work of David Aschauer in 1989 (Gramlich 1994). Aschauer provided empirical analysis to explain the slowdown in U.S. productivity with the slowdown in infrastructure investments. Aschauer’s papers were “followed by an unusual amount of attention to infrastructure from politicians and economists” (Gramlich 1994 p. 1177). Since then, much attention has been devoted to tracing empirical and theoretical linkages between infrastructure and development.

The infrastructure agenda of the East Asian economies—starting with Japan and spreading to the Asian NIEs and middle-income ASEAN members—has been guided by a strategic vision of the top leadership, using coordination and feedback devices within the planning process to implement or realize that vision. Though each of these economies has followed a country-specific approach, one common attribute has been that inherent priorities have been set by the top leadership of each economy. Rapid infrastructure development has been possible because investments were made ahead of infrastructure demand, at times gambling on large infrastructure projects that may have had questionable viability. Providing infrastructure has been closely linked spurring industrialization and economic growth. Countries such as the PRC, Viet Nam, and even India are pursuing this model of infrastructure development today.

The unique aspect of the East Asian model is that these economies developed infrastructure as part of their overall strategy of promoting integration with the regional and global economy. Infrastructure was seen as an important enabling factor in the process of

<sup>9</sup> Canals and railroads in the United States opened up new areas promoting economic growth through regional specialization based on the comparative advantage of each region. Governments (national and subnational) played an active role during 1790–1840, funneling large amounts of foreign and domestic investments into infrastructure projects (Wallis, 2000). Europe saw a major expansion of its infrastructure network by way of railway links, telegraph lines, electricity and cables, gas and water works in the 19th century, followed by telephone lines and tramways at the turn of the 20th century. Japan spent considerable resources building infrastructure before World War II, but it was its efforts after the war, when it allocated 6–8 percent of GDP to infrastructure development, that set an example for other East Asian economies. Hong Kong, China; the Republic of Korea; Malaysia; Singapore; and Taipei, China followed this lead with similar investment levels (Mody, 1997).

globalization until the recent upsurge in the growth of global production networks. Advances in information and communications technology and the growth of production networks across East Asia have changed this basic role of infrastructure—from an enabling factor to an important decision variable that affects the overall costs of production. Multinational firms have various alternatives for investments. Infrastructure—the quality and quantity of a country’s “hardware” and “software” aspects—can change an investor’s overall cost of trade and production. Cross-border infrastructure can have an immense impact on an economy’s competitiveness by reducing the economic distance from external markets, building economies of scale due to wider markets, increasing FDI inflows, and expanding trade and economic activity in general.

The recent interest by the multilateral and regional development institutions in supporting infrastructure development stems from the impact infrastructure investment has, not only on the overall quality of life and poverty reduction, but also on infrastructure governance—infrastructure design and management along with appropriate regulatory frameworks. Though empirical studies are not conclusive about the impact of infrastructure on economic growth and poverty reduction, there is growing recognition of the positive contribution infrastructure makes to these objectives. National and cross-border infrastructure is an important policy instrument for economic development.

### **Lessons from Major Cross-Border Infrastructure Investments in Asia**

A nation’s boundaries often impede cross-border trade, investment, and economic integration. Even in the most open economies, domestic trade is much larger than international trade.

Several regional initiatives are at various stages of implementation in Asia to promote regional cooperation and greater connectivity. In a sense, the 1997–1998 financial crisis was a turning point for regional cooperation among East Asian economies. Before the crisis, the institutional base and policy initiatives were limited to removal of trade and investment barriers under the auspices of the General Agreement on Tariffs and Trade (GATT)/WTO and APEC, while actual integration was driven largely by the private sector. The growing support for regionalism reflected several factors, including the need to reduce financial vulnerabilities at the regional level; the need for greater cooperation with the PRC, given the country’s emerging dominance in the world and in regional markets; and the merit of harmonizing policies, regulations, standards, and procedures to enhance the region’s competitiveness.<sup>10</sup> Market-led integration since the crisis was supplemented by policy-driven cooperation in money and finance, trade and investment, and the provision of regional public goods. In this context, robust transport and communications links are important building blocks, connecting regional markets by supporting production, trade, and investment (box 3).

