EXECUTIVE SUMMARY

The Context and Objectives

Infrastructure is a key factor in economic development. Infrastructure development can also help in narrowing gaps between developed and backward regions. Infrastructure, especially transport and connectivity, is crucial for regional cooperation and integration. In the absence of efficient physical connectivity, any initiatives taken towards regional trade liberalization will remain ineffective. The Association of Southeast Asian Nations (ASEAN) secretariat has identified infrastructure development as one of the Priority Integrated Sectors (PIS) of the ASEAN economic community. It would also be of crucial importance for programmes of regional economic cooperation and integration within the East Asia Summit (EAS) framework. It was in that context that infrastructure development was studied as part of the work programme of the Economic Research Institute for ASEAN and East Asia (ERIA).

This project aims to analyze the current status, issues, and challenges facing infrastructure development in East Asia and examine the role that regional cooperation can play in meeting these challenges. Specific objectives include 1) examining infrastructure rankings of EAS countries in terms of availability and quality of infrastructure development globally as well as within the region and progress made over time; 2) surveying and analyzing the status of infrastructure development, issues, and challenges faced by different EAS countries; 3) collecting basic geographical data at the subregional level and developing a spatial economic model to simulate various effects

of infrastructure development on contiguous subnational regions.

Methodology

The study adopted a three-pronged approach to achieve its objectives.

The methodology followed included the construction of an East Asian Index of Infrastructure Development. This was followed by detailed case studies of infrastructure development and the challenges it faces in 11 EAS countries. Finally, simulations were conducted of the long-term impact of logistic infrastructure development in contiguous regions in East Asia.

a) Construction of an East Asian Index of Infrastructure Development

Following the methodology developed by an earlier RIS study, an attempt was made to develop a comprehensive regional infrastructure index considering the different aspects of infrastructure. This was done to examine the relative rankings of different EAS countries globally and among themselves, including changes in their relative rankings over a 15-year period. This comprehensive index helped improve understanding of the infrastructure gaps that exists between EAS countries and which should be addressed within a programme of regional economic cooperation.

b) Country Studies of Infrastructure Development and Challenges

Detailed country studies for nine EAS countries were conducted to examine the current status of ongoing infrastructure-development projects in each, analyze the data to

address the country-specific issues, and come up with perspectives on infrastructure development.

c) Modeling and simulations

This methodology involved analyzing the long-term impact of logistic-infrastructure development in contiguous regions using simulation supported by the theory of spatial economics and collected regional data sets. Modeling and simulation were done to check the possibility of the occurrence of long-term problems that are not easily predicted by other research methods.

Findings and Conclusions

East Asian Index of Infrastructure Development

Based on the estimated scores of infrastructure index for three separate years, we ranked the countries in descending order. As expected, developed countries occupy the top ten positions in infrastructure development—one country from North America (the United States), two from Asia (Japan and Singapore), and seven countries from Europe. Least developed countries (LDCs) from Africa and Asia (e.g., Myanmar and Cambodia) occupy the bottom ten while developing countries are in the middle ranks.

Based on the estimated ranks, LDCs and landlocked countries worldwide suffer most from infrastructure inadequacy. Within East Asia (ASEAN+6), we find a heterogeneous group. Japan, Singapore, and New Zealand occupy the top three positions. These three countries, along with the Republic of Korea, are also among the

top fifteen worldwide. Lao People's Democratic Republic (Lao PDR), Myanmar, and Cambodia occupy the bottom three in East Asia. Among the sixteen East Asian countries, ten successfully moved up the global ranking between the years 1991 and 2005 while the ranking of six other countries deteriorated. On the whole, the index reveals very wide gaps in infrastructure availability across the EAS region. This gap seems to have widened rather than narrowed over time. Hence, infrastructure development in the lagging regions needs to be given attention if the regional inequalities are not to widen further. The index could be developed further to analyze the role of other aspects of infrastructure, including social infrastructure, and examine its interaction with other variables of socioeconomic development as well as its role in determining the investment climate.

