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ASEAN - INDIA CONNECTIVITY:
THE COMPREHENSIVE ASIA DEVELOPMENT PLAN, PHASE II

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EXECUTIVE SUMMARY

1. INTRODUCTION

Economic Research Institute for ASEAN and East Asia (ERIA) submitted the Comprehensive Asia Development Plan (CADP) to the 5th East Asia Summit in October 2010, as a grand spatial design for infrastructure development in East Asia. The conceptual framework of the CADP, which was elaborated based on new waves of international trade theory namely the fragmentation theory and new economic geography, demonstrated how the region can pursue deepening economic integration as well as narrowing development gaps. This claim was supported by simulation analyses on the impacts of logistic enhancement to the region using the Geographical Simulation Model (GSM). CADP also provided a long list of prospective infrastructure projects which would be important to realize the policy recommendation of the CADP.

During the same series of summit meetings, the 17th ASEAN Summit adopted the Master Plan on ASEAN Connectivity (MPAC) as an umbrella master plan to expedite the establishment of the ASEAN Community, during the drafting process of which ERIA also provided intellectual contribution based on the conceptual framework of the CADP. The MPAC defined three modes of connectivity, namely physical connectivity, institutional connectivity, and people-to-people connectivity, as the keys for the successful establishment of the ASEAN Community. The MPAC and the CADP share a common philosophy in the sense that both stress the importance of physical and institutional connectivity in deepening economic integration and narrowing development gaps. Although the MPAC is a plan of ASEAN, it also emphasizes the importance of the connectivity with neighboring countries including EAS member countries.

Although the CADP successfully fulfilled its initial mission[1], there still remain a number of issues to address, of the primal importance of which is the implementation of infrastructure projects and policy measures recommended in the CADP. This executive summary will summarize the current implementation status of the infrastructure projects listed in the CADP as a follow-up, and another set of prospective infrastructure projects to enhance ASEAN-India connectivity will be presented, together with key findings and policy recommendations from the second phase of an ERIA research project on the CADP.

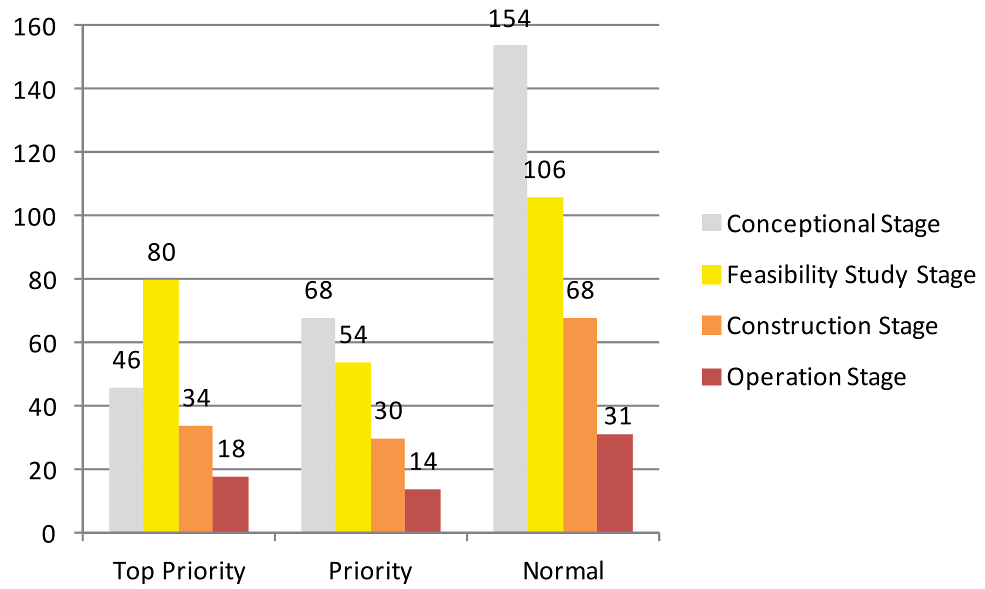
2. Implementation Status of Infrastructure Projects Listed in the CADP

Figure 1 shows current implementation status of the prospective infrastructure projects provided in the long list of the CADP. The conceptional stage means projects have only conceptual design or proposals. The feasibility study stage includes preliminary feasibility studies, bankable feasibility studies, and contract stages. The construction stage takes account of the projects under construction and the projects completed but waiting for operation. We can see more than 60% of the projects have reached at least the feasibility study stage.

[1] Chairman's Statement of the East Asia Summit (EAS), Ha Noi, 30 October 2010. "13. We commended the Economic Research Institute for ASEAN and East Asia (ERIA) for its effective contributions in enhancing regional economic integration, bridging development gaps and promoting connectivity for both ASEAN and EAS countries, including its intellectual contribution to developing the ASEAN Connectivity Master Plan. We noted the Statement of the ERIA's 3rd Governing Board Meeting and its study identifying its future contribution to regional integration. We appreciated the completion of the Comprehensive Asia Development Plan (CADP) by ERIA in collaboration with the ADB and the ASEAN Secretariat."

Figures 2, 3 and 4 illustrate the current implementation status of the selected infrastructure projects in the Mekong sub-region, the Indonesia-Malaysia-Thailand Growth Triangle Plus (IMT+) sub-region, and the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area Plus (BIMP+) sub-region, respectively[2]. Apparent positive trends in the Mekong sub-region can be seen compared with IMT+ and BIMP+, although there remains a significant missing link in the Myanmar section of the Mekong India Economic Corridor (MIEC) which needs to be connected by a number of infrastructure projects in Dawei, such as a deep sea port and a highway from Dawei to Thai border along the ASEAN Highway No.123. This issue has been further elaborated in the second phase of the CADP project and will be discussed in the next section.

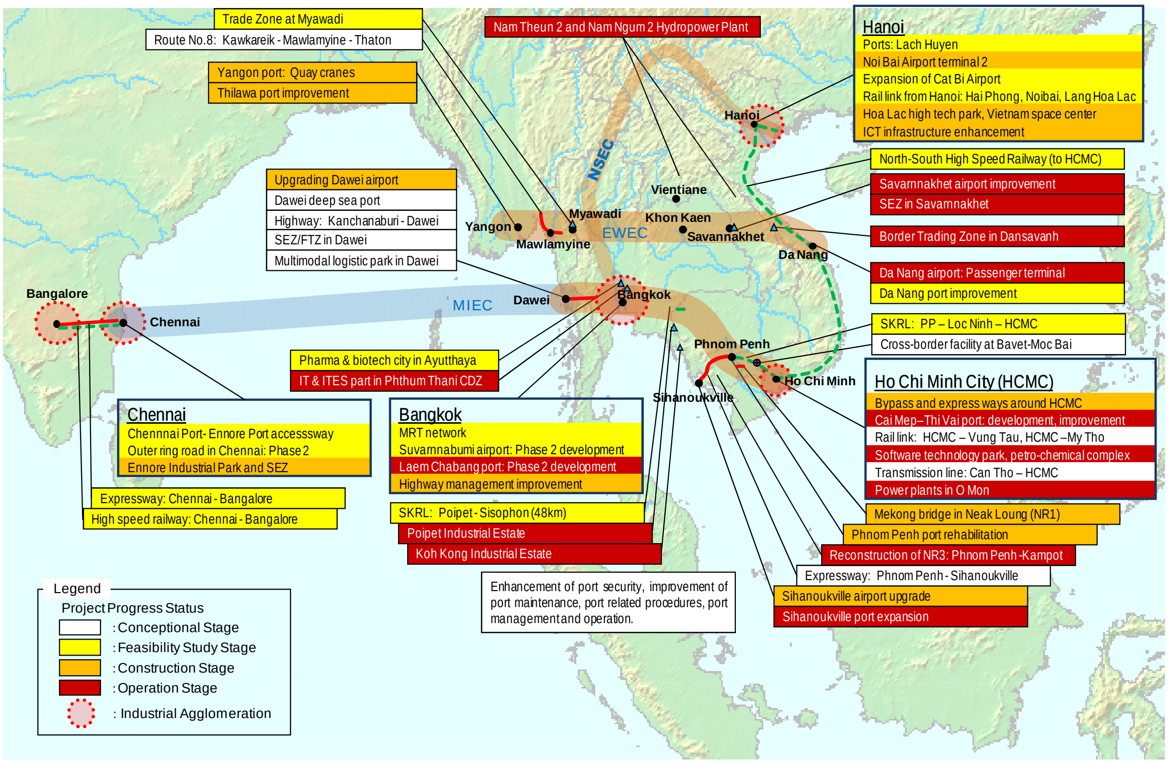
Figure 1: Implementation Status of the Infrastructure Projects Listed in the CADP (as of October 2011)



Source: ERIA.

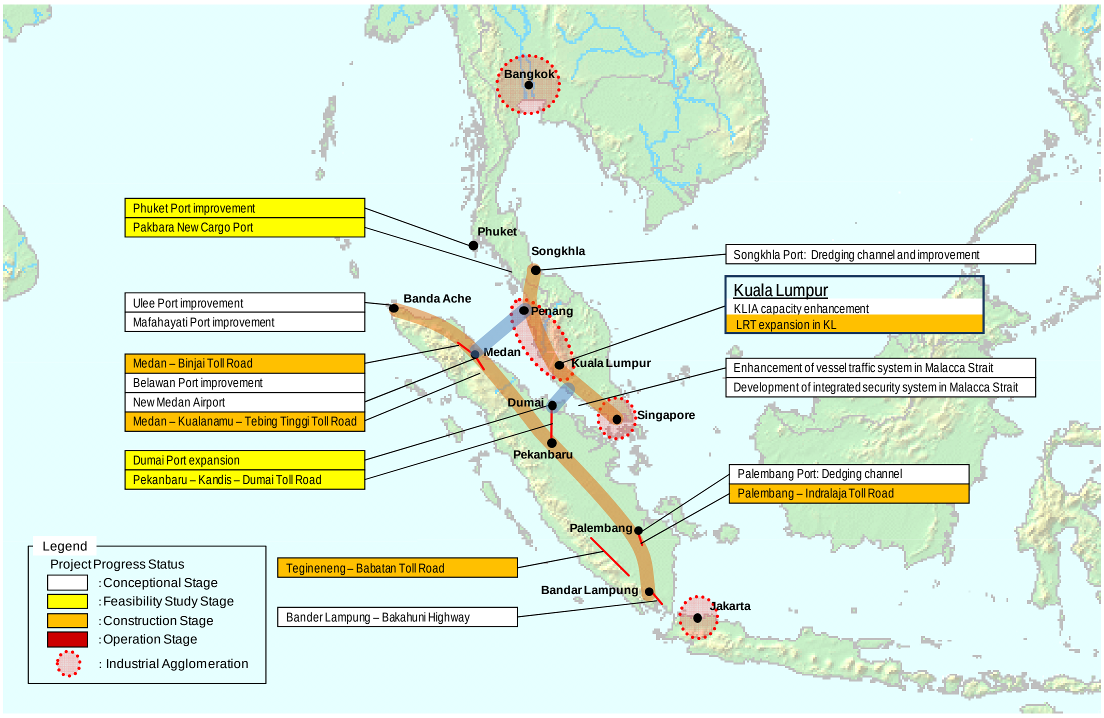
[2] IMT+ and BIMP+ are new concepts extended from the original IMT-GT and BIMP-EAGA concepts. See the CADP report for details.

Figure 2: Selected Infrastructure Projects in the Mekong Sub-region



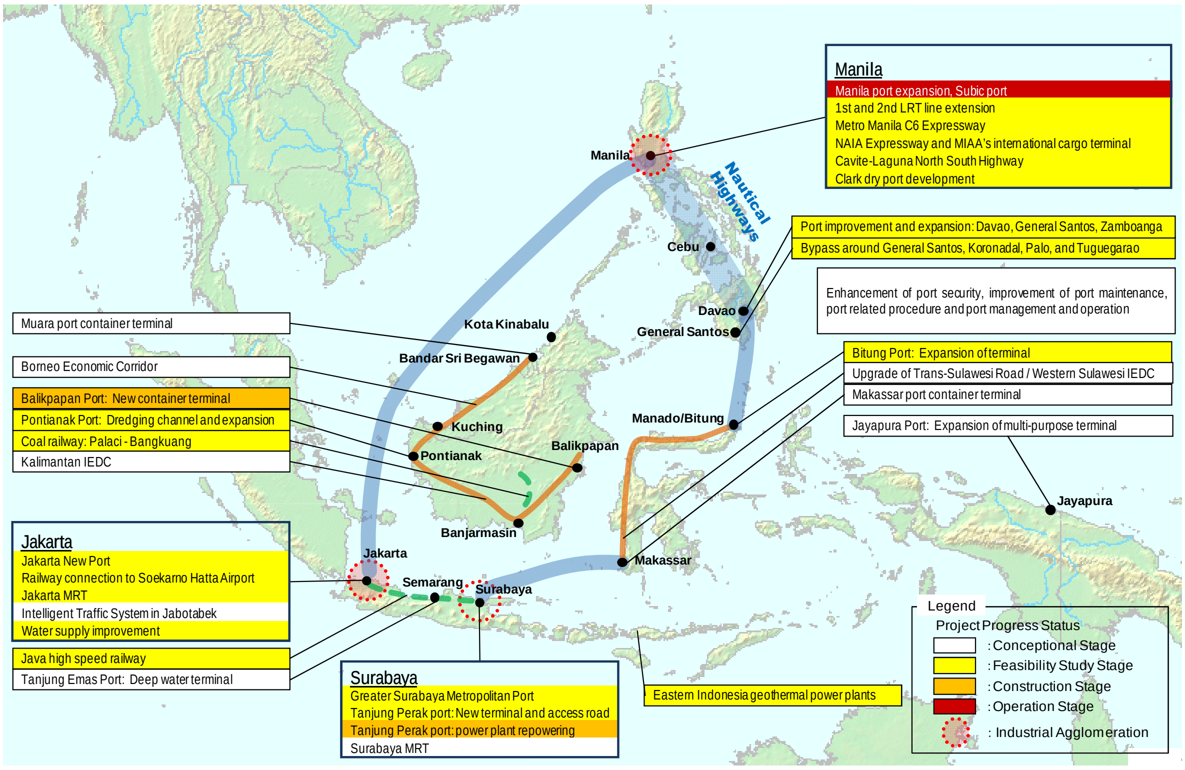
Source: ERIA.

Figure 3: Selected Infrastructure Projects in the IMT+ Sub-region



Source: ERIA.

Figure 4: Selected Infrastructure Projects in the BIMP+ Sub-region



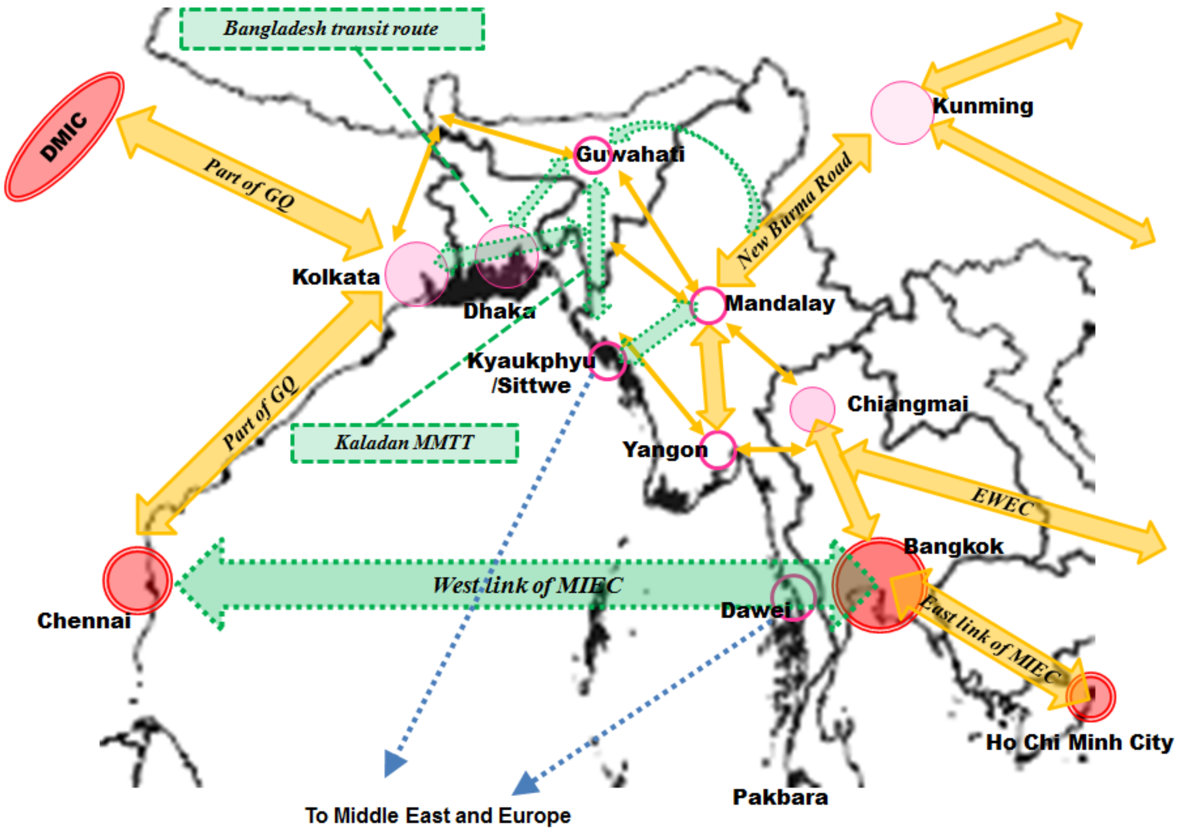
Source: ERIA.

3. ASEAN-INDIA CONNECTIVITY

Although the CADP successfully fulfilled its initial mission, there still remain a number of issues which require further intensive studies. Out of these outstanding issues, ASEAN-India connectivity is selected as the main theme of the second of the CADP (CADP2), because of the growing importance of the issue amidst the ongoing restructuring of economic activities. Both the CADP and the MPAC emphasize the importance of the connectivity with the neighboring countries including China, India, and other EAS member countries. Though both China and India are the emerging economic superpowers in the region as well as the immediate neighbors to ASEAN, the exposure of India in ASEAN is still limited compared with China, reflecting the differences in the historical relationships and the weaker physical connectivity with ASEAN. Therefore, it is highly important to develop a basic strategy to enhance the connectivity between ASEAN and India, because there are huge potential benefits.