The ADB has supported a number of regional and subregional economic cooperation programs involving both hardware and software aspects of infrastructure, including trade and transit facilitation, policy and regulatory harmonization, and capacity building. This section examines four case studies of cross-border infrastructure: the GMS Northern Economic Corridor and Trade and Transit Harmonization,<sup>11</sup> the Nam Theun 2 Hydropower Project, the Regional Cooperation for Pacific Aviation and Information Communications Technology, and the Indonesia-Singapore Gas Transmission program.

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<sup>10</sup> *Regionalism* here includes formal economic cooperation and integration arrangements covering infrastructure, trade, investment, finance, and various types of regional public goods (see Kawai, 2007).

<sup>11</sup> The Greater Mekong Subregion (GMS) comprises Cambodia, the PRC, Lao PDR, Myanmar, Thailand, and Viet Nam.

### **The GMS Northern Economic Corridor and Trade and Transit Harmonization**

The GMS program has focused on regional cooperation for strengthening cross-border connectivity. Key activities include development of economic corridors: roads to improve access, institutional and policy support for trade facilitation, and transit policy harmonization to reduce logistics costs across the subregion. Five economic corridors (two north-south, one east-west, and two southern) were identified, and several road investments have begun. Feasibility studies are addressing prospective railway improvements. Trade and transit harmonization is a key element, bringing to the GMS program both the hardware and software components of infrastructure development.

The Northern Economic Corridor project (ADB, 2002)—which will link Thailand and the PRC via a 228-kilometer road link through the northern and more remote regions of landlocked Lao PDR—was designed to open up economic opportunities across diverse populations. The trade and transit corridor was estimated to cost \$90 million for the physical investments in building road links and the components that will benefit local communities along the way. A social action plan with provisions for community roads, small water and sanitation schemes, education, HIV/AIDS awareness programs, and local capacity-building programs for environmental management was an integral part of the project design. These components were planned in a participatory process involving many ethnic minority groups.

The project was funded using financial and other resources from the two primary beneficiaries (the PRC and Thailand), in partnership with the ADB. The role of the ADB was multifaceted. It (a) helped mobilize financial resources; (b) assisted in project design to ensure greater regional connectivity and the inclusion of isolated regions of northern Lao PDR in the process of regional integration; (c) assisted Lao PDR as the transit country in negotiations on pricing policies, so that maintaining the newly created assets would not place undue fiscal burden on the country's finances; (d) actively worked to ensure that the distribution of costs and benefits across the three countries was fair (given that the most immediate benefits were expected to accrue to the PRC and Thailand, the PRC and Thailand shared two-thirds of project investments and provided Lao PDR with concessional financing); and (e) ensured that the project adopted a social and environmental management plan to include contracting arrangements that aligned incentives of construction firms to mitigate these risks. Similar projects that seek to coordinate regional infrastructure are underway in the subregion.

### Box 3. Cross-Border Infrastructure in Ancient Times

Archeological evidence points to the exchange of goods between Mesopotamia and the Indian and Chinese territories between 7,500 and 4,000 BC. The Persian Royal Routes, which stretched over some 2,900 kilometers and were believed to have been in use as early as 3,500 BC, had all the elements of cross-border infrastructure. Rebuilt by King Darius I and maintained and protected by the Achaemenid Empire (c. 700–330 BC), the facility had postal stations and relays at regular intervals. By having fresh horses and riders ready at each relay point, royal couriers could carry messages across the entire route in nine days, a fraction of the three months it took normal travelers.

The Roman Empire also had an intricate network of coastal shipping and roads that it used for trade with India and the PRC. As the empire grew, the system was expanded to cover 80,000 kilometers of first-class roads by about AD 200. Maintenance of the road system was the responsibility of the inhabitants of the district through which the road passed, but access was public.

Connecting Asia and Europe through the Middle East, the Silk Route stretched over 6,000 kilometers. It was not a single road but several alternative trails connecting disparate areas through very difficult terrain and climate zones. Trade along this route involved goods transported by several local caravans in the form of chains and passed through many traders before eventually reaching their final destination. Alongside these caravans, monks and pilgrims traveled, spreading knowledge, culture, and religion.

Like today's production network, the Silk Route created prosperous clusters of towns and trading posts, complete with the so-called "software" aspects of cross-border infrastructure, such as the exchange, distribution, and storage of goods. The Silk Route became a major channel for trade and transfer of technology—it promulgated knowledge-sharing on administrative practices such as standardized weights and measures, a system of numerical notation and identification, the labeling of commercial goods, and the opening of far-flung colonies. Some historians compare the Silk Route to modern-day communications highways.