Ranking of East Asian Countries in Infrastructure Development

Country	1991	2000	2005
Japan	5	4	2
Singapore	6	2	3
New Zealand	13	12	14
Korea	26	15	15
Australia	7	16	16
Malaysia	37	27	29
Brunei	27	31	36
China	49	43	39
Thailand	43	38	42
India	50	49	51
Vietnam	92	75	61
Indonesia	69	63	62
Philippines	76	65	63
Lao PDR	99	84	92
Myanmar	90	91	95
Cambodia	100	93	98

Summary of Findings from Country Studies

The country studies highlight a number of issues, experiments, and challenges faced by EAS countries in terms of developing infrastructure, including raising resources, relative roles of public and private sectors, models of public-private partnership (PPP), institutional and regulatory capacity, regional inequalities and cross-subsidization of infrastructure delivery, policy issues or soft infrastructure that includes regulations and procedures. A brief summary of findings from each country report follows.

Cambodia

Compared to the infrastructure of other countries in the region, Cambodia's is still in poor condition due to the war, poor master planning, and lack of maintenance. Most passengers and freight use road transport while other means of transportation are relegated to a complementary role. Cambodia's inadequate physical infrastructure, which includes road transportation, electricity, irrigation and water systems, and port facilities, is a major barrier to economic development and poverty reduction. Hence, infrastructure networks can and should be assigned a leading role in supporting the development process.

Considerable investment, capacity building, new policies, and institutional reform are required to overcome this bottleneck. It is a challenge that goes beyond the public sector and needs to involve the private sector. This, in turn, will require new approaches to the provision of infrastructure services and new financing mechanisms. It will also require

the support of development partners. Moreover, considerable progress has been made over the last decade or so towards increased intercountry movement of road transport in Asia, and the basic framework for this movement is being set in place. Cambodia still needs huge investments in infrastructure. Therefore, the government should have a long-term plan to build infrastructure with participation from the donor community and the private sector.

China

Although China's infrastructure has developed rapidly in recent years, its rural roads, railroads, aviation infrastructure, and water and electricity infrastructure are still in need of further development. The issues to be addressed are varied. The imbalanced development of infrastructure among the different regions has caused some conflict between supply and demand and become a barrier to the socioeconomic development of some regions.

The tax reforms implemented in the 1980s decentralized the authority to manage public funds; hence, the national government is unable to provide funds for infrastructure development in the regions. Poor infrastructure management, in turn, has resulted in the low transportation capacity of roads and railways, putting even more pressure on crowded cities and pillar transportation lines.

The low operational efficiency of the infrastructure can also be traced to lay behind software construction, sector-orientated management, poor sectoral coordination, and

lack of joint planning.

There are also various issues with policies and regulations, such as an incomprehensive policy system and a legal system that could stand some improvement. In addition, institutional reforms are also required.

The development of rural infrastructure and that of the western and central regions should be prioritized to narrow the disparities between urban and rural areas and between the western and eastern regions. Private-sector investment should be mobilized not only to promote the viability of financing sources but also to strengthen cooperation between the government and the private sector in infrastructure development. The financing mechanism should be institutionalized and regulated to promote the integration of resources. Innovative financing mechanisms should also be applied to fit different circumstances. Infrastructure development can be further promoted by learning from the experiences and lessons of other countries.

Other areas that should be addressed include logistic hubs and multimodal transportation, human resource development (HRD), and the strengthening of bilateral agreements involving tariff reduction, facilitation of immigration procedures, freight transit, customs and visa services, among others.

India

Provision of quality and efficient infrastructure services is essential to realize the full

growth potential of the Indian economy. There is now widespread consensus that exclusive dependence on government for the provision of all infrastructure services introduces difficulties concerning adequate scale of investment, technical efficiency, proper enforcement of user charges, and competitive market structure. At the same time, complete reliance on private production, particularly without appropriate regulation, is also not likely to produce optimal outcomes.