Figure 5 provides a regional framework to enhance connectivity between ASEAN and India. There are two main routes, the sea route, as the west link of the Mekong-India Economic Corridor (MIEC), and the land routes, with various optional routes, along the trilateral highway between Thailand, Myanmar, and India.

Figure 5: A Regional Framework to Enhance ASEAN-India Connectivity



3-1. Mekong-India Economic Corridor (MIEC)

While the validity of MIEC was also demonstrated in the CADP, there remain significant missing links, including the lack of a Mekong bridge in Neak Leoung (Cambodia) and the lack of the gateway port in Dawei (Myanmar). As often discussed, an economic corridor is only as strong as its weakest link. In addition, the connectivity between Thailand and Myanmar should be enhanced through the construction of a highway between Dawei and Thai border (physical connectivity) and various trade and transport facilitation measures (institutional connectivity). It is important to pinpoint the challenges ahead of the development of MIEC through an updated review of the progress of these projects.

ERIA conducts a series of simulation analyses using the 4th version of the Geographical Simulation Model (GSM), and their findings are summarized as follows: (1) MIEC has the largest impacts on Cambodia, followed by Myanmar, Thailand, and Lao PDR; (2) Taninthayi, where the capital city is Dawei, enjoys the largest impact, equivalent to 9.5% vis-a-vis the GDP in 2030 in the baseline scenario; (3) allowing the transit transport in Myanmar is critical for countries other than Myanmar, especially for Thailand; (4) Dawei project in Myanmar has larger impact than Pak Bara project in Thailand even for Thailand, and there is almost no additional impact when we compare Dawei project only and both Dawei and Pak Bara projects, because most benefit from connecting to India or EU can be achieved by Dawei project only; (5) West Bengal and Tamil Nadu have slight positive impacts while others see slight negative impacts and in total in India there is almost no impact, mainly due to the fact that India has higher preference for domestic products. It reflects India’s least participation in the production networks in Asia. It suggests the need for greater integration with the production networks through improved institutional connectivity.

3-2. The Trilateral Highway Connecting Thailand, Myanmar, and India

Another major route to enhance ASEAN-India connectivity can be developed by upgrading road infrastructure of the Thailand-Myanmar-India section of Asian Highway No.1, which has also been identified as the Trilateral Highway in the cooperation among these three countries[3]. As the road infrastructure in Thailand is already well developed, the remaining issues are the sections in Myanmar and the Northeast India. More importantly, trade and transport facilitation across two national borders between Thailand and Myanmar, and Myanmar and India needs to be addressed with strong political commitment, although there is no trade and transport facilitation initiative between Myanmar and India as of today. Actually, Myanmar locates on the west end of ASEAN, having China on the north, and is the lowest income country in ASEAN with the weakest connectivity with other ASEAN Member States. Similarly, Northeast India locates on the northeast end of India, having China on the northeast beyond Myanmar the immediate neighbor, and is among the poorest regions in India with the weakest connectivity with other parts of India. Myanmar and Northeast India, surrounded by all three of the most vigorous economies in the world, namely, China, India, and (other part of) ASEAN, are expected to play a very important role as the connecting nodes to physically connect these economies. In this broader perspective, Myanmar and Northeast India are no longer at one end of the region they belongs to. Taking this strategic role into consideration, development strategies for Myanmar and Northeast India can be the core of the regional strategy to enhance ASEAN-India connectivity.

[3] The identified route is Bangkok – Nakhon Sawan – Tak – Mae Sot//Myawadi – Thaton – Payagyi– Gangaw – Kaleymyo – Tamu//Moleh – Imphal – Kohima.

3-3. A Regional Framework

A regional framework strategy for the enhancement of ASEAN-India connectivity needs to be designed based on a multi-modal approach, a multi-functional approach, and a multi-tier approach.

First, it is obvious that regional connectivity cannot be completed with a single mode of transportation, implying a need to take a multi-modal approach. As discussed in detail in the last section, a number of infrastructure projects and have been proposed and being implemented in all modes of transportation, namely, land (including road and railways), maritime (including inland waterway transport), and air. In land transport, the completion of the ASEAN Highway Network (AHN), including the upgrading of the weak link along the EWEC between Thingannyinaung and Kawkareik (AH1), and other AHN sections in Myanmar such as Dawei-Kawthaung (AH112), Dawei-Maesameepass (AH123)[4], Chaun U-Kalay (AH1), and Kengtong-Taunggyi (AH2), was adopted as one of the prioritised strategies in the MPAC. The abovementioned sections on AH1 in Myanmar are also identified as integral parts of the trilateral highway connecting Thailand, Myanmar, and India. In addition to the long-waited completion of the Singapore Kunming Rail Link (SKRL), which is also a prioritised project in the MPAC, there is another ambitious plan to establish a rail link from India to Ho Chi Minh City crossing the Indochina Peninsular. In maritime transport, the construction of new ports in Dawei, Kyaukphyu, and Pakbara are in the pipeline, and the expansion or upgrading of existing ports, such as Yangon, Sittwe, and Chennai, are identified. Inland waterways along the Kaladan River and Ganga are also expected to play important roles in enhancing the connectivity between the mainland and Northeast India via Myanmar

4 This section is an integral part of MIEC, connecting Dawei and Thai border near Kanchanaburi.

and Bangladesh respectively. In air transport, there are plans to construct or upgrade airports in Chennai and Dawei. Although this is beyond the scope of this report, air transport network is expected to be enhanced by the ongoing initiatives to establish the ASEAN Single Aviation Market (ASAM) and the ASEAN's air transport agreements with its Dialogue Partners including India, China, and Korea. Although all these initiatives are important on their own, it is of crucial importance to pay enough attention to the connectivity between these different modes of transportation.

Second, in order to explore the full potentials of enhanced regional connectivity, physical infrastructure alone is not sufficient enough, indicating a need for a multi-functional approach. Infrastructure for physical connectivity, such as roads, ports, airports, gas pipelines, and power grids, are of course important as necessary conditions. As discussed in the last section, for example, the connectivity between Myanmar and Northeast India has been limited not only by the lack of adequate physical infrastructure but also by the restrictive institutional arrangement between Myanmar and India, namely the restrictions on the tradable items and the mode of settlement. In order for the success of the comprehensive development plan in Dawei, as the crucial link in MIEC, the timely implementation of transport facilitation agreement in ASEAN is highly important and it was also agreed by ASEAN Leaders as one of the prioritised strategy in the MPAC. A proper enforcement of regional transport agreement would enable logistic service providers to reduce significantly the cost to cross national borders, by saving the money and time for unloading and reloading. In addition, the connectivity of people can be a facilitating factor particularly in the case of border trade. For example, there are various ethnic groups along the border between Myanmar and Northeast India, and some of them share a same language and maintain a strong cultural tie, including trade relationship whichever it is formal or informal. Although they could be sometimes recognized as a discouraging factor for insurgency problems in the border areas, their existing economic relationship can be the basis to expand bilateral trade in the future.

Third, as claimed in the CADP, it is of crucial importance to consider the interactions among the regions in different development stages. In the geographical coverage of this report, there are existing industrial agglomerations such as Bangkok and Chennai (Tier 1). These agglomerations are expected to lead the regional economy by providing large markets of final and intermediate goods and raw materials for neighbouring Tier 2 and Tier 3 regions, and by continuously upgrading themselves to be more innovative to expand the frontiers of economic activities in the region as a whole.

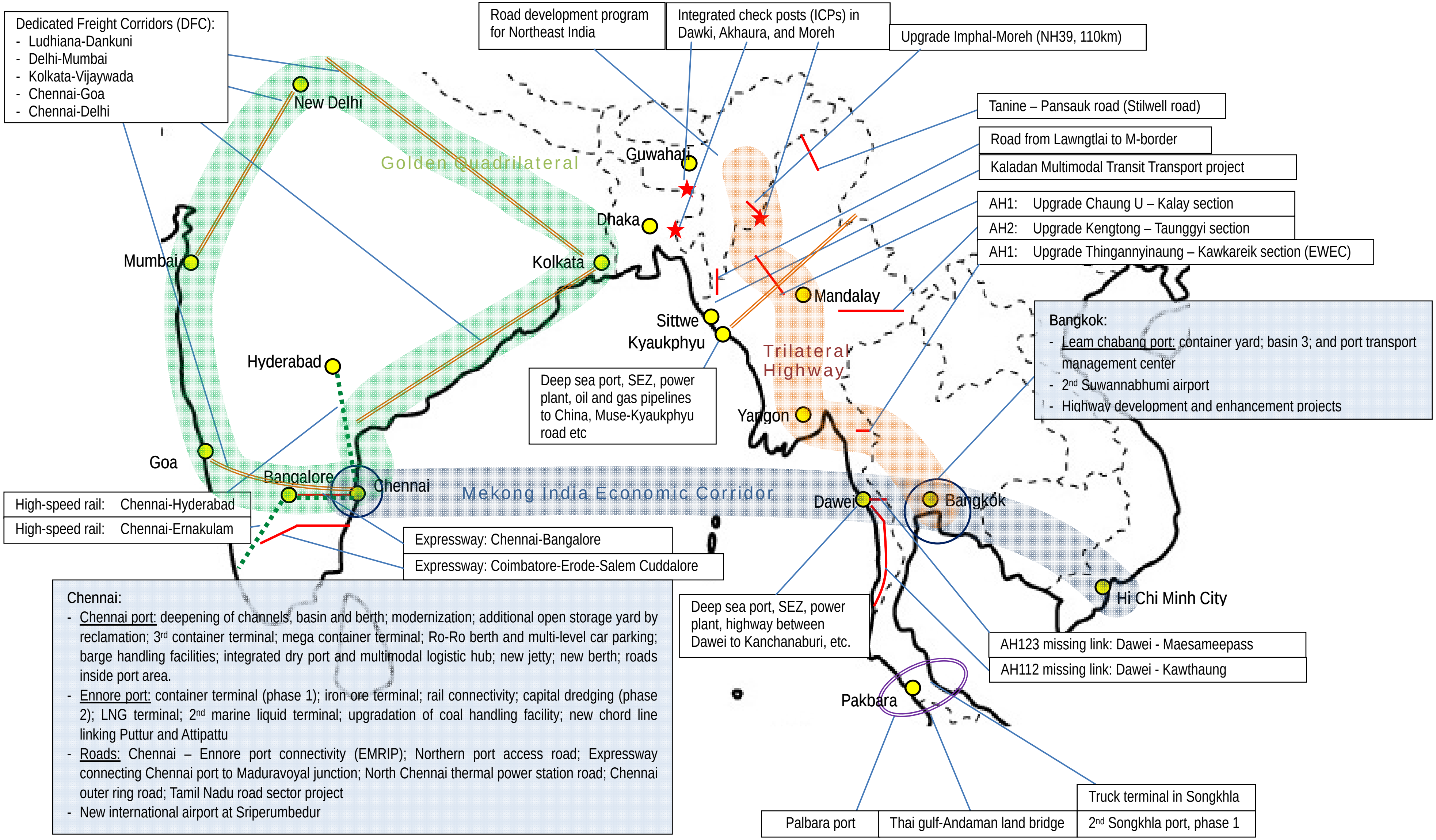
Considering the size and their roles in regional production networks, Chiang Mai, Kolkata, Dhaka, and Kunming can be regarded as existing Tier 2 regions, followed by emerging Tier 2 regions such as Yangon and Mandalay. In addition, taking account of the ongoing development plans and geographical location, Dawei, Kyaukphyu, and some cities in Northeast India such as Guwahati are also expected to join into the regional production network as new connecting nodes of regional production networks. The major role of Tier 2 is to be the sources of economic dynamism in the region by attracting production processes from neighbouring Tier 1 or other places through fragmentation, which are suitable to the location advantage of the region. This process of fragmentation would benefit not only Tier 2 by providing new economic activities which includes new employment opportunities, but also Tier 1 by allowing them to focus more on innovative economic activities.

With enhanced connectivity, other regions, conceptually regarded as Tier 3, are expected to expand their economic activities, such as agriculture, mining, and tourism, based on their own location advantages including the endowment of natural and cultural resources, lower wages and rents. Indeed, Myanmar and Northeast India are endowed with natural and mineral resources such as natural gas, oil, coal and limestones, and have potentials as agricultural production base or tourism destination. These opportunities would not be materialized without efficient and reliable connectivity with neighbouring regions.

3-4. Key Infrastructure Projects for ASEAN-India Connectivity

Figure 6 visualizes key infrastructure projects to enhance the connectivity between ASEAN and India. As already discussed, there are two main routes, namely the sea route along MIEC and the land route along the Trilateral Highway. Although the designed route of Trilateral Highway ends at Kohima in Northeast India, it is expected to connect to mainland India through the existing national highway network in India via "chicken neck," through the multimodal transport corridor being developed under the Kaladan Multimodal Transit Transport project, or through Bangladesh using its highway network or inland waterway.

Figure 6: Selected infrastructure projects for ASEAN-India connectivity



As already discussed, development projects in Dawei are of the primal importance for the successful completion of MIEC. Although there is a comprehensive plan including a deep sea port, a special economic zone, highway to Thai border, a power plant, and so on, the actual construction work has just started and will take several years for completion. In addition, there are a lot of challenges to explore the full potentials of the plan, particularly in inviting foreign investment in Dawei. Furthermore, as pointed out by Kumagai and Isono (2011), it is important to establish an effective and efficient institutional arrangement to allow transit transport in Myanmar part of MIEC, that is, between Maesameepass (Thai border) and Dawei. Under the transport cooperation in ASEAN, three framework agreements on transport facilitation are planned to be implemented by the year 2015, with explicit emphasis on the designated transit transport routes (TTRs). Although this route connecting Kanchanaburi and Dawei is identified as a part of ASEAN Highway Network, it is not included in the "designated" TTRs. As the completion of MIEC is already agreed as one of the strategic actions in the MPAC, this route should be included in the designated TTRs in order to explore the full potentials of the plan. Physical connectivity is necessary, but not the sufficient condition for the success. It should be complemented by an institutional connectivity, that is, a proper institutional arrangement to facilitate cross border movement of goods and services. This in turn would contribute in reducing significantly the service link costs connecting Bangkok and Dawei, and Chennai as well, and facilitating fragmentation of manufacturing activities to Dawei.

On the Indian side, Chennai and surrounding areas have a number of infrastructure projects as well, particularly to expand the capacity of ports and airport, and to enhance the road and rail networks connecting Chennai with other parts of India. Indeed, reflecting the rapid growth of Chennai and surrounding areas, the capacity of Chennai port, including the backyard space, and the access to the port have been identified as key bottlenecks for further development of the region. This problem is well addressed by the planned expansion of ports of Ennore as well as Chennai, and the plan to enhance the connectivity between the two ports. In addition, as Chennai is a growing hub of automotive industry, the planned construction of a Ro-Ro (roll-on, roll-off) berth and a multi-level car parking is expected to have a major impact. With all these infrastructure projects, Chennai and surrounding areas will be well prepared as the gateway connecting ASEAN and India.

In its original design, the identified route of Trilateral Highway is from Bangkok, Nakhon Sawan, Tak, to Mae Sot in Thailand, from Myawaddy, Thaton, Payagyi, Mandalay, Gangaw, Kaleymyo, to Tamu in Myanmar, and from Moleh, Imphal, and to Kohima in India, tracing the Asian (and ASEAN) Highway No.1. As the routes in Thailand and India are already well developed, with an exception that a mountainous section between Moreh and Palel would need moderate repair or upgrading works, the remaining issues are to upgrade physical road infrastructure in Myanmar and to establish effective and efficient institutional arrangement to facilitate cross border trade and transportation.

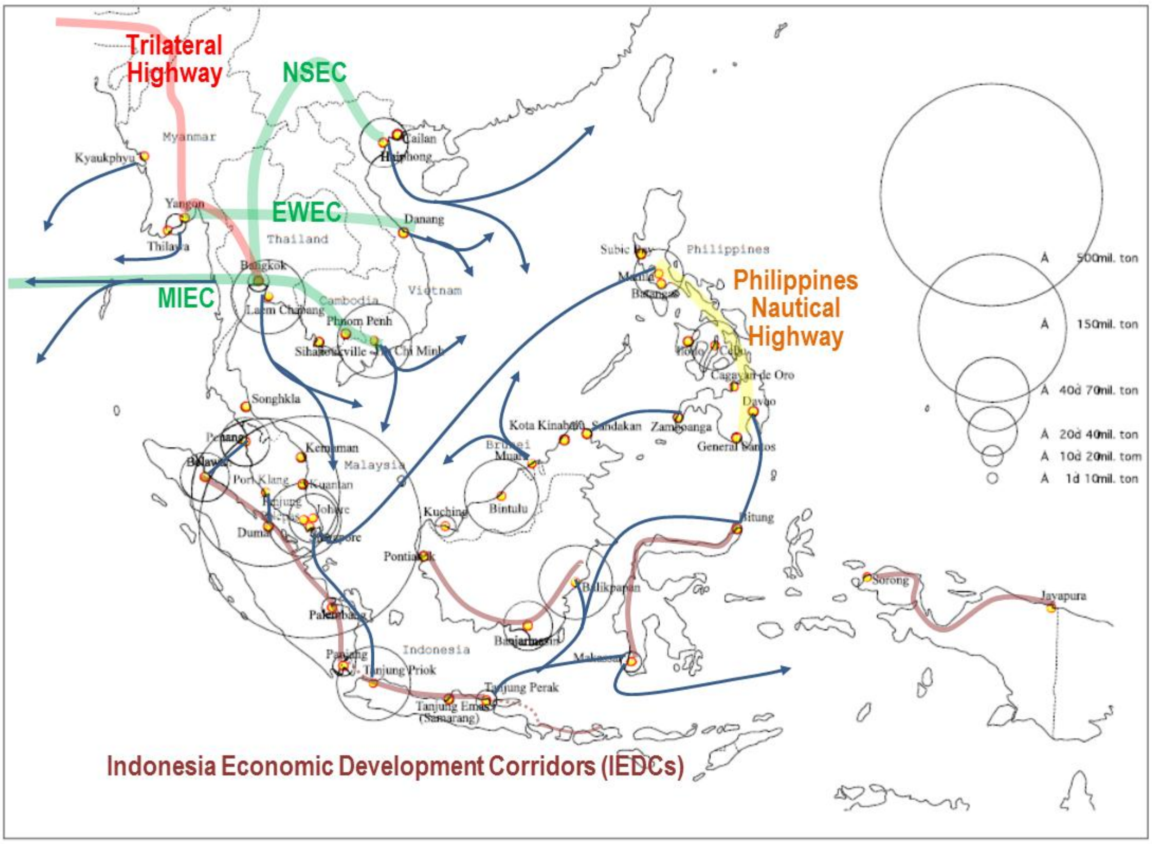
Along the Trilateral Highway, two sections are highlighted in Figure 6, namely, between Thingannyinaung and Kawkareik (near Thai border), and between Chaung U and Kalay (a section between Mandalay and Indian border). These projects are of urgent importance, not only as integral parts of the Trilateral Highway but also as the trunk route to enhance domestic connectivity in Myanmar. From a regional perspective, in addition to these physical infrastructures, institutional connectivity to facilitate cross border trade and transportation needs to be enhanced under the trilateral cooperation. In this sense, India’s plan to establish an Integrated Check Post (ICP) in Moreh is very important.