Weber (cited in van der Vleuten and Kaijser 2005) suggests that the "transport revolution played a major part not only in the economic but political history of Europe" (p. 27). "Leading politicians in the Ottoman and Soviet empires, the Third Reich, as well as individual nations actively used network technologies to build and strengthen their economies."

Throughout history, cross-border connectivity has played an important role in the expansion of the global economy. And though historiographies recognize the importance of such linkages, only recently has research focused on the analytics of infrastructure. Different phases of globalization are tied to different phases of infrastructure development, connecting regions beyond national boundaries.

Source: Rodrigue 2006; Voute 2005; van der Vleuten and Kaijser 2005.

The three economic corridors in the GMS—north-south, east-west, and southern—are expected to form a highly efficient transportation system. No matter how good roads are, they are of little use if traffic is held up at the borders, however. Although international conventions exist to address regulatory and procedural barriers to the cross-border movement of people and goods, most GMS members are unable to fully accede to these conventions. Recognizing this, the ADB has been working with countries involved to implement an agreement on the cross-border movement of services and goods. These types of support allow people and goods to travel around the GMS with minimum impediment, cost, or delay, ensuring that a basic framework is in place to support the economic competitiveness of GMS as an integrated area for production, consumption, and distribution.

The GMS Cross-Border Transport Agreement (CBTA)—which entered into force with the ratification by the six GMS member countries in December 2003—is a multilateral instrument designed to facilitate the cross-border transport of people and goods across the subregion. It incorporates the principles of bilateral or multilateral action and flexibility in recognizing differences in procedures in each GMS country. The agreement includes references to existing international conventions that have demonstrated usefulness across a broad range of countries. It also takes into account, and is consistent with, similar ASEAN initiatives.



The CBTA includes a preamble, with 10 parts and 20 annexes and protocols, that applies to selected and mutually agreed upon routes and points of entry and exit among the signatory countries along the east-west, north-south, and southern economic corridors. The preamble covers (a) single-stop inspection; (b) cross-border movement (visas) for people engaged in transport operations; (c) transit traffic regimes, including exemptions from physical customs inspection; (d) bond deposit, escort, and agriculture and veterinary inspection; (e) requirements that road vehicles will have to meet to qualify as cross-border traffic; (f) exchange of commercial traffic rights; and (g) infrastructure, including road and bridge design standards, road signs, and signals.

### **The Nam Theun 2 Hydropower Project**

Nam Theun 2 (NT2) is a 1,070-megawatt hydropower project being implemented in Lao PDR that will export most of its power to Thailand (ADB, 2004). The \$1.2 billion project is a private sector undertaking with multilateral and bilateral financial and other support. This enormous project—not only the largest private power project in Lao PDR but also the largest private sector hydroelectric cross-border project in the world—has been under preparation since the mid-1980s. The project has very strong supporters as well as several groups that oppose it.

The Lao PDR government is the major beneficiary of NT2. It will receive about \$1.9 billion over the 25-year operation period, from dividend income, royalties, and taxes. The main costs are borne by local communities and the environment around the project area. These costs arise from construction of the dam, the flooding of the Nakai Plateau, and downstream effects associated with the interbasin transfer of water from NT2 to the Xe Bang Fai River. More than 70,000 local inhabitants (some of them from ethnic minorities) will be affected in varying degrees.

One of the major issues has been ensuring a fair system of distributing costs and benefits, with appropriate compensation to protect those most affected by the project. A total of \$90 million has been designated as capital and operating expenditures for environmental and social mitigation and compensation. These obligations are part of the concession agreement signed by government and private sector concessionaires. Mechanisms have been developed to address weak accountability arrangements in the public finance management system, in particular, to facilitate more effective and transparent targeting of NT2 revenues toward poverty reduction, including improved education, health, and sustainable livelihood.

An adequate system to monitor and build capacity support for the government—provided through multilateral and bilateral institutions—is in place to implement a project that is not only a success in terms of producing and trading power but is also helping Lao PDR further its development agenda of poverty reduction, social development, and economic growth. A key challenge is to ensure that the proposed distribution of costs and benefits among different stakeholders groups is fair and remains on track.