While stepping up public investment in infrastructure, India has been actively engaged in finding the appropriate policy framework, which gives the private sector adequate confidence and incentives to invest on a massive scale, but simultaneously preserves sufficient checks and balances through transparency, competition, and regulation. Strong and well-recognized linkages exist between infrastructure, economic growth, and poverty alleviation. Infrastructure will encourage economic growth. In turn, robust economic growth will promote investment in infrastructure by enhancing the people's willingness to pay appropriate user charges.

The outlook for infrastructural improvement in India looks promising. With experience gained in PPPs, formulation of model PPP and concession agreements, infrastructure investments should gain momentum over the coming years. Outlook in infrastructure will depend on how investment in infrastructure is facilitated. Such investment requires long-term funds with long payback periods, for example, from insurance and pension funds. Thus, success on the infrastructure front will be facilitated by the development of a vibrant bond market and pension and insurance reforms. A single, unified

exchange-traded market for corporate bonds would help create a mature debt market for financing infrastructure.

Indonesia

The infrastructure condition in Indonesia has been in crisis over last ten years. Roads in urban areas are severely congested, and many subnational roads are poorly maintained. Although the telecom infrastructure coverage has increased, actual access to telecommunication services remains uneven, and Indonesia's teledensity still lags behind that of its neighbors,

Access to electricity is a problem, particularly for those below the poverty line. At the same time, load shedding—the immediate cutting of power to customers—occurs in Bali and Java while the other main islands also experience severe power shortages.

The percentage of the population with access to piped water has actually fallen, while water quality and regularity of service delivery are also declining. We found that the low access to, and the poor quality of, infrastructure services in Indonesia are caused by a combination of sectoral and cross-sectoral problems. The cross-sectoral issues include institutional problems, financing problems, pricing problems, competition, corporatization, and privatization problems.

Lao PDR

Lao PDR's socioeconomic development is constrained by its being landlocked and its poor infrastructure. The government has introduced a "landlinked" strategy in conjunction with regional and subregional infrastructure development, particularly within the framework of the ASEAN, the Greater Mekong Subregion (GMS), the Triangle Development Area, etc.

Said strategy addresses the importance of infrastructure development, particularly the development of the road/transport sector, as the means to achieve the country's vision of removing itself from the list of LDCs by 2020 and eradicating mass poverty by 2010.

Infrastructure development has been identified as significant both for poverty reduction and private-sector development. The construction of farm-to-market roads, for example, is seen as a means of reducing poverty in the countryside by linking farmers to buyers in other areas. The improvement of logistic infrastructure, particularly factory-to-port transportation, is another way of enhancing business performance, export development, and economic growth. The choices for logistic transportation should also be expanded as a long-term strategy for infrastructure development.

Malaysia

There are four main conclusions to be drawn from the Malaysia's part of the research. First, since its independence, it has deployed substantial amounts of resources for the

expansion and improvement of infrastructure. Generally each five-year plan saw increasing allocation for investment in infrastructure. Second, the private sector is now a major player in the development and operation of infrastructure in the country. Statistics on private-sector investment in infrastructure since the implementation of the government's privatisation policy are difficult to obtain. However, there is sufficient evidence to show that the privatisation contributed to an increase in investment in infrastructure. It is even possible to assert that in the absence of privatisation, the stock of infrastructure in Malaysia would not have expanded as much or as quickly as it has. Third, while some infrastructure components witnessed relatively large outlays of investments compared to other components, there is also no denying that all segments of the sector witnessed significant growth in investment. Finally, the massive investments in infrastructure have contributed to the growth in the capacity and stock of infrastructure in the country and in its modernisation and technical development.

Singapore

Singapore's infrastructural development has been often guided and driven by government agencies set up for that purpose. Singapore formulated a comprehensive development plan in 1955 based on the "ring concept"—high-density satellite towns linked to the Central Business District (CBD) by expressways and a rail system.

One of the most pressing national concerns following independence was the lack of public housing, which the Housing and Development Board (HDB) was tasked to solve. The HDB was able to provide low-cost housing to Singaporeans.