4. THE NEXT STEP: MARITIME CONNECTIVITY IN ASEAN

The concept of economic corridors has been the core of regional development plans in ASEAN and East Asia, as can be seen in the Greater Mekong Subregion (GMS) initiative lead by the Asian Development Bank (ADB) and the CADP as well. In order to explore the full potentials of economic corridors in the region, it is important to enhance the connectivity among the economic corridors by upgrading maritime connectivity. Indeed, as demonstrated in the CADP, the enhancement of maritime connectivity is expected to have larger impacts on economic growth and narrowing of development gaps.

Despite the importance, many ASEAN countries, with the exception of Singapore and Malaysia, rank poorly relative to China and Hong Kong in the UNCTAD Liner Shipping Connectivity Index. At the same time, most of the gateway ports of the AMSs are already "fairly full" which means that investments in capacity expansion would have to be made in order to meet the growth in trade expected from the deeper economic integration of the AMSs among themselves and with the rest of the world. In addition, a JICA study on 47 designated ports in ASEAN revealed a number of challenges in providing a more efficient shipping network services given the varying levels of port infrastructure development[5].

Figure 7: Economic Corridors, 47 Designated Ports, and Maritime Connectivity



Source: The original map is drawn from JICA Study on Guidelines for Assessing Port Development Priorities 2009.
Note: The size of the circles indicate the cargo throughput of 47 designated ports in 2008.

[5] The recommendations from the JICA study was incorporated in the list of prospective infrastructure projects in the CADP.

In addition to the physical infrastructure, it is also important to make the regional shipping market more efficient and competitive. For this purpose, the MPAC identifies the development of an ASEAN Single Shipping Market (ASSM) as one of the key strategies. ASEAN has started a comprehensive study for ASSM, with a support from Korea, based on the strategic paper on ASSM prepared by Indonesia. In addition, ASEAN decided to conduct a study on the roll-on/roll-off (RoRo) network and short sea shipping as one of the prioritised projects in the MPAC. This study is regarded as a first step in exploring one of the options to enhance the connectivity between archipelagic and mainland ASEAN. The successful case of the Philippines Nautical Highway Network is expected to provide important lessons for ASEAN in establishing international RoRo networks in the region.

Enhanced maritime connectivity in ASEAN will enhance the connectivity among various economic corridors, and thereby promote the integration between archipelagic and mainland ASEAN (Figure 7). This is clearly an integral step for ASEAN to become a single market and production base, as envisaged in the ASEAN Economic Community Blueprint, which in turn will spread the benefits of economic integration to throughout ASEAN and East Asia.

CHAPTER 1.

ASEAN-INDIA CONNECTIVITY:
A REGIONAL FRAMEWORK AND KEY INFRASTRUCTURE PROJECTS

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Abstract

Connectivity has been a key concept in the policy debates on economic integration in ASEAN and East Asia, particularly since the adoption of the Master Plan on ASEAN Connectivity (MPAC) in October 2010. Although the primal objective of the MPAC is to enhance connectivity among ASEAN Member States, ASEAN's connectivity with neighbouring countries such as other members of the East Asia Summit is another issue to be addressed. As the second phase of the Comprehensive Asia Development Plan (CADP), Economic Research Institute for ASEAN and East Asia (ERIA) has conducted a series of research on the issue of ASEAN-India connectivity, based on the understanding that the issue has not been explored enough relative to its huge potential benefits to the region.

This chapter provides a regional framework to consider the issue of ASEAN-India connectivity and discusses the current status, opportunities, and challenges of key infrastructure projects for that purpose. Two main routes are proposed, namely, a sea route along the Mekong India Economic Corridor and a land route along the Trilateral Highway, or Asian Highway No.1, connecting Thailand, Myanmar, and India. Development projects in Dawei, Myanmar, is the focus of the former, and the latter will be elaborated further into existing, emerging, and potential routes including various border crossing routes between Myanmar and Northeast India, Kaladan Multimodal Transit Transport Project, and other related infrastructure projects such as Kyaukphyu projects to enhance connectivity between Myanmar and China.

1. Introduction

Economic Research Institute for ASEAN and East Asia (ERIA) submitted the Comprehensive Asia Development Plan (CADP) to the 5th East Asia Summit in October 2010[1], as a grand spatial design for infrastructure development in East Asia. The conceptual framework of the CADP, which was elaborated based on new waves of international trade theory namely the fragmentation theory and new economic geography, demonstrated how the region can pursue deepening economic integration as well as narrowing development gaps. This claim was supported by simulation analyses on the impacts of logistic enhancement to the region using the Geographical Simulation Model (GSM). The CADP also provided a long list of prospective infrastructure projects which would be important to realize the policy recommendation of the CADP.

During the same series of summit meetings, the 17th ASEAN Summit adopted the Master Plan on ASEAN Connectivity (MPAC) as an umbrella master plan to expedite the establishment of the ASEAN Community. The MPAC defined three modes of connectivity, namely physical connectivity, institutional connectivity, and people-to-people connectivity, as the keys for the successful establishment of the ASEAN Community. The MPAC and the CADP share a common philosophy in the sense that both stress the importance of physical and institutional connectivity in

[1] Chairman's Statement of the East Asia Summit (EAS), Ha Noi, 30 October 2010. "13. We commended the Economic Research Institute for ASEAN and East Asia (ERIA) for its effective contributions in enhancing regional economic integration, bridging development gaps and promoting connectivity for both ASEAN and EAS countries, including its intellectual contribution to developing the ASEAN Connectivity Master Plan. We noted the Statement of the ERIA's 3rd Governing Board Meeting and its study identifying its future contribution to regional integration. We appreciated the completion of the Comprehensive Asia Development Plan (CADP) by ERIA in collaboration with the ADB and the ASEAN Secretariat."

deepening economic integration and narrowing development gaps. Although the MPAC is a plan of ASEAN, it also emphasizes the importance of the connectivity with neighboring countries.

Although the CADP successfully fulfilled its initial mission, there still remain a number of issues which require further intensive studies. Out of these outstanding issues, ASEAN-India connectivity was selected as the main theme of the 2nd phase of the CADP, because of the growing importance of the issue amidst the ongoing restructuring of economic activities. As stated in the MPAC, ASEAN put an explicit emphasis on the connectivity with the neighboring countries including China, India, and other EAS member countries. Although both China and India are emerging economic superpowers in the region and the immediate neighbors to ASEAN, the extents of the connectivity with ASEAN differ significantly. With the strong supports of the government and the business activities of the private sector, China has been aggressively penetrating into ASEAN. In comparison, the exposure of India to ASEAN is rather limited, reflecting the differences in the historical relationships and the weaker physical connectivity with ASEAN. In view of the potential benefits for both ASEAN and India, it is highly important to develop a basic strategy to enhance the connectivity between ASEAN and India. This is the objective of this report.

The concept of the Mekong-India Economic Corridor (MIEC)[2] is one of the examples. Although the validity of MIEC was also demonstrated in the CADP, there remain significant missing links, including the lack of a Mekong bridge in Neak Leoung (Cambodia) and the lack of the gateway port in Dawei (Myanmar). In addition, the connectivity between Thailand and Myanmar should be enhanced through the

[2] ERIA (2009).

construction of a highway between Dawei and Thai border (physical connectivity) and various trade and transport facilitation measures (institutional connectivity). It is important to pinpoint the challenges ahead of the development of MIEC through an updated review of the progress of these projects.

Another major route to enhance ASEAN-India connectivity can be developed by upgrading road infrastructure of the Thailand-Myanmar-India section of Asian Highway No.1, which has also been identified as the Trilateral Highway in the cooperation among these three countries[3]. As the road infrastructure in Thailand is already well developed, the remaining issues are the sections in Myanmar and the Northeast India. More importantly, trade and transport facilitation across two national borders between Thailand and Myanmar, and Myanmar and India needs to be addressed with strong political commitment, although there is no trade and transport facilitation initiative between Myanmar and India as of today.

In addition, given the wide geographical scope and the less developed transport infrastructure, it is also important to pay explicit attention to the connectivity between Myanmar and Northeast India. The border area is less populated, less developed, and less connected. Enhancing the connectivity between Myanmar and Northeast India would open new opportunities for the development of the border area, which in turn would contribute to narrow the development gaps.

In the followings, section 2 presents the conceptual framework of the CADP as the basis for the subsequent discussion. Section 3summarizes the current status of international trade between ASEAN and India. Section 4 highlights the existing, planned, and potential routes to enhance ASEAN-India connectivity and analyses the

[3] The identified route is Bangkok – Nakhon Sawan – Tak – Mae Sot//Myawaddy – Thaton – Payagyi – Mandalay – Gangaw – Kaleymyo – Tamu//Moleh – Imphal – Kohima.

opportunities and challenges for each route. Section 5 concludes this chapter by presenting some policy recommendations.

2. THE CONCEPTUAL FRAMEWORK OF THE COMPREHENSIVE ASIA DEVELOPMENT PLAN (CADP): A REVIEW

In response to the Joint Press Statement of the EAS in June 2009, ERIA promoted the formulation of the Comprehensive Asia Development Plan (CADP) in collaboration with Asian Development Bank (ADB) and the ASEAN Secretariat and submitted the final report of the CADP to the 5th EAS in October 2010. This section describes the conceptual framework of the CADP as the basis of the following discussion in this report[4].

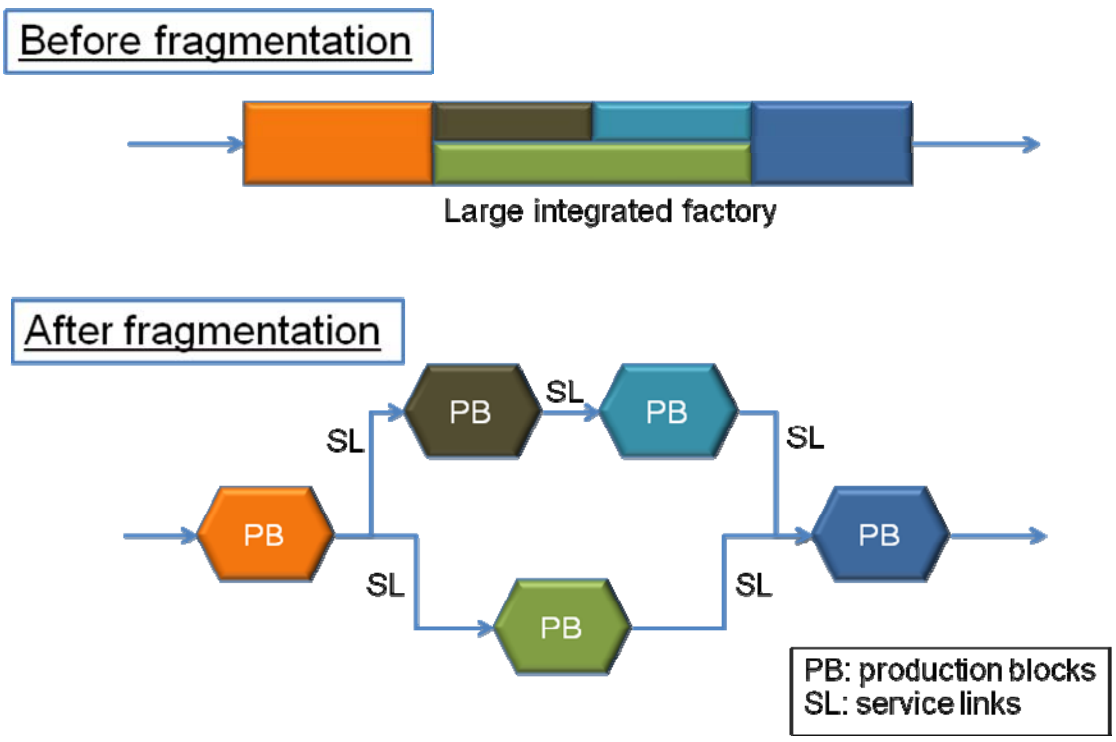
Since the 1980s, East Asia has achieved remarkable economic development by establishing international production networks through fragmentation of manufacturing industries, under which fragmented production processes were relocated to make the best use of location advantage of each region/country. However, the coverage of the production networks remains limited to the regions around existing and emerging industrial agglomerations, such as outskirts of the capital of each country, and significant development gaps still remain in East Asia. The CADP claims that the remaining development gaps could be turned into the sources of economic dynamism, which in turn could contribute to further deepening economic integration and to narrowing development gaps at the same time.

The conceptual framework of the CADP is based on new waves of international

[4] The report of the CADP is fully downloadable from ERIA website, www.eria.org.

trade theory such as the fragmentation theory and new economic geography. For example, as for machinery industries, many production processes are needed before final goods are produced, some of which are labor intensive, capital intensive, or knowledge intensive processes. Given such nature of manufacturing activities, it may be more efficient to produce goods through fragmentation by relocating each production process to the best place to make the best use of the location advantage than to locate whole production processes with different factor intensities in one place. This explains the benefits of fragmentation (Figure 1).

Figure 1: The Fragmentation Theory: Production Blocks and Service Links



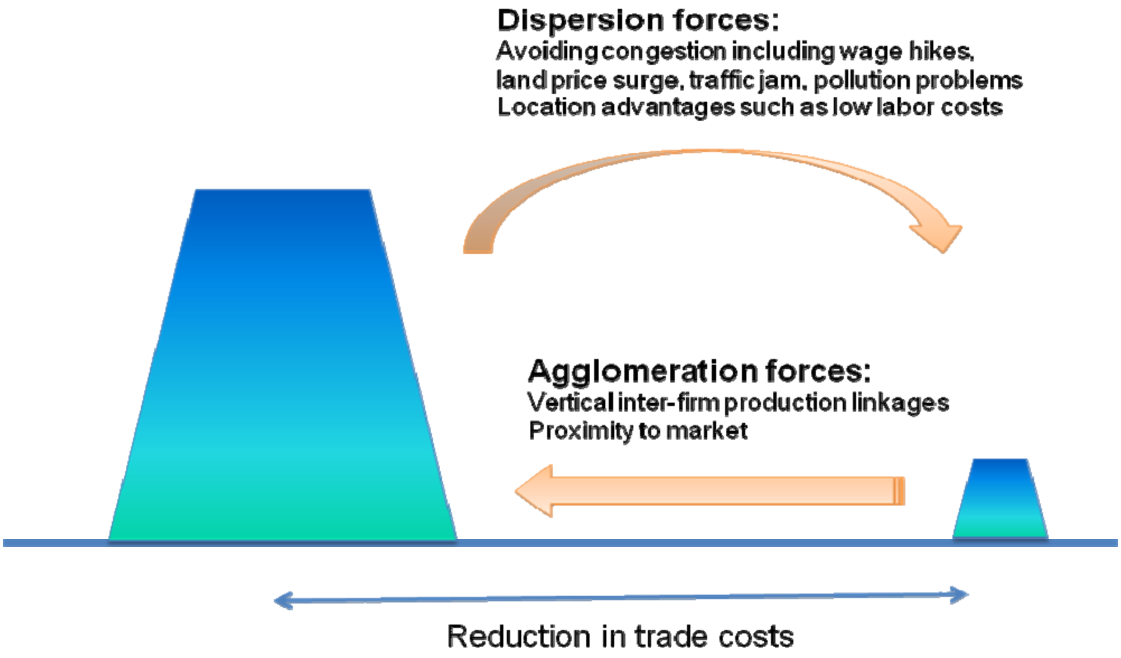
Source: ERIA (2010).

The conditions for this to function well are (1) the existence of areas with different production conditions defined by factor endowments, and (2) not-too-expensive service link cost[5] to connect fragmented production processes. Seen from this viewpoint, there still remain plenty of room to optimize the location of production processes through fragmentation in East Asia, where the large economic disparities remain, that is, there are countries and regions with significantly different wage levels.

New economic geography claims that it is required to properly control agglomeration effects and dispersion effects which have influence between industrial agglomerations and surrounding areas (Figure 2). Once an industrial agglomeration is formed, many more firms will approach to the industrial agglomeration, seeking convenience of component procurement and accessibility to a large market. This is an agglomeration effect. On the other hand, if an industrial agglomeration is developed, production costs, such as wages and rents, will increase and some firms will try to leave the industrial agglomeration. This is a dispersion effect. If the service link cost is reduced by infrastructure development, trade liberalization and/or facilitation, and other policy measures, the dispersion effect could be relatively increased, as the disadvantage to locate in a remote area could be mitigated by improved business environment. Furthermore, to promote relocation of production processes to areas with low wage levels, basic economic infrastructures, such as electricity and water, need to be improved in the areas.

[5] Service link costs are defined as all costs to connect fragmented production processes, which include transportation costs, customs duty, and so on.