**Pacific Cooperation for Aviation and Information Communications Technology** Regional cooperation means something very different for the island economies of the Pacific, which are small, have fragmented markets, and are isolated physically. Cross-border connectivity is a major challenge, as the scope for hard infrastructure to strengthen physical connectivity is limited by geographical dispersion and remoteness. A strong rationale exists for regional cooperation on the software aspects to improve connectivity—through efficient regional aviation, shipping, and information and communications.

Aviation in the Pacific involves 43 air transport operators, 266 aircraft, and nearly 4,000 licensed personnel. The capacity for safety and security regulation and oversight is difficult

to sustain with small individual markets. Noncompliance with international safety standards and other regulations makes air travel in the Pacific less safe and secure than elsewhere, and it reduces connectivity (ADB, 2005b). Air travel is vital for Pacific economies given the geographical nature of the region and the importance of tourism.

To establish a strict, rule-based international regulatory environment, a regional agency—the Pacific Aviation Safety Office (PASO)—was formally established. PASO is expected to help reduce overall oversight costs and meet international standards by avoiding duplication, creating economies of scale, harmonizing regulatory systems, and making available scarce technical expertise available as and when needed. An investment program will support PASO's continuing development to improve aviation safety and security. The program has four components: (a) harmonizing the regulatory environment, (b) ensuring compliance with international standards; (c) establishing a regional inspection and surveillance system, and (d) upgrading PASO headquarters. The project involves extensive capacity building, formulation of regulatory and legal frameworks, and adoption of necessary documentation systems. The project is expected to be self-sustaining in five years, once revenues match expected costs. It is designed to serve as a model for intergovernmental regional cooperation in the field of regulation services, needed to develop adequate regional transportation infrastructure.

For many developed countries, information and communication technology (ICT) provides additional information services over already well-established communications infrastructure. In the Pacific, cross-border ICT—using very small aperture terminal satellite communications (VSAT)—has the potential to radically address two fundamental challenges, distance and small market size. ICT cooperation can aggregate production, so that fishing and agriculture cooperatives, for example, can access larger markets and even very small enterprises, such as microtourism or agrotourism resorts, can attract the attention of global audiences. Digital connectivity can thus become a lifeline that allows isolated island economies to participate in expanding global and regional markets.

Technological solutions—such as multiple-access VSAT technology—allow data from the Internet to be beamed down to a multitude of places within the footprint of a given satellite. Users located anywhere in the Pacific—on land or sea—can communicate by e-mail, facilitate exchanges between local administration and the central government, and market tourism, for example. Establishment of this or a similar wide-area system would help the Pacific capitalize on its vast human and natural resources more effectively.

Strong communications capacity provides a cluster of countries with opportunities to grow into an integrated region and to thrive on economies of scale—something the Pacific still needs to do. In trade, ICT is important for procurement, exports, or aggregating national production; in governance, the system could improve local administration, human resource deployment, budgeting, and much more. A wide-area communication network also benefits hospital procurement, disaster management, health alerts, and school research, among other activities. In short, digital connectivity—through effective and inexpensive ICT cooperation across island nations—can open up a new window to the world.

### **Indonesia-Singapore Gas Transmission**

Although a large number of Asian countries have gas resources, the region has yet to develop an integrated cross-border gas network. The Indonesia-Singapore gas pipeline began as a domestic pipeline with ADB funding from various multilateral and bilateral sources. The original project was to construct onshore and offshore pipelines to increase domestic use of gas as a substitute for petroleum and to improve energy efficiency. The project included a set of policies to create an enabling environment for private-sector participation in the gas sector and establish a regulatory framework and supporting

institutions for transmission and distribution systems. An important policy covenant under the ADB loan was that the state gas company (PT Perusahaan Gas Negara Pesero Terbuka) would partially divest a portion of its equity in the project to a suitable strategic partner to spread economic risks and to introduce world-class operations, maintenance, and financing to Indonesia's gas sector.

The 1997–98 financial crisis brought considerable uncertainty to the domestic gas market and delayed securing a strategic investor. In response, the government, in partnership with the ADB, formed Transmisi Gas Indonesia in 2002. Through open competitive bid, it divested 40 percent of its equity to Transasia, a consortium comprising Malaysia's Petronas, Gulf Indonesia, Singapore Petroleum, and Canada's Talisman Energy. Transasia paid \$187.6 million for the 40 percent equity that included about \$58 million toward the cost of extending the Grissik-Battam pipeline to Gissik-Battam-Singapore. The cross-border project is an initial step, not merely in restructuring Indonesia's gas sector but in opening the door to the broader goal of establishing a proposed trans-ASEAN gas pipeline (Thomson Financial, 2002).