Singapore has a world-class seaport and airport. The Port Authority of Singapore (PSA) handles about one-fifth of the world's total container transshipments throughput. In 2006, it began offering a comprehensive range of "soft" services ancillary to the physical handling of cargo. These ancillary services cover the entire maritime and logistics value chain, including insurance, brokerage, arbitration, and financing. To sustain Changi Airport's elite hub status, the government opened a Budget Terminal in October 2006 and Terminal 3 in January 2008. Changi is a good example of Singapore's efforts to regionalize its infrastructure business. Singapore's airport management, its associated and related companies, and infrastructure management have impressed many overseas airport operators and inspired them to initiate partnerships and investment opportunities.

With global demands necessitating improved information access, Singapore has moved away from low-value-adding manufacturing and is carving a niche for itself in the provision of infrastructure for research and development (R&D) and information technology (IT). It is now also trying to develop various industrial parks outside the country to spread its knowledge and experience in infrastructure development for industrialization.

Thailand

Roads are the most widely used mode of transportation for the movement of domestic goods in Thailand, which has a number of nodes that provide multimodal transfer points

for air and sea shipments to facilitate trade services of major products and goods. At the regional level, Thailand has developed bilateral frameworks with its neighbors to create a transport and logistics network across the region via land-border points. Regarding railroad, all rail routes have connections with roadway transportation and logistics, but the most important hubs for distributing products are Bangkok Port, Laem Chabang Port, and ICD Lat Krabang.

In the past, the development of Thailand's transport and logistics infrastructures has been significantly influenced by the official policies of the Thai government, but not collectively of the Greater Mekong Subregion's. However, this, under the pressure of global competition tends to change toward more regional missions. Thailand's development agenda is outlined in a development plan designed by the National Economic and Social Development Board. Currently, the national agenda considers the following issues: competitiveness, logistics, poverty and income distribution, and sustainable development. Thailand intends to become a world-class provider of logistical support for business and trade in the Indochina region. Strategic topics are (1) business logistics improvement; (2) new trade lanes and logistics network optimization; (3) logistics service internationalization; (4) trade facilitation enhancement; and (5) capacity building.

Viet Nam

The state of Viet Nam's transport infrastructure makes it difficult for the country to post socioeconomic improvements. In response to the changes in the local and international

economy, the government in 2004 redefined its strategy for the development of transport infrastructure by 2020. The comprehensive strategy covers road, railway, sea, inland waterways, and air transport.

One of the important issues in the development of such infrastructure is funding, The government plans to secure such funding through the state budget and through private funds using Build-Operate-Transfer (BOT), Build-Transfer (BT), or Build-Transfer-Operate (BTO) contracts with local and foreign investors. It is now taking various measures to attract more foreign investments. These measures include crafting a legal framework to facilitate the flow investment, especially to the transport sector.

Indo-ASEAN Logistic Network

Even though India and the ASEAN are geographically contiguous with shared borders between India and Myanmar and centuries-old cultural and trade links, exploitation of the full potential of regional economic integration is constrained by poor transport connectivity. To strengthen the Indo-ASEAN logistics network, the following three issues may be addressed: 1) strengthening Indian domestic physical transportation infrastructure; 2) setting up a multimodal Indo-ASEAN logistics network; 3) ensuring transportation quality as value-added logistics.

Geographical Simulation Model for ERIA

The first important finding is that border costs play a big role in the location choice of population and industries. The simulations done using IDE/ERIA-GSM revealed that physical infrastructure alone is not enough to capitalize on a location's advantages. It is obvious that border costs are an obstacle to the regional development.

The second finding is that the difference in nominal wage is an important determinant of agglomeration. In continental South East Asian countries, there is quite a large difference in nominal wage not only internationally but also intranationally. We found that several "core" regions emerged repeatedly in the simulation's quite large range of parameters. Bangkok, in particular, should be noted as a robust "core" region, having both higher nominal wage and locational advantages. However, the importance of the initial difference in nominal wage does not mean that spatial economics does not matter at all. On the contrary, infrastructure developments have the power to amend regional inequality caused by the initial difference in nominal wage to some extent. There is a need to develop the IDE/ERIA-GSM simulation model further to cover China, India, and the Mekong region. This is in view of the increasing level of cooperation between India and Myanmar for the development of trilateral highways, inland waterways, and rail links to improve connectivity between India's northeast region and Myanmar.