Figure 2: Agglomeration and Dispersion in New Economic Geography

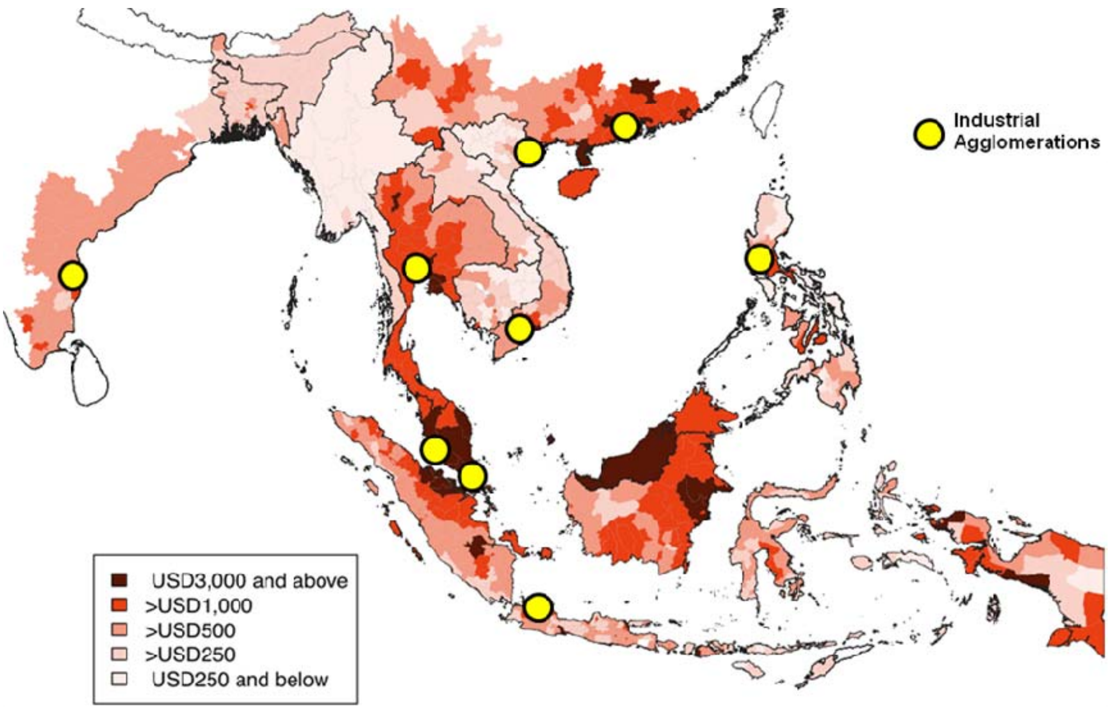


Source: ERIA (2010).

In fact, international production networks in East Asia have been established through the processes described above. The economic disparities persisting in East Asia would be the source to further continue this process, and to deepen economic integration and narrow development gaps. For this purpose, infrastructure development plan should be designed from a wider point of view encompassing the existing subregional initiatives such as the Greater Mekong Subregion (GMS), Indonesia, Malaysia, Thailand Growth Triangle (IMT-GT) and Brunei, Indonesia, Malaysia, the Philippines, East ASEAN Growth Area (BIMP-EAGA).

The CADP designates the intended regions of analysis, composing ASEAN countries and neighboring regions, as three tiers on a conceptual basis. Tier 1 includes countries/regions that are already in production networks and where industrial agglomerations have started to form. Issues and challenges to take care of are upgrading industrial agglomerations, increasing innovation, and climbing up the ladder from middle-income to fully developed countries/regions. Tier 2 corresponds to countries/regions that are not yet fully integrated into quick and high-frequency production networks. Issues and challenges are how to participate in quick and high-frequency production networks by reducing service link costs and improving location advantages for production. Tier 3 comprises countries/regions that are not likely to come into quick and high-frequency production networks in the short run but would like to provide a new framework for industrial development with the development of logistics infrastructure as a trigger.

Figure 3: GDP per capita (2005) and Industrial Agglomerations (Tier 1)



Source: ERIA (2010).

The regions designated as Tier 1 in the ASEAN and neighboring region are the metropolitan areas (industrial agglomerations) such as Bangkok, Singapore, Kuala Lumpur, Jakarta, Manila, Hanoi, Ho Chi Minh, and Chennai (Figure 3). These industrial agglomerations have worked as nodes of production networks and supported remarkable economic growth in the region, and are expected to lead the economy of the region in the future as well. Therefore, development strategies for Tier 1 to overcome “the middle income trap” and shift to truly advanced and innovative economies are of critical importance for the future of the region. This will require these industrial agglomerations themselves to be able to realize more innovations in various aspects of production. A firm survey conducted by ERIA revealed that the firms promoting innovations actively are more willing to make use of business transactions with multinational corporations, technical supports from public agencies, technical licenses from other corporations, and so on. Especially concerning the first point described above, supportive measures are important to enable local small and medium enterprises (SMEs) to engage with multinational corporations or participate in the international productive networks. To make industrial agglomerations more innovative, it is required to create this sort of a virtuous cycle between business relationships and technical innovations. In addition, to improve urban amenities through infrastructure development including public transportation networks, water supply and sewerage systems is effective to enhance attractiveness of industrial agglomerations as a destination for foreign direct investment.

The development strategies in Tier 2 focus on the reduction of the service link costs. The most effective strategy for Tier 2 to participate in the productive networks is to invite some of the production processes (typically, labor-intensive processes) in the existing industrial agglomerations through fragmentation. For this to take place, business environments need to be improved to ensure that parts and components could be traded at low cost and in a reliable manner. In concrete terms, the reduction of cost and time for transportation and crossing national boundaries are necessary and which in turn requires further measures for trade liberalization/facilitation, transport facilitation, enhancement of competitiveness of logistic sector through liberalization, upgrading of transportation infrastructure such as highways and railways, and the development of basic infrastructure such as electricity and water to support economic growth in Tier 2.

The mountainous areas of the Indochina Peninsular and small islands in the Southern Philippines and the Eastern Indonesia are amongst those which fall into Tier 3. Most of these regions are difficult to participate in the production networks of manufacturing industries even in the medium to long term. However, by enhancing the connectivity with neighboring Tier 1 and Tier 2 regions, it is possible to make use of their location advantages on primary products, natural resources, and tourism resources in a more effective way and formulate original development strategies of the regions.

Although the policies to be prioritized in each tier are different, when designing a comprehensive infrastructure development plan, it is crucial to pay full attention to interactions among these tiers. What comes into the picture here is the concept of economic corridors. The CADP emphasizes the effectiveness of development strategies centered by economic corridors to promote fragmentation of production activities by mainly enhancing connectivity in each region along corridors through the improvement of logistics (i.e. reduction of the service link cost), while controlling agglomeration/dispersion effects and aiming at balancing deepening economic integration with narrowing development gaps.

3. DEVELOPMENT AND CURRENT STATUS OF ASEAN-INDIACONNECTIVITY

3-1. ASEAN-India Trade Relationship

During the first decade in the 21st century, India has emerged as one of the key players in the global economy. As illustrated by De (2011), India's merchandise trade increased from US$ 93.0 in 2000 to US$ 422.9 in 2009, with a high compound average growth rate (CAGR) of 18.3%. During the same period, merchandise trade between ASEAN and India also recorded a significant increase from US$ 7.1 billion in 2000 to US$ 41.3 billion in 2009, with a CAGR of 21.6%. A careful and detailed analysis on international trade between ASEAN and India by Obashi (2011) revealed the growing importance of each other, particularly in the 2000s. For ASEAN, India's share as the destination of merchandise export and as the origin of merchandise import doubled from 1.6% and 1.0% in 2000 to 3.3% and 2.1% in 2009, respectively. For India, ASEAN's share as the destination of merchandise export increased rapidly from 6.5% in 2000 to 10.6% in 2009, whereas ASEAN's share as the origin of merchandise import recorded a slight decline from 11.0% in 2000 to 9.1% in 2009, indicating the slow progress of ASEAN in penetrating into Indian market[6].

Meanwhile, the proportion of machinery in ASEAN's total imports from India has doubled during the 5 years to 2009, from 9.8% to 19.3%, though not to the level of the machinery's share for the ASEAN's export side, which has been more than 30% since 2000. In relative terms, ASEAN Member States tend to export more machinery parts to and import more finished machinery products from India, compared to two decades

[6] According to De (2011), in contrast to ASEAN, China expanded its share in India's merchandise import more than double during the same period, from 5.8% in 2001 to 13.1% in 2009.

ago.

In the ASEAN's machinery exports to India, computer parts and accessories and electric integrated circuits are the top two goods, constituting more than 10% shares in major exporters, namely Singapore, Malaysia, and Thailand. Another interesting point to note in the ASEAN's machinery imports from India is the rapid increase in mobile phones. The share of India as the import origin of mobile phones surged from a negligible level in 2005 to 10% in 2009. Obashi (2011) attributed this surge for the establishment of a Nokia factory in Chennai, India, in January 2006. As supporting evidence, the market share of Nokia is about 60% in Indonesia, the top importer of mobile phones from India, 49% in 2009, among the ASEAN Member States. That is, the global strategy of a single company could shape trade patterns between two countries with weak trade relationship.

All these development are regarded as the evidence of the significant growth and structural shifts in merchandise trade between ASEAN and India. Considering the growth performance and the geographical adjacency, however, the trade relationship between ASEAN and India could have been enhanced further. The shares of Thailand in India's export and import are 0.96% and 1.04% respectively in 2009, despite the relatively short distance between the two countries. India's trade with CLMV countries is still limited, suggesting further scope for trade expansion in near future. As De (2011) concluded, "one of the major obstacles to the expansion of trade between India and ASEAN is the high cost of moving goods across the borders." There remain plenty of room to improve physical connectivity between ASEAN and India to reduce service link costs, which in turn is expected to further accelerate the fragmentation of manufacturing activities. By promoting this process, ASEAN and India can effectively deepen economic integration, and as a consequence, narrow the remaining development gaps in the region.

3-2. Myanmar's Trade with Neighbours

This subsection takes a closer look at Myanmar's trade with neighboring countries, considering its strategic location surrounded by India, China, and other part of ASEAN. As narrowing development gap is one of the two ultimate goals for ASEAN and East Asia, it is important to pay special attention to the lowest income country in the region. Although there are a number of challenges for the economic development of Myanmar, its strategic location is one of the natural endowments to utilize in designing its development strategy. For this purpose, it is worthwhile deepening our understanding on the development and the current status of Myanmar's trade with neighboring countries.

Although Myanmar's share in the regional trade is still limited, Myanmar has steadily increased its international trade since the introduction of an open door policy in 1988 under the military government. During the last two decades, Myanmar's export increased from US$ 466 million in FY1991/92 to US$ 8,864 million in FY2010/11 with a CAGR of 16.8%, and Myanmar's import increased from US$ 851 million in FY1991/92 to US$ 6,415 million in FY2010/11 with a CAGR of 11.2%. The high export growth was not severely affected by the import ban imposed by the United States in 2003, mainly because of the rapid expansion of trade with two neighbouring countries, Thailand and China[7]. The share of Thailand in Myanmar's trade (export +

[7] According to IMF, Direction of Trade Statistics, United States was the largest export destination for Myanmar with a share of 22.4% in 2000, followed by Thailand (11.8%), India (8.2%) and China (5.7%).

import) doubled from 15.2% in FY2000/01 to 30.4% in FY2009/10, reflecting the increase of Myanmar's export of natural gas to Thailand through pipelines. The comparable figures for China expanded more than a double from 12.0% to 24.2%, and this figure is likely to grow further once natural gas export the gas pipeline to China is completed in 2013. In contrast, Myanmar's trade with other neighbouring countries has been sluggish during the last decade. The share of India in Myanmar's trade marked a rather slow expansion from 8.9% in FY2000/01 to 10.3% in FY2009/10. As for Bangladesh, the share was even halved during the same period from 1.4% to 0.7%[8].

Border trade with neighbouring countries shared around 8% of Myanmar's total trade in the end of the 1990s, but the share gradually increased to 13.9% in FY2010/11. In FY1997/98, the shares of China and Thailand in Myanmar's border trade (export + import) were 56.7% and 32.6% respectively, followed by India (8.7%). Reflecting the rapid increase in Myanmar's border trade with China, the corresponding shares of the three countries has become 77.9%, 19.9%, and 1.0%, respectively. That is, the performance of Myanmar's border trade with three major partners has witnessed a significant difference; despite the comparable length of the border[9]. This contrasting performance of the three neighbouring countries can be attributable for the physical connectivity.

Muse (105 mile), located between Muse in Myanmar and Ruili, Yunnan Province of China, has been the largest border check point in Myanmar, with a distinctive share of 65.4% in FY2006/07, followed by three border check points along the Thai border

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8 All these figures are calculated based on the data provided in Kyaw Min Htun, *et al* (2011), unless otherwise stated. The same applies for the next paragraph.

9 According to Myanmar Embassy in Tokyo (http://www.myanmar-embassy-tokyo.net/about.htm), Myanmar shares national borders with China (2,204km), Thailand (2,107km), India (1,643km), Bangladesh (271km), and Lao PDR (238km).

namely Myawaddy (14.3%), Kawthaung (7.2%), and Myeik (4.1%). Muse (105 mile), established in 1995, started to function as a one-stop service center in 1998. In the same year, the main route (R4) connected 460km between Muse and Mandalay, the second largest city in central Myanmar. As a result, the transportation time between Muse and Mandalay was drastically reduced from 2-3days or up to one week to 12-16 hours[10]. In addition, China established a Jiegao Special Border Trade Area in Ruili, and constructed a highway connecting Kunming and Baoshan in 2005. And in the next year, a Border Trade Zone was opened in Muse, with a strong support of China. All these infrastructure development contributed significantly in enhancing physical connectivity between China and Myanmar, providing firm evidence on the importance of physical infrastructure to expand international trade across national borders[11].

Myawaddy in Myanmar and Mae Sot in Thailand have been regarded as the main gate for the border trade between the two countries, as implied by the fact that they are on the East West Economic Corridor (EWEC) facilitated by ADB, the Asian (and ASEAN) Highway No.1 designated by UNESCAP, and the Trilateral Highway Project. In order to meet the growing volume of border trade with Thailand through Myawaddy [12], Myanmar government constructed Myawaddy Trade Zone in 2008.However, the border trade through Myawaddy has been officially closed since July 2010 due to ethnic insurgency issues in the area. As discussed above, Myawaddy is the main gate for Myanmar’s border trade with Thailand. Therefore, it is highly

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[10] See Kudo (2010) for details.

[11] Another important aspect to note is the insurgency problem in Myanmar. As Kudo (2010) pointed out, “(t)he border trade through the new “Burma Road” has become possible by not only the road and border gate development, but also restored peace and security and the resultant Myanmar government’s control in the border areas.

[12] US$ 2.3 million in FY2001/02 to US$ 13.0 million in FY2006/07.

expected that the border gate would resume the operation as soon as possible.[13] It should be also noted that the completion of EWEC is adopted as one of the strategic actions in the Master Plan on ASEAN Connectivity (MPAC).

Myanmar's border trade with India has been slow as compared to those with China and Thailand. Along the national border with India, there are two border check points in Tamu and Rhee. According to Kudo (2010), the shares of these bore check points in Myanmar's border trade were 0.9% and 0.6 % respectively in FY 2006/07. The border areas are mountainous, and the road infrastructure is generally insufficient to accommodate a large amount of international trade. In addition, the limitation on the number of items allowed to trade and the mode of settlement have been major obstacles to the expansion of trade activities across the border between Myanmar and India. That is, there remain ample room to enhance institutional connectivity. This issue will be further elaborated in the next section.

3-3. Emerging Nodes of ASEAN-India Connectivity: Myanmar and Northeast India

The characteristics of Myanmar in ASEAN and those of Northeast India in India are similar in various aspects. Myanmar locates on the west end of ASEAN, having China on the north, and is the lowest income country in ASEAN with the weakest connectivity with other ASEAN Member States. Similarly, Northeast India locates on the northeast end of India, having China on the northeast beyond Myanmar the immediate neighbor, and is among the poorest regions in India with the weakest connectivity with other parts

[13] Nevertheless, according to the Thai official statistics, the volume of cross-border trade between Myanmar and Thailand has been increasing since the closure of official border trade gate in Myawaddy-Mae Sot. The large amount of informal border trade has been conducted through the informal routes, and shows a strong demand for goods of each country.

of India. The main economic activity is agriculture, and both have some natural resources. Another important fact is that the connectivity between Myanmar and Northeast India is still very weak, although they share a 1,643km long national border.

On the other hand, Myanmar and Northeast India, surrounded by all three of the most vigorous economies in the world, namely, China, India, and (other part of) ASEAN, are expected to play a very important role as the connecting nodes to physically link these economies. In this broader perspective, Myanmar and Northeast India are no longer at one end of the region they belongs to. Taking this strategic role into consideration, development strategies for Myanmar and Northeast India can be the core of the regional strategy to enhance ASEAN-India connectivity.