### Lessons Learned

Most of the lessons from these case studies are specific to the context and circumstances of the individual projects. However, a few generic lessons can be drawn:

- Governments involved in cross-border infrastructure projects need to play a larger role, even if the projects are primarily private sector driven. Their role can be multifaceted and, in most cases, context specific—from sharing risks to creating credible policy regimes to providing direct or indirect financial support. For example, if high fixed costs, the long life of assets, and space specificity expose cross-border infrastructure to risks as a result of high sunk costs (or unrecoverable past expenditures), governments need to ensure private-sector confidence by establishing credible policy regimes.
- In the absence of a single pervasive sovereign jurisdiction, aligning the differing interests of two or more nations requires either formal or informal institutional arrangements aimed at lowering transaction costs, reducing any risk of conflict, or both—through, for example, the European Commission or the GMS.<sup>12</sup>
- The presence of multiple constituencies involved in cross-border infrastructure requires capacities and mechanisms to identify the magnitude and distribution of the benefits and costs of cooperation. When costs and benefits between different groups vary dramatically, a fair system of distribution needs to be introduced and the issue of incentive compatibility must be addressed—and internalized at the planning and design stage. In the case of cross-border transport projects, sufficient incentives should be provided to any transit country to ensure project success.
- Appropriate mitigation plans and adequate financial and technical resources are required to deal with transborder externalities, such as the spread of HIV/AIDS, pollution, the erosion of social values and cultural identities, and the trafficking of vulnerable groups. Bridging shared history, cultural values, norms, and creating cohesiveness based on ethnic identity can help cross-border infrastructure projects build trust across ethnic divides—an essential element for successful regional cooperation.<sup>13</sup>

<sup>12</sup> International arbitration offers a solution to this problem, but recourse to this option must be agreed on and adhered to a priori.

<sup>13</sup> In the GMS program, cross-border infrastructure was found to be a crucial building block in developing cultural capital to reap the so-called “peace dividend,” expand markets, and exploit economic opportunities

- Planning and preparation costs are almost always high. Some projects require up-front external financial and other support to be successful.

## **A Framework for Cross-Border Infrastructure**

Given the rapid growth of regional economic activities, trade, and investment in Asia, cross-border infrastructure has become an important building block of regional economic integration in the age of globalization. Many cross-border infrastructure initiatives are specifically directed at facilitating cross-border trade by reducing overall transport and logistics costs. Cross-border infrastructure has also helped improve connectivity within a country or changed the market structure of domestic sectors.

Except in the European Union, which has well-defined rules on market integration to support cross-border infrastructure, these projects are usually planned and designed on a bilateral basis. In some cases, individual project negotiations have worked well. Scandinavian countries have interchanged as much as 7 percent of total subregional power generation based solely on a gentlemen's agreement. Though in theory, project-to-project cooperation between governments for mutual benefit should work without requiring a formalized institutional or legal framework, in reality this approach often involves high transaction costs, high failure rates, or long lead times. A project-to-project approach does not follow a single, integrated framework for planning and designing projects.

This section proposes a framework for planning and designing cross-border infrastructure in three dimensions: political, economic and financial, and institutional and software. All of these dimensions usually need to be addressed to ensure successful cross-border infrastructure results.

### **Political Dimensions**

Infrastructure often has a political angle. This is particularly true of cross-border infrastructure, because it invariably raises foreign policy issues. More often than not, a cross-border infrastructure project, policy, or program is used to promote or hinder a government's foreign policy goals. In this sense, any cross-border infrastructure project requires strong political leadership at the national level, a strategic vision based on shared priorities for regional integration and development, and political commitment to this bilateral or multilateral coordination.

Several levels of governments are often involved in planning, designing, and coordinating cross-border infrastructure. Even within a country, the central planner often has different perceptions about the value of cross-border infrastructure than local governments and users. This can lead to problems of mismatches in prioritization and resource allocation. Local governments, for example, may have a greater stake in connectivity with neighboring countries than the central government does. The highest political leadership must set a clear strategic vision for national and cross-border infrastructure in order to resolve such mismatches at the national level.