SOME POLICY RECOMMENDATIONS

An East Asian Infrastructure Development Committee for Sharing Best Practices and Promoting Regional Cooperation

The country studies highlight a number of issues, experiments, and challenges faced by EAS countries in terms of developing infrastructure. These include raising resources; relative roles of public and private sectors; PPP models; institutional and regulatory capacity; regional inequalities; development of rural infrastructure; cross-subsidization of infrastructure delivery; and policy issues or soft infrastructure. The latter cover regulations and procedures with regard to customs valuation, cabotage rules, and conformity assessment procedures, among others.

Given the richness of the experiments, there is tremendous opportunity to learn from one another and share development experiences across EAS countries, (e.g., development of the ASEAN's single window; the Indian experience in funding its highway-development programme through the imposition of taxes on petroleum sales; the Japanese experience in modernizing its transportation sector; experiments on viability gap funding for PPP in India, etc.). The study group, therefore, recommends the establishment of a structured dialogue between the infrastructure authorities of EAS countries, especially authorities involved in transport, to facilitate mutual cooperation and sharing of development experiences and expertise for capacity building. This mechanism, the East Asian Infrastructure Development Committee, could report to meetings of the EAS infrastructure and transport ministers.

A Regional Financing Mechanism for Infrastructure Development

The East Asian infrastructure index reveals very wide gaps in terms of infrastructure availability across the EAS region, which seem to have widened rather than narrowed over time. Hence, infrastructure development in the lagging regions needs to be paid due attention if the regional inequalities are not to widen further.

In order to bridge the regional infrastructure deficits, a huge amount of resources--estimated to be between US$200 billion to US$500 billion per year—is needed. On the other hand, the region's foreign exchange reserves now add up to more than US$3 trillion, far in excess of the region's Balance-of-Payments (BPO) liquidity needs. These foreign exchange reserves remain invested in western securities, earning negative rates of return in the absence of a regional framework for their fruitful deployment. The study group's attention was drawn to an RIS proposal of a regional mechanism created to mobilize a very small proportion of these reserves for the development of regional cross-border connectivity and other highly productive infrastructure. It might also assist in generating new demand within the region and help in adjusting global imbalances. The group felt that this proposal needs to be examined further by the EAS policymakers, including the modalities for operationalising the regional mechanism through exiting regional institutions or creating a new one.

Cooperation in Trade Facilitation for Cross-border Trade

The group concluded that the development of efficient logistics infrastructure and network is crucial for regional economic cooperation and development. Similarly, border infrastructure for efficient handling of cargo is also very important for promoting cross-border trade. EAS needs to pay greater attention to trade facilitation, including cooperation between customs authorities for the introduction of information and communication technology (ICT), reduction of paper work, harmonization and standardization of rules and standards, conformity assessment procedures, and mutual recognition arrangements to reduce transaction costs. One of the most important issues is to make customs and immigration procdures more efficient. The clearance times at the borders should be monitored and evaluated. The introduction of a common, harmonized document for customs and immigration is also a realistic solution to this issue. The revision of the "cabotage" policy might likewise be necessary along with the introduction of an East Asian common radio frequency identification (RFID) system for logistics.

Cooperation for Collection of Statistics

Better statistics, especially at the subnational level in each country, are needed to facilitate research on infrastructure development. It is important to establish a uniform territorial unit for geographical statistics specifically for East Asia. In Europe, Eurostat established the Nomenclature of Territorial Units for Statistics (NUTS) more than 25

years ago. A similar concept could be considered in East Asia (EA-NUTS). There is also need for more precise data on routes and infrastructures connecting regions and the border costs or transaction costs caused by inefficient custom procedures.