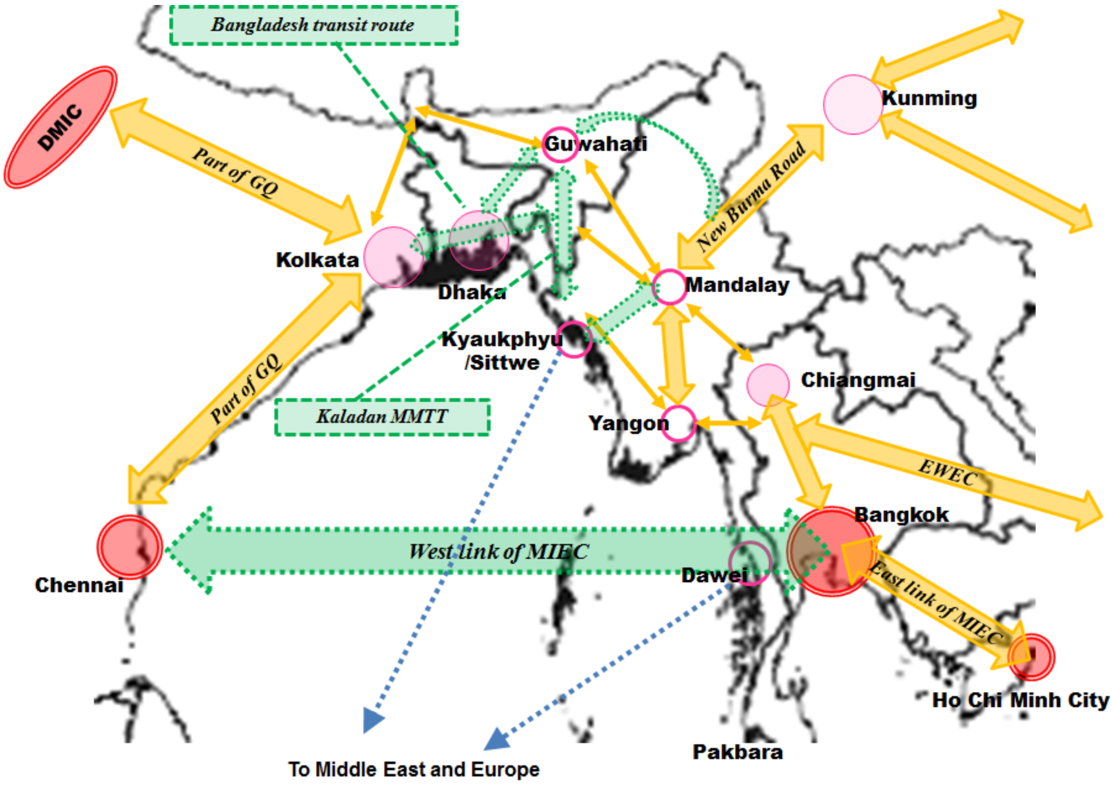
4. INFRASTRUCTURE FOR ASEAN-INDIA CONNECTIVITY

4-1. A Regional Framework

Figure 4 provides a framework for the regional strategy to enhance connectivity between ASEAN and India. There are two main routes, the sea route, as the west link of the Mekong-India Economic Corridor (MIEC), and the land routes, with various optional routes, along the trilateral highway between Thailand, Myanmar, and India.

The west link of MIEC, from Bangkok to Chennai via Dawei, is designed to enhance the connectivity between the two Tier 1 regions. Bangkok and Chennai have formed agglomerations of manufacturing industry by inviting a large amount of foreign direct investment most notably in automotive and electronics sectors. The enhanced connectivity between Bangkok and Chennai is expected to enable those manufacturing companies to improve their competitiveness by reviewing and restructuring their production networks, including further fragmentation of some parts of production processes. Reflecting the promising benefits, ASEAN Leaders agreed to promote the completion of MIEC in the Master Plan on ASEAN Connectivity (ASEAN, 2010).

Figure 4:A Regional Framework to Enhance ASEAN-India Connectivity



However, MIEC is not sufficient to meet a number of challenges the region faces. In order to effectively expand regional production networks, which is of crucial importance to pursue both deepening economic integration and narrowing development gaps at the same time, it is necessary to improve physical infrastructure for land transportation. As illustrated in Figure 3, there still remains large area with less than US$ 500 per capita income along the north bank of the Andaman Sea, consisting of

Myanmar and Northeast India. These economies are characterized by agriculture and other natural resource industry, with no significant manufacturing activity. For these regions, enhanced connectivity with neighbouring cities and countries is highly important to widen the access to the large market and to invite new industries, fragmented production processes, based on their location advantages. There are a number of challenges to enhance physical connectivity through land transportation, as observed in the implementation process of the Greater Mekong Subregion (GMS) project, including the Cross Border Transport Agreement (CBTA)[14]. In Figure 4, the routes in yellow arrows are existing routes and those in green arrows are largely in preparation stages or require extensive upgrading work, and the thickness of arrows indicates the strength of connectivity. As discussed in the last section and highlighted in Figure 4, there is a significant gap in the connectivity between Myanmar and Northeast India. This gap needs to be filled with various physical infrastructure projects as already identified as the Trilateral Highway connecting Thailand, Myanmar and Northeast India, most of which are also identified as Asian (and ASEAN) Highway No.1. And the Trilateral Highway is expected to connect to the well-developed national highway network in India, including the Golden Quadrilateral (GQ).

These two routes, namely, the west link of MIEC and the Trilateral Highway are the key for the successful enhancement of the connectivity between ASEAN and India. The remainder of this section discusses the development, current status, opportunities and challenges of various segments of these two routes, as well as other related and complementary routes to enhance the connectivity between Myanmar and China, and between Northeast India and Bangladesh.

[14] Ishida (2011) discusses the challenges in implementing CBTA in detail.

4-2. Mekong India Economic Corridor (MIEC)

4-2-1. Background

One of the main policy recommendations in the CADP was to promote the Mekong-India Economic Corridor (MIEC), which enhances the connectivity between Ho Chi Minh City, Phnom Penh, Bangkok, and Dawei by road, and further to Chennai in India by sea route. MIEC is an extended version of the Southern Economic Corridor (SEC) as defined by ADB, with the objective of exploring more impacts by widening the scope of regional economic integration.

Compared to the East West Economic Corridor (EWEC) and the North South Economic Corridor (NSEC), MIEC is more relevant to the conceptual framework of the CADP in the sense that it includes existing and emerging industrial agglomerations along the corridor, namely, Ho Chi Minh City, Bangkok, and Chennai. In order to pursue deepening economic integration and narrowing development gaps at the same time, it is important to utilize two opposite forces of globalization, namely, agglomeration forces and dispersion forces. In order to make this mechanism work effectively, an economic corridor should be designed to include regions at different development stages, that is, those with a different endowment of economic resources. In between the above mentioned industrial agglomerations, MIEC passes through lower-income countries and regions such as Cambodia and Dawei in Myanmar. In this regard, MIEC is a good example to examine the validity of the conceptual framework of the CADP. Reflecting the promising impacts to the region, ASEAN Transport Ministers adopted the promotion of MIEC as one of the key actions in the latest 5 year plan of ASEAN transport cooperation, the Brunei Action Plan (BAP), and the decision was also supported by ASEAN Leaders as reflected in the Master Plan on ASEAN

Connectivity (MPAC). This is one of the recent major progresses in realizing MIEC.

As often discussed, an economic corridor is only as strong as its weakest link. There still remains a lot to do to explore the full potential of MIEC by enhancing weak links. For example, the CADP recommended the construction of a Mekong Bridge in Neak Leoung (Cambodia). Japan's recent decision to provide assistance to Cambodia, despite the difficulties stemming from the bad fiscal position of the country, is another major and welcomed development. This project is expected to improve drastically the physical connectivity between Phnom Penh and Ho Chi Minh City by allowing truck drivers to go across the Mekong River without waiting for ferries. The simulation analyses in the CADP found that the Cambodian regions along National Road No.5 such as Svay Rieng, Prey Veng, and Phnom Penh would enjoy larger benefits, while regions along National Road No.6 could be negatively affected. The total economic effect in Cambodia is still positive. Although the Mekong Bridge in Neak Leoung itself is a national project of Cambodia, the positive economic effects would spread to neighboring countries such as Vietnam and Lao PDR. This implies that the lack of a bridge over the Mekong River in Neak Leoung has been a significant bottleneck in ASEAN and surrounding regions, instead of being merely a bottleneck in Cambodia.

Given this significant step made in Cambodia, the remaining and more important issue is to establish the new linkage between Bangkok and Chennai. It is important to open an access routefrom Bangkok to the Andaman Sea, by constructing a highway road connecting Kanchanaburi (Thailand) and Dawei. And, a comprehensive development project should be implemented for Dawei, including a deep sea port,special economic zones, power plants, and so on. In particular, a deep sea port in Dawei will provide vast opportunities for the firms operating in Bangkok metropolitan area and the region along MIEC by opening up a new shipping route to India, the Middle East, and Europe. On the other hand, firms in India, particularly those in Chennai, are expected to have less costly and alternative access to ASEAN. In addition, this development is expected to reduce congestion in the Malacca Strait.

All in all, the full spec MIEC can be regarded as a multimodal economic corridor, or a land bridge, passing through the Indochina Peninsular as a whole. And, the simulation analyses in the CADP revealed that the impacts of MIEC on economic growth and narrowing development gaps were much larger than other scenarios such as EWEC and NSEC. According to the simulation, the percentage increases in real GDP in 2020 vis-à-vis the baseline scenario are 0.32% for EWEC, 0.14% for NSEC, and 1.19% for MIEC, and the percentage reductions in the Gini coefficients, a measure of income inequality, are 0.07% for EWEC, 0.13% for NSEC, and 0.23% for MIEC (ERIA, 2010).

4-2-2. Outline of Dawei Development Projects

Myanmar needs deep sea ports for the promotion of regional and international trade. Myanmar Port Authority (MPA) which provides port services conducted preliminary study and site selections for deep seaport by taking into consideration of natural and technical conditions. The appropriate sites are earmarked for construction of deep sea ports along the coastline of Myanmar; such as Kyaukpyu in Rakhine State, Kalegauk in Mon State, Dawei and Bokpyin in Tanintharyi Region.

In July 1996, an MOU had been signed between MPA and Italian Thai Development Public Company Limited (ITD) to execute feasibility study for Dawei deep sea port and integrated development plan. The scope of the project included construction of highway road and development of deep sea port to accommodate 50,000 DWT and 300,000 DWT general/container vessels and break bulk vessels respectively. According to the feasibility study, ITD selected three favorable locations for deep sea ports.

An Memorandum of Understanding (MOU) on the Dawei deep seaport and industrial estate project between MPA and ITD was signed on 6 December 2008 and the Framework Agreement signed on 2 November 2010. ITD has been granted the right from the Myanmar Government to develop the Dawei Project covering the area of 250 km^2, over 75 years project period, for the development of a deep sea port, industrial estate, and trans-border corridor link. The total project cost is estimated to be US$80 billion.

(1) Dawei Deep Sea Port

Three proposed deep sea ports with the maximum draft of -20m Chart Datum are planned with the capacity of over 200 MT per annum for services of liquid cargo, general cargo, containers and bulk cargo. Dawei Deep Sea Port will be integrated with road and rail transportation right up to the port terminals in order to accommodate the tremendous amount of raw materials and finished goods. In addition, the sea ports will be equipped with a shipbuilding facility capable of providing building and maintenance services for large vessels.

According to the port plan, vessels can approach through navigation channel and fair way to port areas. Port development project has two port areas as follows:

a) Deep sea port (North)- Port area is 2.7 $km^2$and 1.5 km^2 cargo yard and 1.4 km^2 ship building yard are included.

b) Deep sea port (South)- Port area is 3 km^2 and 1.5 km^2 ship agriculture yard is included.

The Dawei Port facilities and industries are well linked. The steel industry will be supported by the bulk port, requiring throughput of iron ore, coal and other materials, and will export its owned finished products totaling 40 million tons a year. The Dawei Port will handle 5 million tons of agricultural produce like rice, sugar, corn, tapioca and other grains a year. The import of coal will be 25 million tons a year. The Dawei Port will handle 3.2 million TEU a year, which is equivalent to 45 million to 50 million ton of general cargo, 35 million tons of chemical and petrochemical, and 36 million tons of crude oil. The handling capacity of the Dawei Port is up to 200 million ton a year.

(2) Dawei Industrial Estate

The integrated industrial estate offers a consolidated one-stop industrial production base, consisting of upstream to downstream products in five different zones as follows:

a) Zone A- Heavy industry zone (38.3 km^2) includes coal fired power plant, steel mill, fertilizer, ship building and cargo yards and deep sea port;

b) Zone B - Heavy industry zone for oil and gas storage, oil refinery, gas separation plant and compound circled power plant;

c) Zone C- Medium and heavy industry zone (44.7 km^2) for upstream and downstream petroleum industry;

d) Zone D- Medium industry zone (58.6 km^2);

e) Zone E- Light industry zone (43 km^2); and

f) Public area (13.5 km^2) for commercial complex, authority center and township and district offices.

The industrial estate will need at least 300,000 m^3 of water per day. A reservoir will be built to provide 100 million m^3 to the industrial estate during the four month of dry season.

(3) Dawei Special Economic Zone Law

In order to enhance the Dawei Deep Sea Port and Industrial Estate Project, the previous military government enacted Dawei Special Economic Zone Law as Law No (17/2011) on 27 January 2011. The objectives of this law are as follows:

a) to implement the Dawei Special Economic Zone by the supervision of the Central Body in accord with the objectives contained in section 3 of the Myanmar Special Economic Zone;

b) to emerge as the pivotal place for the trade and transportation of South East Asian Region;

c) to develop the businesses of the Dawei Special Economic Zone;

d) to create more employment opportunities for the public within the Dawei Speicial Economic Zone; and

e) to develop the infrastructures within the Dawei Special Economic Zone.

Although it is still in the early stage of development, the planned deep sea port and special economic zone (SEZ) at Dawei are providing clues as to its industrial and energy impact.ITD has already named some of the companies that may invest in the project, including Myanmar's Asia World Company, while the Thai energy company, PTT Exploration and Production (PTTEP), will reportedly be responsible for producing 6000 megawatts (MW) of electricity transmitted to Thailand. PTTEP is said to be involved in establishing a coal fired power plant, a steel mill, and a fertilizer factory located in the SEZ's heavy industry zone A. While the heavy industry zone B will contain oil and gas storage facilities, an oil refinery, a gas separation plant, and a combined cycle power plant.

The first phase of the development project includes road construction of an eight lane freeway between Dawei and Kanchanaburi of Thailand. The preparation works that were implemented in 2010 was a small port, soil boring at deep sea port basin, accommodation and site offices, and Nabule-Phu Nam Ron road. However Nabule - Yebyu road construction project and land acquisition and relocation of seven villages in Nabule area are underway up to the present (October 2011). The Dawei Deep Sea Port will require over 50,000 acres of land.

Sevenvillages - Nyaungbinseik village of Launglon, and Hteingyi, Pradat, Leishaung, Mayingyi, Mudu and Kalouthta villages of Yebyu Township–were included in the Dawei Special Economic Zone, and these villages and villagers will be displaced. Hteingyi, Pradat, Lesishaung, Mayingyi and Mudu villages will be relocated to Bawa village, Nyaungbunseik village to Pantininn village and Kaloutha to nearby area. Region government, Dawei Special Economic Zone Supportive Group (temporary), and ITD are coordinating to reimburse villagers for loss of annual and perennial crops plantations at current prices. ITD have been directed to give back the villages enough lands for accommodation and agriculture in new settlement, to reclaim lands for farming and growing perennial crops, to provide them with monthly cash assistance to families in the interval, while they are making no profit from farming; to relocate and allowing them to continue farming in old place while starting crops plantation in new settlement, to help the families start farming if they live on earnings from framing, and the crop is in season, to provide monthly cash assistance before the start of next season if the crop is out of season so as to avoid suffering from lack of income, to allow families who earn livings from perennial crops to grow the same crop in new plantation and then displace there when they are able to make profits from the plantation, and to provide guaranteed monthly and annual cash assistance if they are so displaced earlier; coordination has been made to complete construction school, hospital, clinic, bazaar, and religious edifices in new settlement at the time of displace; two-storey RC buildings with GI-sheet roofs will be built for displaced families; and plans for convenience of socio-economic status of displaced villagers are included. In order to secure environmental and social issues, Chulalongkorn University and Tesco Co.,Ltd. will conduct Environmental Impact Assessment (EIA) and TEAM Consulting Engineering and Management Co., Ltd. of Thailand will conduct Social Impact Assessment (SIA).

4-2-3. Opportunities and Challenges

The fact that ASEAN Leaders adopted the promotion of MIEC as one of the strategic actions in MPAC indicates the strong political will of ASEAN Member States, not only of the countries of immediate concerns, Myanmar and Thailand.

Kumagai and Isono (2011) conducted a series of simulation analyses using the 4th version of the IDE/ERIA Geographical Simulation Model (GSM), and their findings can be summarized as follows: (1) MIEC has the largest impacts on Cambodia, followed by Myanmar, Thailand, and Lao PDR; (2) Tanintharyi, where Dawei is located, enjoys the largest impact, equivalent to 9.5% vis-a-vis the baseline scenario; (3) allowing the transit transport in Myanmar is critical for countries other than Myanmar, especially for Thailand; (4) Dawei project has larger impact than Pak Bara project for Thailand, and there is almost no additional impact when we compare Dawei project only and both

Dawei and Pak Bara projects; (5) West Bengal and Tamil Nadu have slight positive impacts while others see slight negative impacts and in total in India there is almost no impact, mainly due to the fact that India has higher preference for domestic products. The higher expected impact on lower income AMSs, such as Cambodia and Myanmar, implies that MIEC is effective in narrowing development gaps (NDGs), one of the main objectives of the ASEAN Community.

In this way, the Dawei project will enhance connectivity between Bangkok and Chennai, which can open wide opportunities for the businesses to optimize their production activities in ASEAN and India (through fragmentation and reviewing supply chains). Having an alternative route, in addition to the existing route via Singapore, would enhance the resilience of regional production networks. Myanmar, one of the least developed economies in the region, will enjoy the economic benefits from the Dawei project according to the GSM. The Dawei project may provide an attractive industrial location for private firms and factories that are currently located in Thailand and the neighboring countries, including Japan affiliated ones, to relocate to. Japanese firms understand well the necessity to diversify their production sites in the region, so that they could avoid the risks of natural disasters.

On the other hand, there also exist challenges.ITD has established a special purpose company (Dawei Development Corporation: DDC), which is wholly owned by ITD. ITD has been looking for investors for up to 49% share of DDC. Total investment amount of DDC is estimated as US$80 billion. As is often the case, funding is the main problem in the implementation of the Dawei development project.ITD has long had difficulty in finding partners, mainly because Myanmar has long been under the Western, the US’s in particular, sanctions. Large MNCs were thus far reluctant to invest and do businesses in Myanmar, since they are afraid of damaging their reputation in the international community. However, the new government of Myanmar, which was established 30 March 2011, is apparently moving forward to political and economic reforms, including the dialogue with Aung San Suu Kyi, the leader of democratic forces, the release of quite a number of political prisoners, relaxing media control and internet access, the consultation with the IMF to restructure the country's highly distorted exchange rate system, and so forth. Based on these changes, the US started to talk intensively with the Myanmar government, and people think that the sanctions imposed by them may soon be relaxed, or lifted in due time. The next ASEAN Summit in mid-November will reward Myanmar by allowing it to take a role of ASEAN Chair in 2014. Accordingly, the large MNCs started to pay more attention to Myanmar. The change of this atmosphere can be regarded as a favorable factor for fund raising for the Dawei project.