There is a need to develop sufficient mutual trust and goodwill between governments involved in the project. As multiple constituencies are often involved in cross-border infrastructure, institutional mechanisms are needed to sort out the true objectives of cooperation and to resolve any obstacles. This can be done either through formal institutions (such as the European Union) or, as is the case in many Asian groups, through informal

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in transborder regions. It also provided a means for smaller nations to become relevant in the process of globalization.

political consensus to create such collaborative arrangements. Whichever approach is taken, governments need to make political efforts to develop mutual trust and build consensus among them in various ways, including joint studies, dialogue, and interactions among politicians, experts, news media, and citizens.

A strong political commitment to international coordination for cross-border infrastructure can also reduce overall external risks. Governments involved need to collectively ensure that the underlying policy environment supports cross-border infrastructure, particularly when the project undertaken involves the private sector. Strong political commitment to coordinate using a multilateral framework can make it difficult for individual governments to unilaterally renege on the terms of an agreement under which the infrastructure is supplied, as the other parties naturally would also have an interest in enforcing the agreement. Transparent and predictable governance structures and institutional arrangements for infrastructure projects reduce overall risks and enhance project feasibility.

### **Economic and Financial Dimensions**

Benefits from better connectivity through cross-border infrastructure—in the form of lower logistics costs, expanded trade, higher growth, and greater poverty reduction—tend to be indirect and long term, whereas costs tend to be incurred immediately and up front. These benefits are often asymmetric across countries, making it difficult to agree on the appropriate distribution of costs. These can raise doubts over resource allocation, especially for high-profile projects. Hence economic and financial feasibility and distributional consequences need to be carefully studied and well established. This is particularly the case because political leaders often announce cross-border infrastructure projects without undertaking the necessary economic and financial analyses beforehand.

Cross-border infrastructure projects should be planned and designed within the overall medium-term development strategy of each of the countries involved, and they should be identified within a regional sector planning framework. This framework should not only apply existing tools for sector planning (in terms of least-cost planning) but also require an institutional arrangement for effective regional policy coordination, including both strategic discussions at a high official level and technical consultations at the working level.<sup>14</sup>

Economic and financial analyses of projects identified within a regional sector planning framework are important for any infrastructure; they are particularly important for cross-border infrastructure given the capital intensities; complex structures of costs and benefits; regional public goods attributes; and long-term, indirect impacts. Cross-border infrastructure often involves various groups of stakeholders across national boundaries, and the groups that bear the greatest costs are not necessarily those that enjoy the greatest benefits from the project. With this in mind, a detailed distribution analysis is necessary to assess the project impact.

An appropriate institutional mechanism needs to be designed to ensure that stakeholder groups that are affected unfavorably by cross-border infrastructure projects are compensated fairly.<sup>15</sup> Such an assurance is crucial to ensure a fair system of distribution and obtain support from less powerful countries, regions, or groups.

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<sup>14</sup> For example, within GMS a broad hierarchy of institutional arrangements exists to prepare subregional strategies. There are working groups for energy and transport at ministerial levels, supported by a number of other institutional arrangements for coordinating work at technical level.

<sup>15</sup> In the northern economic corridor, for example, the benefits would accrue largely to PRC and Thailand, while Lao PDR would have to pay large economic and social costs. It was therefore very important to ensure that the interests of pure transit countries—such as Lao PDR—were ensured when structuring the project finance.

## **Institutional and Software Dimensions**

Institutional and software components are as important in cross-border infrastructure as the physical (or hardware) components. For any hard infrastructure facility to work, well-designed institutional and software support is essential. It is particularly important for cross-border infrastructure, because of the involvement of multiple constituencies and the associated externalities. Developing a relevant institutional and software agenda for cross-border infrastructure can be complex, because no single legal or policy jurisdiction exists and the agenda often involves a large number of issues.

Successful cross-border infrastructure requires institutional arrangements, formal or informal, that will help reach an optimum outcome arising from cooperation as opposed to independently chosen suboptimal outcomes. Technocratic cooperation is the most critical element. Institutional requirements for coordination vary depending on how complex a sector is. For example, the technical complexity is lower for a cross-border road project (primarily involving agreements on design standards and road signage at the construction stage) than for an electricity project (for which an agreement on technical standards is essential for both construction and operation). The asymmetric distribution of costs and benefits between different stakeholders needs to be addressed at the planning and design stage.<sup>16</sup> Thus sector-specific institutions will be needed for detailed planning, design, coordination, and financial arrangements in any cross-border infrastructure.