Another challenge is the small population in Dawei. Most of them have migrated to Thailand as migrant workers. Whether they come back to Tanintharyi Region or not when the Dawei project is completed, is an important factor for the success of the industrial estates.

4-3. Connectivity between Myanmar and Northeast India

As already discussed, the weak physical connectivity between Myanmar and North India has been one of the major bottlenecks to enhance the border trade between the two countries. This subsection discusses the development, current status, and prospects of the connectivity between Myanmar and Northeast India, focusing on the physical and institutional infrastructure.

Out of the eight states in Northeast India, four states, namely Arunachal Pradesh, Nagaland, Manipur, and Mizoram, share national borders with Myanmar, and the total length stretches to 1,643km. Along the national border, four land customs stations (LCSs) in (1) Moreh in Manipur / Tamu in Sagaing, (2) Zolkawtar in Mizoram /Rihkhawdar (Chin), (4) Avakhungin Nagaland / Layshi in Sagaing, and (4) Nampong in Arunachal Pradesh / Pangsu in Sagain, have beenidentified to serve the border trade with Myanmar[15]. Out of these, Moreh LCS has been the busiest, handling almost 99% of the regions' trade with Myanmar, although Northeast India's trade with Myanmar has always remained less than a percent of India's total trade with Myanmar since the opening of Moreh LCS in 1995 (De, 2011).

The remainder of this subsection will discuss the current status, opportunities, and challenges of three routes for the enhance the connectivity between Myanmar and Northeast India, namely, (1) Moreh/Tamu route, (2) Zolkawtar/Rhee route, and (3) Nampong/Pangsu route which is known as Stilwell Road.

4-3-1. Moreh/Tamu Route

Moreh in Manipur State of India and Tamu in Sagain Region of Myanmar has been the main gate for the border trade between India and Myanmar. Moreh is 109 km away from Imphal, the capital city of Manipur State, and there is a small town (Palel) in between. The road from Imphal to Palel (49 km) is largely 2 lanes, flat terrain, and the surface is fairly paved and maintained. In contrast, the road from Palel to Moreh (60 km) is single-lane and mostly mountainous. The surface is paved but not maintained,

[15] Avakhung was agreed bilaterally as an LCS in Nagaland, with its Myanmar counterpart of Layshi, in October 2008. Border check points in Avakhung/Layshi and Nampong/Pangsu are not in operation.

therefore a number of sections between Palel and Moreh need to be repaired[16]. On the Myanmar side, a 150 km road from Tamu, Kalewa, to Kalemyo and a 10 km road from Kyigone to Kalemyo were constructed by the Border Road Organization (BRO) of India by 2001, and named as a friendship road. The road from Tamu to Kalemyo is in a good condition, as a result of a maintenance work by Myanmar government in 2008[17]. The road from Imphal, Palel, to Moreh, and the friendship road from Tamu, Kalewa, to Kalemyo are integral parts of the trilateral highway project under the Mekong-Ganga Cooperation initiative, and are expected to serve as a trunk route to facilitate the movement of goods and people.

The bilateral agreement between Myanmar and India limits the number of tradable items for the border trade to 40, and only in terms of barter trade. Trade imbalance needs to be settled by reverse trade within 6 months, instead of financial settlement[18], and there's no "formal" foreign exchange facility in the border area. Due to these restrictions, official border trade has not been growing. According to the statistics of Moreh LCS, in FY2010/11, India's export to Myanmar was Rs. 2.6 million of cumin seed, and India's import from Myanmar was Rs. 32 million of betel nuts and Rs 4 million of dry ginger. The remaining trade imbalance needs to be settled by India's

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[16] Authors conducted an experimental drive in May 2011. It took 56 minites from Imphal to Palel (49km) with an average speed of 52.5km/h, and 94 minutes from Palel to Moreh (60km) with an average speed of 38.3km/h. Reflecting the security issues in the border area, we encountered three security check points by the Assam Rifles along the route. Time for the security check was less than 1 minute each, probably reflecting the recent improvement in the security problems.

[17] According to an experimental drive conducted by researchers of Yangon Institute of Economics in 2011, it took 150 minutes for the 131 km road from Kalay to Tamu, with an average speed of 52.4km/h, implying a good condition of the road. See Kyaw Min Htun, *et al* (2011) for details.

[18] This is because of the economic sanction on Myanmar imposed by the United States. As the Asian Clearing Union (ACU) mechanism still depend on the use of US dollar for final settlement. There is a plan in India to use Indian Rupee as the currency of settlement for the bilateral trade with Myanmar.

additional export of some of the 40 goods listed in the bilateral agreement[19]. Such a restricted trade practice has been a major bottleneck to expand the bilateral trade between India and Myanmar.

Instead, informal border trade has been growing, although it is very difficult to know the exact figures. Local people living in the border area are allowed to go to Myanmar only by registering name and age, even without showing their passport. There are markets on both sides of the border, to serve for the customers from the other side of the border. The market in Myanmar side deals a number of imported Chinese products such as electric appliances, blankets, and plastic products, and Myanmar products such as fruits, candles, and soaps. And Chinese products, similar to those traded in the border markets, can be found in markets in Imphal or other places. Putting these pieces of information together, it is natural to consider that Chinese products have been imported through informal border trade to meet the demand in Northeast India. As referred in De (2011), the total trade at Moreh including informal volume is estimated at Rs. 2,800 million, which is far more than the official trade statistics, Rs. 150 million, indicating a significant amount of informal trade across the border, backed by a strong demand in the market.

Therefore, in order to expand the trade between Myanmar and India across the border, it is important for the both governments to take necessary steps to upgrade existing border trade to normal trade, by lifting or expanding the list of tradable items and by allowing financial settlements including the introduction of letters of credits (L/C). However, from the viewpoint of India, there is a fear of possible influx of

[19] On 9 May 2011, the Reserve Bank of India (RBI) had a meeting with local traders and bankers in Imphal. Reportedly, RBI had been trying to convince Myanmar counterpart to introduce "letter of credit (L/C)" for the settlement of border trade, instead of restricting to barter trade. At that point, however, Myanmar side was not interested in this idea. *The Sangai Express*, 10 May 2011.

Chinese products into the domestic market. Given the potential demands for Chinese products, as implied in the last paragraph, a proper management of the country of origin by Myanmar government would be of crucial importance, to keep the trade flows under control. Another direction for India and Myanmar might be to consider transit transport agreements involving China and Thailand.

De (2011) attributes the low level of border trade at Moreh to the lack of modern trade facilities, both hardware and software, and the absence of adequate security. However, with a proper policy environment and moderate improvement of road infrastructure, Moreh/Tamu border can become an important gateway connecting India to Myanmar, and further to China and Thailand.

4-3-2. Zolkawtar/RheeRoute

Zolkawtar in Mizoram State of India and Rihkhawdar (Rhee) in Chin State of Myanmar are the secondary gate for the border trade between India and Myanmar. Zolkawtar is 225 km away from Aizawl, the capital city of Mizoram State. The whole stretch from Aizawl to Zolkawtar is largely 2 lanes and highly mountainous terrain[20], although the surface is paved and fairly maintained as compared to the section between Palel and Moreh in Manipur. Reflecting the better security condition, there is no security checkpoint along the route from Aizawl to Zolkawtar.

The regulation on border trade is the same with those for Moreh/Tamu border. In Zolkawtar, physical border facilities such as land customs station (LCS), post office, and a bank (State Bank of India) are already developed, and ready to operate.

[20] Despite the good condition of the road infrastructure and the absence of security checkpoint, because of the mountainous terrain, it took 460 minutes for the authors to drive from Aizawl to Zolkawtar. The average speed was 29.3km/h.

However, the development of "official" border trade is much slower than Moreh/Tamu border.

If the route from Aizawl to Agartala is improved, and the transit trade through Bangladesh is realized, this route will become the shortest land route connecting Myanmar and Kolkata via Northeast India and Bangladesh.

4-3-3. Nampong/Pangsu Route: Stilwell Road

Ledo road was constructed during the World War II by the US army to establish a new strategic route connecting between Ledo in Arunachal Pradesh and Bhamo in Kachin to provide the necessary supplies to China and resistance group against Japanese army in the region[21]. Ledo Road, by connecting to Burma Road at Bhamo, established a strategically important supply route from Ledo to Kunming. Later, Ledo Road was renamed as Stilwell Road by Chiang Kai-Shek to praise the achievement of General Joseph W. Stilwell, who conducted the operation.

Stilwell road passes India/Myanmar border in Nampong/Pangsu, where the bilateral agreement was made to establish border check points. As of today, however, Nampong LCS has not started its operation, and the border is not yet opened for official border trade. As Saharia (2010) points out, reactivation of Stilwell road, including the operationalization of border checkpoints in Nampong and Pangsu, could open wide opportunities for India, Myanmar, and China to explore the full potentials of sub-regional economic integration. Saharia (2010) further claims that "asset value of this existing massive infrastructure of both the countries can be fully utilized by just linking the missing part" by Stilwell Road, based on the fact that both India and China

[21] See Saharia (2010) for the details of Stilwell Road.

have well connected networks of highways and railways up to Ledo and Ruili respectively, and that Myanmar already established strong connectivity from Muse, the counterpart of Ruili, to Mandalay[22], and to Yangon.

Although there are a number of challenges ahead to reactivate Stilwell Road, exactly same as the case of Moreh/Tamu and Zolkawtar/Rhee routes, and there is a need to conduct further study, it is worthwhile putting this initiative on the agenda of regional cooperation. Indeed, "India and China are eager to reopen this road; India wants to open its landlocked northeastern states to trade with China and ASEAN nations, while China is willing to send its products through the same route. Myanmar would be able to reap benefit handsomely from this trade by charging transit fees and gaining spin-off benefits from tourism" (Kyaw Min Htun, *et al*, 2011). This can be a practical way to materialize its "Look East Policy" for India, and to explore the full benefits of MPAC for ASEAN, Myanmar in particular. And for East Asia as a whole, this is a promising way to pursue deepening economic integration and narrowing development gaps, as the enhanced connectivity among Northeast India, Myanmar, and Yunnan would mitigate geographical disadvantages of, and open new opportunities for the region.

4-4. Connectivity between Northeast and Mainland India

4-4-1. Kaladan Multimodal Transit Transport Project

As is well known, one of the main bottlenecks for the economic development of Northeast India is its weak connectivity with other parts of India. As a result of the separation of East Pakistan (now Bangladesh) in 1947[23], the connectivity between Northeast and other part of India was physically narrowed to a 26 km-wide route,

[22] This route is known as New Burma Road. See Kudo (2010) for details.
[23] Later, East Pakistan declared independence as Bangladesh in 1971.

so-called “chicken neck”. After years of disregard, “Government of India lately seriously engaged in addressing the various issues including massive investment in infrastructure development particularly in the areas of communication and road, rail, and air connectivity” (Saharia, 2010).

Kaladan Multimodal Transit Transport (KMTT) Project is one of such initiatives, which was designed to provide an alternative route that connects Northeast India and the mainland India, Kolkata in particular, through Chin and Rakhine in Myanmar[24]. KMTT project includes following infrastructure development: (1) expansion of Sittwe port from the maximum capacity of 4,000 to 7,000 ton; (2) construction of river port in Paletwa; (3) channel dredging of Kaladan River from Sittwe to Paletwa; (4) road construction from Paletwa to Myeikwa at Myanmar-India border (129km)[25]. The government of India provided US$ 76 million for KMTT project, although this does not include the cost for the road construction between Paletwa and Myeikwa.

KMTT project has already commenced, and planned to be completed within a few years to come. As this project is strongly promoted by India, there is no funding problem. Although the size of the project is much smaller than the mega project in Kyaukphyu supported by China, it seems to be adequate considering the size and scope of economic activity in the neighboring region. In addition, a synergy with Kyaukphyu project is expected.

Although physical infrastructure for KMTT project is to be constructed in Myanmar territory, it is of crucial importance to establish necessary institutional arrangement

[24] For further information on KMTT project, see De (2011) and Kyaw Min Htun, *et al* (2011).

[25] The original plan was to use inland waterway up to Kaletwa, 67km north of Paletwa. As it was found that the width and depth of Kaladan River between Paletwa and Kaletwa are not sufficient enough for inland waterway transport, the plan was revised as explained in the text. Based on the interview with Essar, the contractor of KMTT project, in May 2011.

between India and Myanmar in order to reap the full potentials of the project. However, the economic viability of the project is still unclear, probably because the project has been driven primarily by political and strategic motives of India and Myanmar.

4-4-2. Bangladesh transit route

The dependence on "chicken neck" and the expectation on KMTT project in connecting Northeast and the mainland India have roots in the strained relationship between India and Bangladesh. If the transit trade through Bangladesh were allowed with a reasonable level of efficiency, the landscape of this issue would be changed dramatically. Indeed, India and Bangladesh have already reached to an agreement on transit trade through inland waterway (Ganga) in Bangladesh.

In order to facilitate the border trade between Northeast India and Bangladesh, India has established 26 LCSs along the border, of which 20 are already in operation (De, 2011). Among the four states sharing national borders with Bangladesh, namely Assam, Meghalaya, Tripura and Mizoram, Meghalaya is the largest gateway. Northeast India's export to Bangladesh is dominated by raw materials such as coal, limestone, boulders, and agro-horticultural products, while the North India's import from Bangladesh is largely finished products such as cement, synthetic fabric, readymade garments, and processed foods, reflecting weak manufacturing sector in Northeast India. In contrast, Bangladesh, taking advantage of its abundant labor force, has become a global center of garment/apparel industry. The enhanced connectivity between India and Bangladesh, both in terms of physical and institutional, could boost the border trade and open new opportunities for Northeast India to invite some of the production processes related to the manufacturing activity in Bangladesh.

4-5. Connectivity between Myanmar and China: Kyaukphyu project

Kyaukphyu is situated in the north of Rambree Island, Kyaukphyu District in Rakhine State. It is divided into two, the shore and the archipelago. It is situated at 6 feet above the sea level. The group of islands consists of 71 archipelagos. The landscape is not a flat plain. The area of the township is 678.37 square miles or 434,144 acres, which range 54 miles from the east to the west and 90 miles from the north to the south. Kyaukphyu Township is organized with 10 wards including 54 village tracts and 262 small villages. The whole population is about 200,000. Being formed by a group of archipelagos, Kyaukphyu, the small town, has many creeks and rivulets. All rivers and creeks are salinated, and the tide occurs for the whole year round. Thus, water transportation is a single means to access most villages in the township. On the main island of Rambree, where Kyaukphyu is situated, Ram town and other villages of the township can be accessed by road.

4-5-1. Shwe Gas Project

Started in 2000, the Shwe Gas project is led by a consortium of companies carrying out natural gas operations in the Shwe, Shwe Phyu and Mya gas fields situated in Block A-1 and A-3 off the coast of Rakhine State. With 51% of the shares for both blocks, Daewoo International Corporation of Korea is the operator of the project. ONGC Videsh Limited and Gail Limited from India respectively hold 17% and 8.5% of the shares and Korea Gas Corporation holds another 8.5% share. Myanma Oil and Gas Enterprise (MOGE) as the national partner in the Shwe consortium holds 15% share.

The natural gas produced under the Shwe project will be sold to the affiliate of China National Petroleum Corporation (CNPC), and sent to China via a pipeline that will run across Myanmar. The project was started in 2009. Onshore Gas Terminal (OGT) is being constructed near Kyauk Pyu. The construction of OGT was started in 2009 and will be completed in 2013.

4-5-2. Kyaukphyu Deep Seaport

Kyaukphyu Deep Seaport plan is being implemented in the Made Island. A deep seaport with 91 berths will be built to cover for 11 containers, 19 cargo vessels, 39 petrol chemical carriers, 8 repairing ships, 2 cruise liners, and 12 service ships. Kyaukphyu's Deep Seaport is under construction near the town in the Than Zit River on Made Island. The Made Island is situated 8 miles away in the south-east of Kyaukphyu. The island is 3.5 miles long and 2.5 miles wide. According to the records of 1975, it is found that foreign vessels can sail and anchor safely in the sea around Kyaukphyu and the Made Island. It is known that the Myanmar Port Authority has surveyed that the depth of sea is from 105 feet to 158 feet within 35 miles range of the waterway. The water area of the Made Island has 4,000 square feet, so there is sufficient space for anchored ships. Since 1995, the authorized persons as well as domestic and foreign experts have done many surveys, and the best location was selected. That place is fit for the essential requirements for a deep seaport including natural landscape that could protect from heavy cyclones and high tide.

Total length of water front on the port area on the Made Island is 2350 meters and total backup area covered 4390 acres. Least available depth (LOA) is 30 meters, and

800 meters at Southern part of Island will be allocated for Oil and Gas Terminal and 1550 meters at Northern part of Island is allocated for Commercial Deep Seaport.

It is also found that the projects of the Kyaukphyu-Kunming Oil Pipeline, the Natural Gas Pipeline, and the China-Myanmar Economic Corridor are under the arrangement to carry out simultaneously with the deep seaport project. On 31 October 2009, the opening ceremony was held for the beginning of the project of Myanmar-China Crude Oil Pipeline and the Work Boat Wharf. The signing ceremony of MoU for the China-Myanmar Corridor Project was held on 18 May 2010. The corridor would connect with Muse (opposite to Ruili, the Chinese bordr town) and Kyaukphyu. Kyaukphyu Deep Seaport could be berthed by 300,000-ton oil tankers. The project includes a 480-meter long quay, a 150-meter long jetty to allow 5000-ton vessels to berth, a 29.7 kilo meter long waterway, a 600,000-cubic meter water storage tank, and machine facilities as well as constructing buildings.

The construction of the retaining banks at port site on the Made Island has been done. It comes to know that the waterway is being cleared up for the purposes of incoming and outgoing ships. While the deep seaport project is under way, the floor of the Than Zit River is being dredged by machines to make oil tankers access the Indian Ocean. The waterway is essential for the deep seaport. It is known that for the convenience of incoming and outgoing of over 300,000-ton vessels, the shoal and the river bed are being dredged. The task of clearing the waterway is being carried out day and night by dredging ships of Dharty Co. Ltd. Within the area of the Than Zit River, the local people are doing fishing. The early warning has been made by the concerned departments to all fishermen to mark the visible signs in daytime as well as light signals in night time for safety.

The industrial estate will be constructed together with Kyaukphyu Deep Seaport, though the local people do not know yet where the industrial estate would be constructed. It is not started yet until to the date of writing this chapter (October 2011). Foreign and domestic investors are interested in Kyaukphyu Industrial Estate project, so they are preparing to invest in it if it emerges.

4-5-3. Kyaukphyu – Kunming Railway Project

A ceremony to sign a Memorandum of Understanding on Muse-Kyaukpyu rail transportation system project between Myanma Railways under the Ministry of Rail Transportation of the Republic of the Union of Myanmar and China Railway Engineering Corporation of the People's Republic of China was held on 27 May 2011. Also present on the occasion were Vice-President of the Republic of the Union of Myanmar Thiha Thura U Tin Aung Myint Oo, Union ministers, members of Myanmar Investment Commission, Chinese Ambassador Mr Li Junhwa, and President Mr Li Chang Jin of China Railway Engineering Corporation of China and party.

In the presence of the Union Minister for Rail Transportation, Managing Director U Thein Swe of Myanma Railways and Chairman of China Railway International Mr Zhao Deyi, on behalf of China Railway Engineering Corporation, signed the MoU and exchanged notes.

Plans are under way to construct 78.92 miles long railroad, 41 small and large bridges, 36 tunnels in 37.37 miles in total length and seven railway stations on Muse-Lashio railroad section, which will be the first phase of the project. The estimated term of the phase is about three years. The project will take account of environmental issues and protection tasks.

The project of Kyaukphyu - Kunming Railroad is estimated to finish in 2015. The route will pass through the Rakhine State, Magway and Mandalay Regions and Shan State. The railroad is divided into 4 sections. The first section is from Kyaukphyu, Ann to Minbu. The second is from Minbu to Magway to Mandalay. The third is from Mandalay to Lashio to Muse and finally Muse to Jijo in Myanmar-China border area. The construction of the railroad project has not started yet in Kyaukphyu as of October 2011.

4-5-4. Opportunities and Challenges

Kyaukphyu projects will pose opportunities and challenges to both Myanmar and China. First, the natural gas and oil pipline project will bring another large amount of foreign currency to Myanmar. Myanmar currently exports natural gas to Thailand, which accounts for 40-50% of Myanmar's total exports. Myanmar will have another source of foreign currency earnings. The fees for usage of oil pipeline will also bring a considerable amount of foreign exchanges to Myanmar.

Second, on the other hand, China can secure natural gas, which is much needed for its rapidly growing economy. The oil pipeline can reduce China's dependence on the Malacca Straits for its importing oil and diversify its route of sourcing oil from the Middle East and Africa.

Third, the construction of deep seaport will provide an opportunity for Kyaukphyu to develop its own industrial cluster. This possible cluster will be enhanced by better connectivity between Kyaukphyu and Muse, the border town of Yunnan Province of China, by road and railway. China may use this corridor to export its goods to India, the Middle East and Europe via Kyaukphyu Deep Seaport.

However, there are some challenges. First, the impact of the Shwe natural gas on the Chinese economy will be limited. The impact of the oil import through the pipeline to China is also limited. This is because China's energy demand is huge, and the provision of natural gas and imported oil via Kyaukphyu Deep Seaport and pipeline is not large enough to improve the Chinese energy security.

Second, the gas and oil pipelines run through some part where ethnic insurgencies are rampant. The pipelines can be a good target of the ethnic armed groups. The Myanmar military have to tighten the security along the pipelines and this will cost. Moreover, such an action of the Myanmar army may promote militarization in the regions, which may cause human rights abuses.

Third, the proposed industrial estate has less prospects to succeed thus far. The Kyaukphyu area is remote, rural, and less connected with other parts of Myanmar. The deep seaport is not sufficient to create an industrial cluster. How to attract potential investors is a big challenge for the Myanmar government.

Last, but not least, there exists anti-Chinese sentiment among Myanmar local people. This may be related to the way of implementation of big projects of Chinese companies financed by the Chinese government. It is often said that the Chinese companies do everything by their own resources including laborers, and the local firms and people cannot enjoy the related works. Information of the projects is not well disclosed, and so forth. How to cooperate with Myanmar firms and people to implement the big projects is also important for China.

5. POLICY RECOMMENDATIONS

It is important to reconfirm the ultimate goals of enhancing regional connectivity, that is, to facilitate the economic development of ASEAN and East Asia by deepening economic integration and narrowing development gaps. Based on this, we need to have a conceptual framework to streamline various infrastructure projects and institutional arrangements, including ongoing initiatives and those in the pipeline or needed.

5-1. A Regional Framework

A regional framework strategy for the enhancement of ASEAN-India connectivity needs to be designed based on a multi-modal approach, a multi-functional approach, and a multi-tier approach.

First, it is obvious that regional connectivity cannot be completed with a single mode of transportation, implying a need to take a multi-modal approach. As discussed in detail in the last section, a number of infrastructure projects have been proposed and are being implemented in all modes of transportation, namely, land (including road and railways), maritime (including inland waterway transport), and air. In land transport, the completion of the ASEAN Highway Network (AHN), including the upgrading of a weak link along the EWEC between Thingannyinaung and Kawkareik (AH1), and other AHN sections in Myanmar such as Dawei-Kawthaung (AH112), Dawei-Maesameepass (AH123)[26], Chaun U-Kalay (AH1), and Kengtong-Taunggyi (AH2), was adopted as one of the prioritised strategies in the Master Plan on ASEAN Connectivity (MPAC). The

[26] This section is an integral part of MIEC, connecting Dawei and Thai border near Kanchanaburi.

abovementioned sections on AH1 in Myanmar are also identified as integral parts of the trilateral highway connecting Thailand, Myanmar, and India. In addition to the long-waited completion of the Singapore Kunming Rail Link (SKRL), which is also a prioritised project in MPAC, there is another ambitious plan to establish a rail link from India to Hi Chi Minh City crossing the Indochina Peninsular[27]. In maritime transport, the construction of new ports in Dawei, Kyaukphyu, and Pakbara are in the pipeline, and the expansion or upgrading of existing ports, such as Yangon, Sittwe, and Chennai, are identified. Inland waterways along the Kaladan River and Ganga are also expected to play important roles in enhancing the connectivity between the mainland and Northeast India via Myanmar and Bangladesh respectively. In air transport, there are plans to construct or upgrade airports in Chennai and Dawei. Although this is beyond the scope of this report, air transport network is expected to be enhanced by the ongoing initiatives to establish the ASEAN Single Aviation Market (ASAM) and the ASEAN's air transport agreements with its Dialogue Partners including India, China, and Korea. Although all these initiatives are important on their own, it is of crucial importance to pay enough attention to the connectivity between these different modes of transportation.

Second, in order to explore the full potentials of enhanced regional connectivity, physical infrastructure alone is not sufficient enough, indicating a need for a multi-functional approach. Infrastructure for physical connectivity, such as roads, ports, airports, gas pipelines, and power grids, are of course important as necessary conditions. As discussed in the last section, for example, the connectivity between Myanmar and Northeast India has been limited not only by the lack of adequate

[27] See De (2011) and Kyaw Min Htun, *et al* (2011) for details.

physical infrastructure but also by the restrictive institutional arrangement between Myanmar and India, namely the restrictions on the tradable items and the mode of settlement. In order for the success of the comprehensive development plan in Dawei, as the crucial link in MIEC, the timely implementation of transport facilitation agreement in ASEAN is highly important, and it was also agreed by ASEAN Leaders as one of the prioritized strategies in MPAC[28]. A proper enforcement of regional transport agreement would enable logistic service providers to reduce significantly the cost to cross national borders, by saving the money and time for unloading and reloading[29]. In addition, the connectivity of people can be a facilitating factor particularly in the case of border trade. For example, there are various ethnic groups along the border between Myanmar and Northeast India, and some of them share a same language and maintain a strong cultural tie, including trade relationship whichever it is formal or informal. Although they could be sometimes recognized as a discouraging factor for insurgency problems in the border areas, their existing economic relationship can be the basis to expand bilateral trade in the future.

Third, as claimed in the CADP (ERIA, 2010), it is of crucial importance to consider the interactions among the regions in different development stages. In the geographical coverage of this report, there are existing industrial agglomerations such as Bangkok and Chennai (Tier 1). These agglomerations are expected to lead the regional economy by providing large markets of final and intermediate goods and raw

[28] According to MPAC (ASEAN, 2010), "(i)n order to realise the vision of "single market and production base" as envisaged in the AEC Blueprint, ASEAN's connectivity should be enhanced through transport facilitation initiatives to minimise (and eventually eliminate) the frictions at national borders that increase the transactions cost of moving goods between countries in the region. These initiatives include: ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT); ASEAN Framework Agreement on the Facilitation of Inter-State Transport (AFAFIST); and ASEAN Framework Agreement on Multimodal Transport (AFAMT)."

[29] See JETRO (2009) and Ishida (2011) for details.

materials for neighbouring Tier 2 and Tier 3 regions, and by continuously upgrading themselves to be more innovative to expand the frontiers of economic activities in the region as a whole.

Considering the size and their roles in regional production networks, Chiang Mai, Kolkata, Dhaka, and Kunming can be regarded as existing Tier 2 regions, followed by emerging Tier 2 regions such as Yangon and Mandalay. In addition, taking account of the ongoing development plans and geographical location, Dawei, Kyaukphyu, and some cities in Northeast India such as Guwahati are also expected to join into the regional production network as new connecting nodes of regional production networks. The major role of Tier 2 is to be the sources of economic dynamism in the region by attracting production processes from neighbouring Tier 1 or other places through fragmentation, which are suitable to the location advantage of the region. This process of fragmentation would benefit not only Tier 2 by providing new economic activities which includes new employment opportunities, but also Tier 1 by allowing them to focus more on innovative economic activities.

With enhanced connectivity, other regions, conceptually regarded as Tier 3, are expected to expand their economic activities, such as agriculture, mining, and tourism, based on their own location advantages including the endowment of natural and cultural resources, lower wages and rents. Indeed, Myanmar and Northeast India are endowed with natural and mineral resources such as natural gas, oil, coal and limestones, and have potentials as agricultural production base or tourism destination. These opportunities would not be materialized without efficient and reliable connectivity with neighbouring regions.

5-2. Key InfrastructureProjects

Figure 5 visualizes key infrastructure projects to enhance the connectivity between ASEAN and India. As already discussed, there are two main routes, namely the sea route along MIEC and the land route along the Trilateral Highway. Although the designed route of Trilateral Highway ends at Kohima in Northeast India, it is expected to connect to mainland India through the existing national highway network in India via "chicken neck," through the multimodal transport corridor being developed under the Kaladan Multimodal Transit Transport project, or through Bangladesh using its highway network or inland waterway.

As already discussed, development projects in Dawei are of the primal importance for the successful completion of MIEC. Although there is a comprehensive plan including a deep sea port, a special economic zone, highway to Thai border, a power plant, and so on, the actual construction work has just started and will take several years for completion. In addition, there are a lot of challenges to explore the full potentials of the plan, particularly in inviting foreign investment in Dawei. Furthermore, as pointed out by Kumagai and Isono (2011), it is important to establish an effective and efficient institutional arrangement to allow transit transport in Myanmar part of MIEC, that is, between Maesameepass (Thai border) and Dawei. Under the transport cooperation in ASEAN, three framework agreements on transport facilitation are planned to be implemented by the year 2015, with explicit emphasis on the designated transit transport routes (TTRs)[30]. Although this route connecting Kanchanaburi and Dawei is identified as a part of ASEAN Highway Network, it is not included in the "designated" TTRs. As the completion of MIEC is already agreed as one of the

[30] For more details on TTRs and transport facilitation measures in ASEAN, see ERIA Study Team (2010).

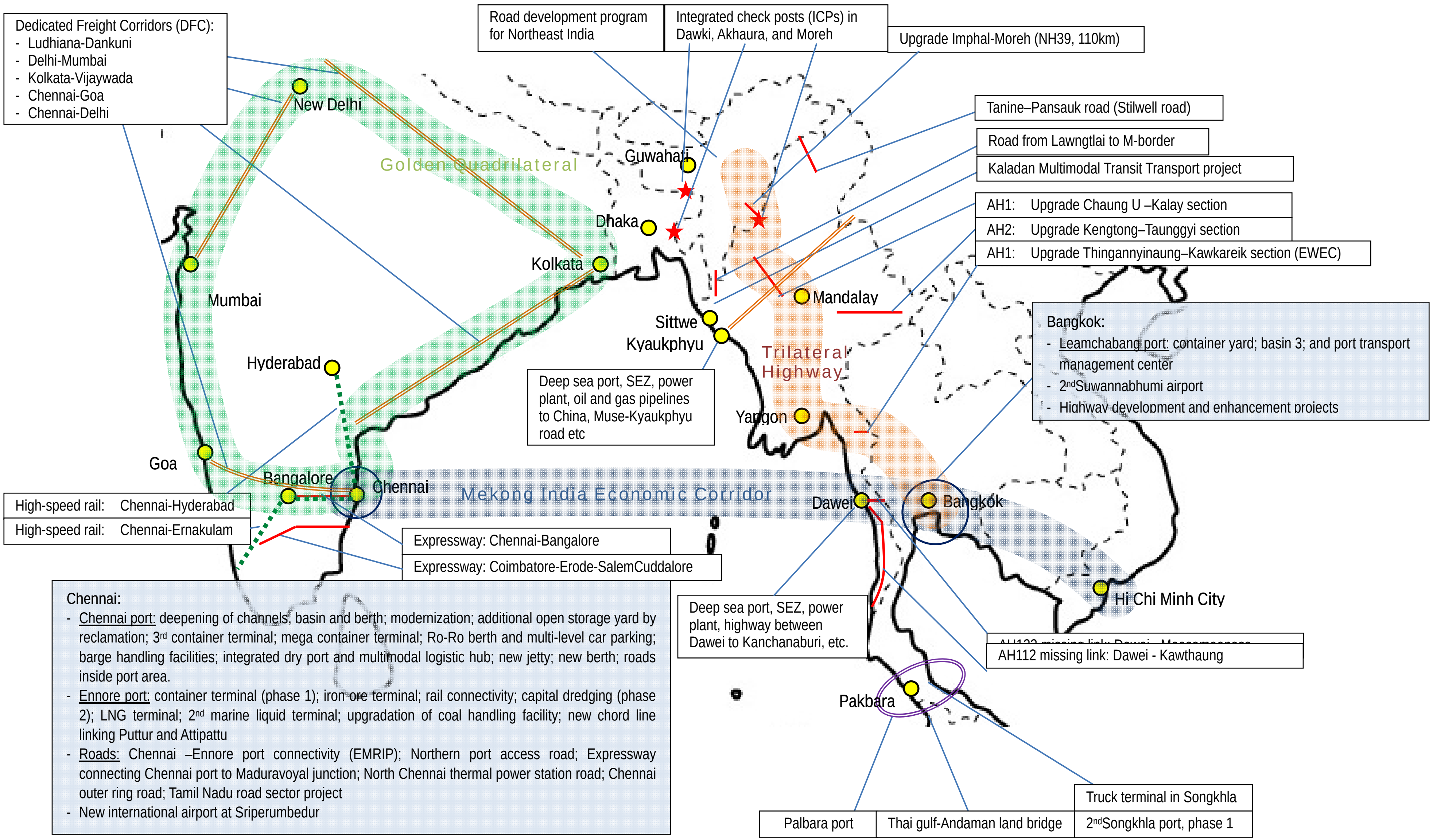
strategic actions in MPAC, this route should be included in the designated TTRs in order to explore the full potentials of the plan. Physical connectivity is necessary, but not a sufficient condition for the success. It should be complemented by an institutional connectivity, that is, a proper institutional arrangement to facilitate cross border movement of goods and services. This in turn would contribute in reducing significantly the service link costs connecting Bangkok and Dawei, and Chennai as well, and facilitating fragmentation of manufacturing activities to Dawei.

On the Indian side, Chennai and surrounding areas have a number of infrastructure projects as well, particularly to expand the capacity of ports and airport, and to enhance the road and rail networks connecting Chennai with other parts of India. Indeed, reflecting the rapid growth of Chennai and surrounding areas, the capacity of Chennai port, including the backyard space, and the access to the port have been identified as key bottlenecks for further development of the region. This problem is well addressed by the planned expansion of ports of Ennore as well as Chennai, and the plan to enhance the connectivity between the two ports. In addition, as Chennai is a growing hub of automotive industry, the planned construction of a Ro-Ro (roll-on, roll-off) berth and a multi-level car parking is expected to have a major impact. With all these infrastructure projects, Chennai and surrounding areas will be well prepared as the gateway connecting ASEAN and India.

In its original design, the identified route of Trilateral Highway is from Bangkok, Nakhon Sawan, Tak, to Mae Sot in Thailand, from Myawaddy, Thaton, Payagyi, Mandalay, Gangaw, Kaleymyo, to Tamu in Myanmar, and from Moleh, Imphal, and to Kohima in India, tracing the Asian (and ASEAN) Highway No.1. As the routes in Thailand and India are already well developed, with an exception that a mountainous section between Moreh and Palel would need moderate repair or upgrading works, the remaining issues are to upgrade physical road infrastructure in Myanmar and to establish effective and efficient institutional arrangement to facilitate cross border trade and transportation.

Along the Trilateral Highway, two sections are highlighted in Figure 5, namely, between Thingannyinaung and Kawkareik (near Thai border), and between Chaung U and Kalay (a section between Mandalay and Indian border). These projects are of urgent importance, not only as integral parts of the Trilateral Highway but also as the trunk route to enhance domestic connectivity in Myanmar. From a regional perspective, in addition to these physical infrastructures, institutional connectivity to facilitate cross border trade and transportation needs to be enhanced under the trilateral cooperation. In this sense, India's plan to establish an Integrated Check Post (ICP) in Moreh is very important.