It is important to design institutions in a way that provides incentives for long-term success. This is particularly true when costs and benefits of cross-border infrastructure projects vary drastically across groups. Cross-border projects need to align incentives and financing arrangements in ways that allow all participating countries to benefit from the projects.

The strong need for planning and coordination for cross-border infrastructure requires a systematic institutional arrangement, whether formal or informal. Though in theory, ad hoc institutional and technocratic coordination and negotiations between governments on a project-to-project basis should work well without a formalized institutional or legal framework, in reality this approach has had high failure rates and long lead times, significantly raising transaction costs and making such collaborations infeasible. Strong institutional coordination helps minimize such costs. A systematic, comprehensive, institutionalized approach is essential for success.

Harmonizing regulatory, procedural, and technical standards and environmental, social, and other safeguard requirements helps reduce risks and lower transaction costs for cross-border infrastructure. Resources are clearly needed for investing in such software aspects, particularly strengthening local capacity and building consensus.

## **Conclusion: The Future of Cross-Border Infrastructure in Asia**

Economic growth and poverty reduction in Asia are closely tied to its ability to reap benefits from regional economic integration. Though logistics have not yet become a serious constraint, action will be required to enhance both the quality and quantity of infrastructure to improve overall efficiency. Growing cross-border economic activities in Asia have important implications for the demand for infrastructure development in the region. Infrastructure needs for feeder seaports and logistics services, among others, will continue to rise rapidly.

With the emergence of the PRC and India as important destinations for exports and sources of imports, cross-border connectivity with different regions of these countries features prominently in Asia's infrastructure development plans. For the neighboring economies in

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<sup>16</sup> In NT2, for example, compensation for environmental and social impacts was built into the design of the project and became part of the contracting arrangements.

Southeast Asia, South Asia, and Central Asia, export-related transport and logistics will be particularly important, especially those geared toward serving the PRC and India. For poorer countries and poorer areas within countries in which infrastructure is a major constraint to expanding economic opportunities, improved access to larger regional markets will be key to economic success. The efficiency of cross-border infrastructure connectivity will be an important determinant of a country's prospects for economic growth, employment creation, poverty reduction, and social improvement.

Through greater investment in logistics and infrastructure, Asia can further strengthen its productivity and competitiveness. It can gain more from improved connectivity—such as cross-border transport corridors on land and a series of feeder ports and regional hubs—for promoting exports and imports. Connectivity can be increased by improving overall efficiency: by building, rehabilitating, upgrading, and modernizing infrastructure services, equipment, and facilities; supporting capacity building for asset management and maintenance; coordinating cross-border services and harmonizing regulations, procedures, and standards; and facilitating trade and customs. Various stakeholders need to work together to ensure success in this difficult area.

### **Governments**

Asian governments need to play an increasingly important role in cross-border infrastructure, even when projects are handled by the private sector. Their role includes planning at the regional level, coordinating policies and procedures, creating credible legal and regulatory policy regimes, strengthening infrastructure governance (transparency and accountability in financial management), and sharing risk. Cross-border infrastructure requires harmonizing rules and regulations covering the environment and social aspects and crafting policy regimes for private-sector participation.

Asian governments can take several steps to ensure these considerations are taken into account. First, candidate projects and programs for cross-border infrastructure should be identified that enhance the region's trade and integration agenda. Strong political leadership is needed to support such cross-border infrastructure arising from a vision of regional cooperation and integration based on improvements in transport and logistics efficiency and market expansion for the entire region. Asian governments need to reorient existing partnerships to deliver greater regional connectivity.

Second, Asian governments should integrate cross-border infrastructure projects and programs into their countries' own development plans, to demonstrate their willingness and commitment to support such initiatives. They could then establish institutional arrangements to support collaborative cross-border infrastructure projects for technical coordination, legal and regulatory coordination, and risk sharing that are inevitable in such projects and programs. It is important for governments to develop a strong, credible partnership, based on mutual trust.

Third, Asian governments could strengthen their collective work to mobilize a large pool of regional savings for "bankable" regional infrastructure investment. Strengthening national and regional bond markets—though such initiatives as the Asian Bond Markets Initiative and the Asian Bond Fund—is one of the first steps in creating a viable source of infrastructure financing to tap these Asian savings. At the same time, governments can make joint efforts to help create bankable projects through concerted national reforms to improve policy and regulatory environments and infrastructure governance.

## **The Private Sector**

Though the role of the private sector in cross-border infrastructure has been somewhat opportunistic, the sector has brought real “additionality.” Several successful cross-border infrastructure projects demonstrate that where relationships are governed purely by commercial considerations, differences are more easily resolved. Given the public sector’s resource constraints, the private sector will have to play an increasingly important role in cross-border infrastructure. There are substantial financial rewards to be derived from regional or subregional cooperation in such sectors as energy, telecommunications, and transport.

The private sector is expected to play a critical role in this process, in several ways. First, it can bring additional financial and technical resources for cross-border infrastructure. Together with governments and other development partners, it can undertake commercially viable cross-border infrastructure investments with an acceptable risk profile.

Second, the private sector can provide the enormous resources needed for improving cross-border connectivity through national and cross-border infrastructure investment projects. To dispel the past perception that these partnerships are often opportunistic and not based on mutual trust, the private sector should be encouraged to act as a reliable and dependable partner. It needs to develop a long-term view of returns and rewards, as infrastructure projects and concessions are long-term business ventures.

Third, there is no better strategy for risk sharing than to reduce the overall risk for the project. Due market and financial diligence remains fundamental to a successful cross-border infrastructure.

## **Civil Society**

Most cross-border infrastructure projects and programs are high-profile investments. Civil society organizations are often critical of them or even oppose them, for several reasons. First, these groups often have serious concerns about the environmental and social costs associated with large infrastructure projects or programs. Second, the asymmetric distribution of costs and benefits among stakeholder groups induces them to pay greater attention to the people who bear the brunt of the costs in terms of loss of land, property, and livelihood rather than the majority of people who benefit from the project. Third, unlike national projects or programs, cross-border projects involve no single jurisdiction. It is thus difficult to ensure a fair system of compensation and processes.

Civil society organizations have a useful and constructive role to play in enhancing the overall outcome of cross-border projects. Most important, civil society can provide a rigorous system of screening and monitoring cross-border infrastructure to ensure that transparent processes are in place for project planning, design, and implementation and for a fair distribution of costs and benefits among different groups of stakeholders. In this way, civil society can give voice to stakeholders who are adversely affected by projects.

## **Multilateral Institutions**

Regional connectivity is a public good with high externalities. Hence multilateral institutions have a crucial role to play in cross-border infrastructure projects. In the European Union, financial instruments are available to identify and design cross-border projects, in order to develop a large internal market and strengthen intraregional connectivity and regional competitiveness. The European Community budget finances part of these costs using “structural funds” at below market rates, involving some form of subsidy, to promote cross-



border infrastructure; the European Investment Bank plays a significant role in funding the projects.

In the GMS, the ADB has provided financial resources and capacity building through its technical assistance program. Multilateral institutions like the ADB can play a special role in ensuring that cross-border infrastructure complements the work being done by local governments and other stakeholders in all areas identified in the framework. They can help in the process of integration, regionally and as part of the larger globalization process.

The role of multilateral institutions in cross-border infrastructure includes many facets. As financiers, multilateral institutions can provide loans and other risk mitigation instruments, such as guarantees, and help mobilize resources from other development partners, including the private sector. As knowledge partners and technical advisors, multilateral institutions can provide expert advice, share lessons learned regionally and globally, and tailor knowledge to the specific needs and conditions in the countries involved. As capacity builders, multilateral institutions can help developing countries and regional or subregional bodies strengthen their institutional and human capacity to manage cross-border infrastructure, particularly for strengthening infrastructure governance (for example, financial management) and supporting software and institutional aspects. Perhaps most important, as honest brokers, multilateral institutions can play a catalytic role in cross-border infrastructure projects, bringing countries and other stakeholders together impartially and facilitating the dialogue and discussion process so that countries can reach political convergence to strengthen cross-border connectivity.

Financial and technical appraisals are important inputs for multilateral institutions, but so are environmental and social appraisals to ensure the mitigation of negative impacts and a fair distribution of costs and benefits among different stakeholder groups in the project design. Many regions have also benefited from specialized funds to support the identification, design, planning, and even financing of such projects. The success of the GMS program can be attributed, in large measure, to the ADB's sponsorship of financial and other technical resources that supported the collective processes.

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