Figure 5:Selected infrastructure projects for ASEAN-India connectivity



FINAL REMARKS: BEYOND THE DISASTERS

The year of 2011 will surely be remembered as a year of unprecedented disasters in the history of economic development in East Asia. The mega earthquake, tsunami, and the subsequent electricity shortage in Japan severely damaged regional production networks, and the impacts spread not only to other part of Japan, but also to East Asia, and further to the world. In order to recover from the disaster, a number of manufacturing companies reviewed their global strategies, including the restructuring of their supply chain networks. One of the major actions of Japanese companies, not only the global players but also small and medium enterprises, was to upgrade the role of production facilities in Southeast Asia, including Bangkok metropolitan area.

The restructuring process was disrupted by another unprecedented disaster, the massive floods on Thailand in October 2011. A significant area of Thailand, including agricultural areas and several industrial estates, were completely sunk, and a number of manufacturing companies were forced to suspend the production activities due not only to the direct damages from the floods but also to the disruption of supply chains. The disasters are still going on.

To make the matters worse, the global economy has been suffered by the financial crisis in Europe, while the US economy has still been struggling in the recovery from the severe recession for years. As a result, we are observing a sign of slowdown in emerging economies including China and India, which can negatively affect the recovery from the disasters. It will take a long time for the affected people, companies, and regions to fully recover from the damages.

Although not by choice, the disasters have renewed people's perception on the importance of connectivity, including the necessity to have alternative routes and sources of supply to enhance the resiliency of regional production networks. It is risky to depend too much on a specific route or production facilities, although it could be efficient from a short term viewpoint. A longer term perspective, which is of crucial importance, is requiring ASEAN and East Asia to renew and upgrade its commitments for regional cooperation such as the establishment of the ASEAN Economic Community, including the implementation of the Master Plan on ASEAN Connectivity, and the deepening of economic integration and the narrowing of development gaps in East Asia and beyond.

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CHAPTER 2.

DEVELOPMENT AND CURRENT STATUS OF MACHINERY TRADE BETWEEN ASEAN AND INDIA

AYAKO OBASHI

Abstract

The importance of the ASEAN as destination of India's exports of machinery has nearly doubled over the last few years. Meanwhile, the proportion of machinery inthe ASEAN's total imports from India, or India's exports to the ASEAN, has doubled over the last several years though not to the level of the machinery's share for the ASEAN's export side. In relative terms, the ASEAN member states tend to export more machinery parts to and import more finished machinery products from India, compared to two decades ago. In the ASEAN's machinery exports to India, computer parts and accessories and electric integrated circuits are the top two goods. In the ASEAN's machinery imports from India, there was a noticeable surge in the imports of mobile phones in the last several years. Singapore has been a leading exporter and importer in the ASEAN's machinery trade with India, but for the ASEAN's import side, Indonesia has rapidly increased the imports of finished machinery products including mobile phones over the last several years to the level exceeding Singapore in value.

1. INTRODUCTION

This chapter aims at deepening our basic understanding on the development and current status of trade in machinery between the ASEAN member states and India. Bilateral international trade data for the ASEAN and India are examined from variousaspects. Section 2 examines data for the ASEAN's exports to the world by destination and its imports by origin, considering the importance of India as its trading partner. The ASEAN's presence in India's exports to and imports from the world is also considered. Section 3 looks at the ASEAN's exports to and imports from India by industry, with a special interest in machinery. Section 4 focuses on the ASEAN's trade in machinery with India. The ASEAN's machinery exports to and imports from India are broken down by country and by machinery subsector. The final section provides a brief summary of the observed facts on machinery trade between the ASEAN and India and concludes with discussion on the impact of the Nokia's launch of mobile device manufacturing facility in India in 2006 on India's exports of mobile phones to the ASEAN.

2. ASEAN AND INDIA'S EXPORTS TO AND IMPORTS FROM THE WORLD

This section examines data for the total merchandise exports by the ASEAN to the world by destination and its imports by origin to consider the relative importance of India as its trading partner. The same examination is done with the importance of ASEAN in India's total merchandise exports to and imports from the world.

Bilateral export and import data used throughout this chapter are obtained from the United Nations Commodity Trade Statistics Database (UN Comtrade). I have cleaned up raw data obtained from the UN Comtrade as described in Appendix A.1. The ASEAN here includes Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. Due to the scarcity of trade data for the period of interest, Brunei, Myanmar, Cambodia, and Laos are excluded from sample. The dataset covers the years 1990, 1995, and 2000-2009.[1]

2-1. By Export Destination and Import Origin

We begin by examining on how important India is as the ASEAN's trading partner, and vice versa. The upper table of Table 1 shows the proportions of India as destination ofthe ASEAN's total exports and as origin of the ASEAN's total imports in 1990, 2000, and 2009. The figures are reported for exports and imports of all commodities, those of manufactured goods, and those of machinery. For the ASEAN's trade in all commodities, the percentage of India as export destination has doubled from 1.6% in 2000 to 3.3% in 2009 while its percentage as import destination also has doubled from 1.0% in 2000 to 2.1% in 2009. A similar rise in the India's share both as the ASEAN's export destination and import origin can be observed for trade in manufactured goods and that in machinery. Nevertheless, India is still of slight importance both in the ASEAN's exports and imports, with its share as destination and origin limited to 2-3% as of 2009.

[1] ASEAN-India FTA which took effect in January 2010 is beyond the scope of my analysis.

Table 1: The Proportions of India/ASEAN as the ASEAN/India's Export Destination and Import Origin

For ASEAN	India as export destination			India as import origin		
	1990	2000	2009	1990	2000	2009
All commodities	1.3%	1.6%	3.3%	0.9%	1.0%	2.1%
Manufactured goods	1.1%	1.3%	2.7%	0.9%	0.8%	1.7%
Machinery	0.9%	1.0%	2.4%	0.3%	0.3%	0.9%

For India	ASEAN as export destination			ASEAN as import origin		
	1990	2000	2009	1990	2000	2009
All commodities	5.4%	6.5%	10.6%	6.3%	11.0%	9.1%
Manufactured goods	5.3%	5.9%	9.2%	5.7%	9.9%	7.5%
Machinery	12.7%	11.6%	19.2%	6.4%	17.1%	9.9%

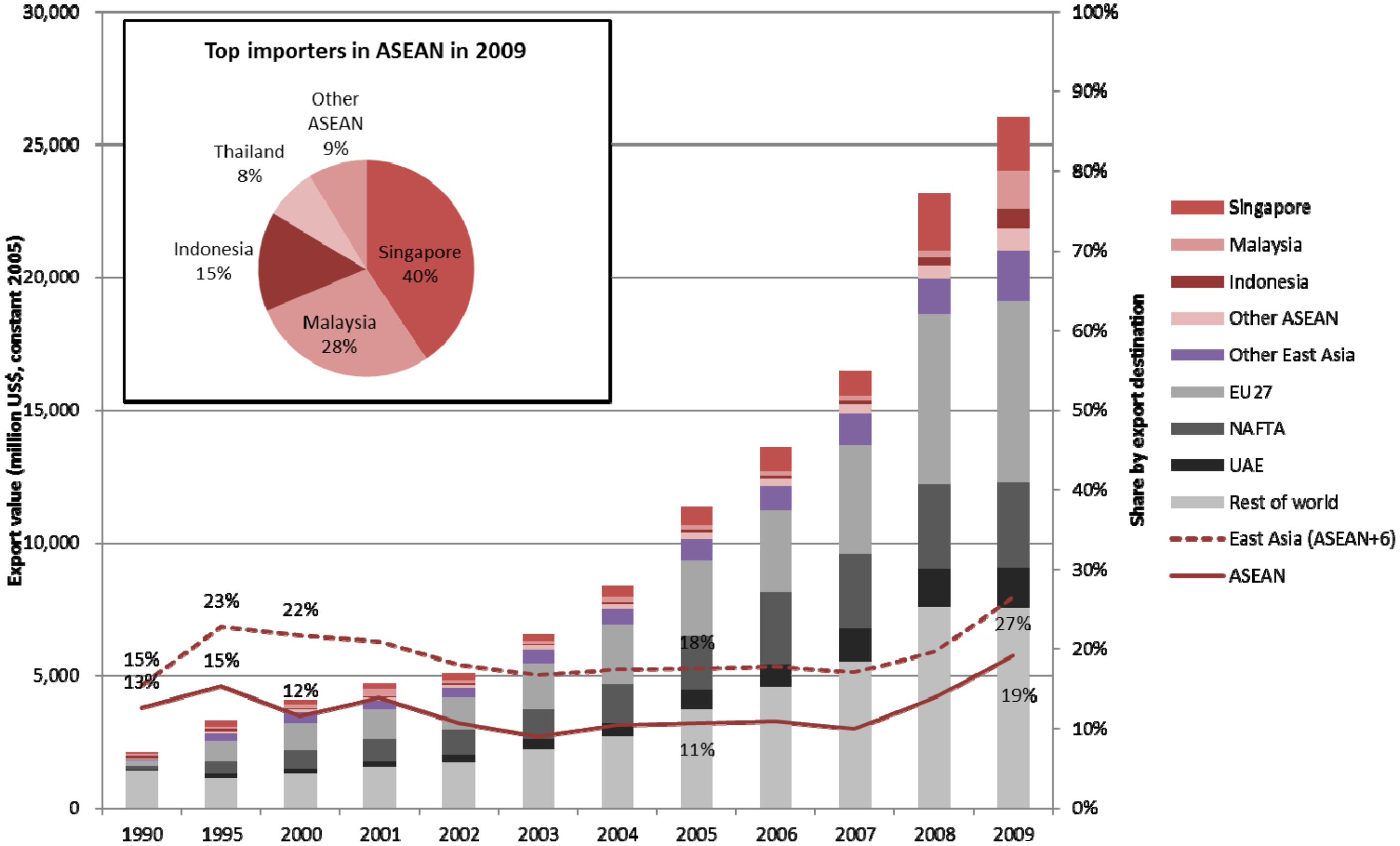
Source: UN Comtrade (export and import statistics for all commodities, manufactured goods (HS28-92), and machinery (HS84-92) reported by the ASEAN member states and India, various versions of the HS classification).

The corresponding figures for the proportion of the ASEAN as India's export destination and import origin are shown in the lower table of Table 1. It is obvious at a glance that the ASEAN becomes relatively more important trading partner for India, compared to the India's importance in the ASEAN's trade. For each of trade in all commodities, that in manufactured goods, and that in machinery, the percentage of the ASEAN as export destination has almost doubled in the last decade though its percentage as import destination has decreased during the same period. The rise in the ASEAN's share as India's export destination is particularly noticeable for exports of machinery. In 2009, about one fifth (19.2%) of India's exports of machinery were destined for the ASEAN member states.

Figure 1 provides a snapshot of the trend in India's exports of machinery by destination in the years 1990, 1995, and 2000-2009. In the stacked bar chart of export values, each export destination country/region is shown in a different color. The solid line chart shows the proportions of the ASEAN as India's export destination, and the dashed line chart shows the corresponding percentages of the East Asian region as a whole, i.e. ASEAN+6.[2] The solid line chart demonstrates that the ASEAN's share as destination of India's machinery exports leaped in just two years. The ASEAN's share of India's machinery exports hovered around 10% from 2002 to 2007 and has doubled form 10.0% in 2007 to 19.2% in 2009. More interestingly, the rise in the East Asia's share of India's machinery exports during the period 2007-2009 was attributed to the increasing importance of the ASEAN as export destination. India has become to export more machinery to the ASEAN member states rather than to China or other East Asian countries. In 2009, the ASEAN's share as destination of India's machinery exports was 19.2%, which was almost three fourth of the percentage of East Asia as a whole (26.5%).

[2] ASEAN+6 consists of the ASEAN member countries, China, Japan, Republic of Korea, India, Australia, and New Zealand.

Figure 1: India's Machinery Exports by Destination

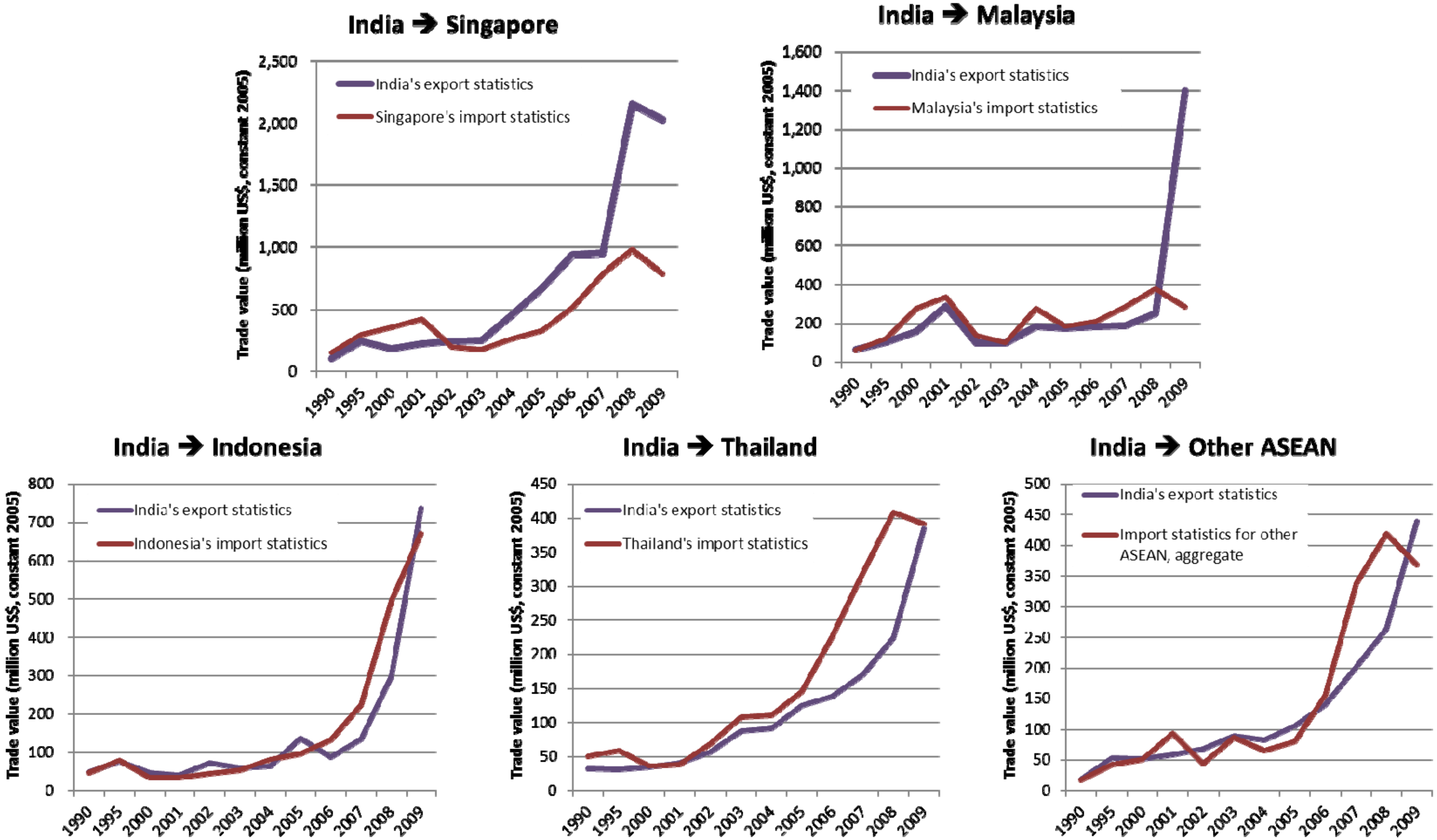


Source: UN Comtrade (export statistics for machinery industry (HS84-92) reported by India, various versions of the HS classification.

Among the ASEAN member states, Singapore has been a major destination country of India's exports of machinery throughout the period of interest except the year 2001, followed by Malaysia and Indonesia. The top destinations in the ASEAN in 2009 are shown in the pie chart in the upper left part of Figure 1. In 2009, 40.6% of India's machinery exports to the ASEAN were destined for Singapore, 28.1% for Malaysia, 14.8% for Indonesia, and the rest for Thailand and other countries.

It should be noted that there was a noticeable surge in India's exports of machinery to Malaysia from 2008 to 2009. Being curious about this surge, we look into the ASEAN's importance in India's machinery exports by comparing data obtained from India's export statistics and the mirror data from the ASEAN's import statistics in Figure 2. The blue line charts show the values of India's machinery exports to the ASEAN member states reported in India's export statistics. The red line charts show the corresponding values of the ASEAN member states' machinery imports from India reported in the ASEAN member states' import statistics.

Figure 2: India's Machinery Exports to the ASEAN Member States: Comparison of Export Statistics with Import Statistics



Source: UN Comtrade (export and import statistics for machinery industry (HS84-92) reported by India and the ASEAN member states, various versions of the HS classification).

In the UN Comtrade database, imports are generally reported on the basis of cost, insurance and freight (c.i.f.), while exports are reported on a freeon board (f.o.b.) basis. This tends to make import values higher than the corresponding export values; however, for Singapore, the export value has exceeded the import value since 2003, and the gap between the values has been widening especially in the last few years. Such a counterintuitive trend is also observed for Malaysia, which has experienced a sudden surgein the export value, unlike in the import value, from 2008 to 2009. The fact that the values reported in export statistics are higher than those reported in import statistics cannot, it seems, be explained only by the differences in the time of recording. Singapore and Malaysia may be recorded as (immediate) destination at India's customs because the ultimate destination market cannot necessarily be specified at the time of export, which leads to the higher values reported in export statistics. In other words, it appears that Singapore and Malaysia have become more important for India as entrepôt trade base.[3] In addition, firms located in special economic zones (SEZ) in India would tend to overstate the values of their exports to be awarded special tax privileges.

3. ASEAN'S EXPORTS TO AND IMPORTS FROM INDIA

This section looks at the ASEAN's total merchandise exports to and imports from India by industry, with a special interest in machinery. Excluding the possible effects

[3] Further discussion on the role of Singapore and Malaysia as enterpôt trade base for India is beyond the scope of this chapter, because of the scarcity of data for re-exports and re-imports. Some of machinery goods exported from India to Singapore or Malaysia may be consumed locally and others may be re-exported back to India, to other ASEAN member states, or to other parts of the world.

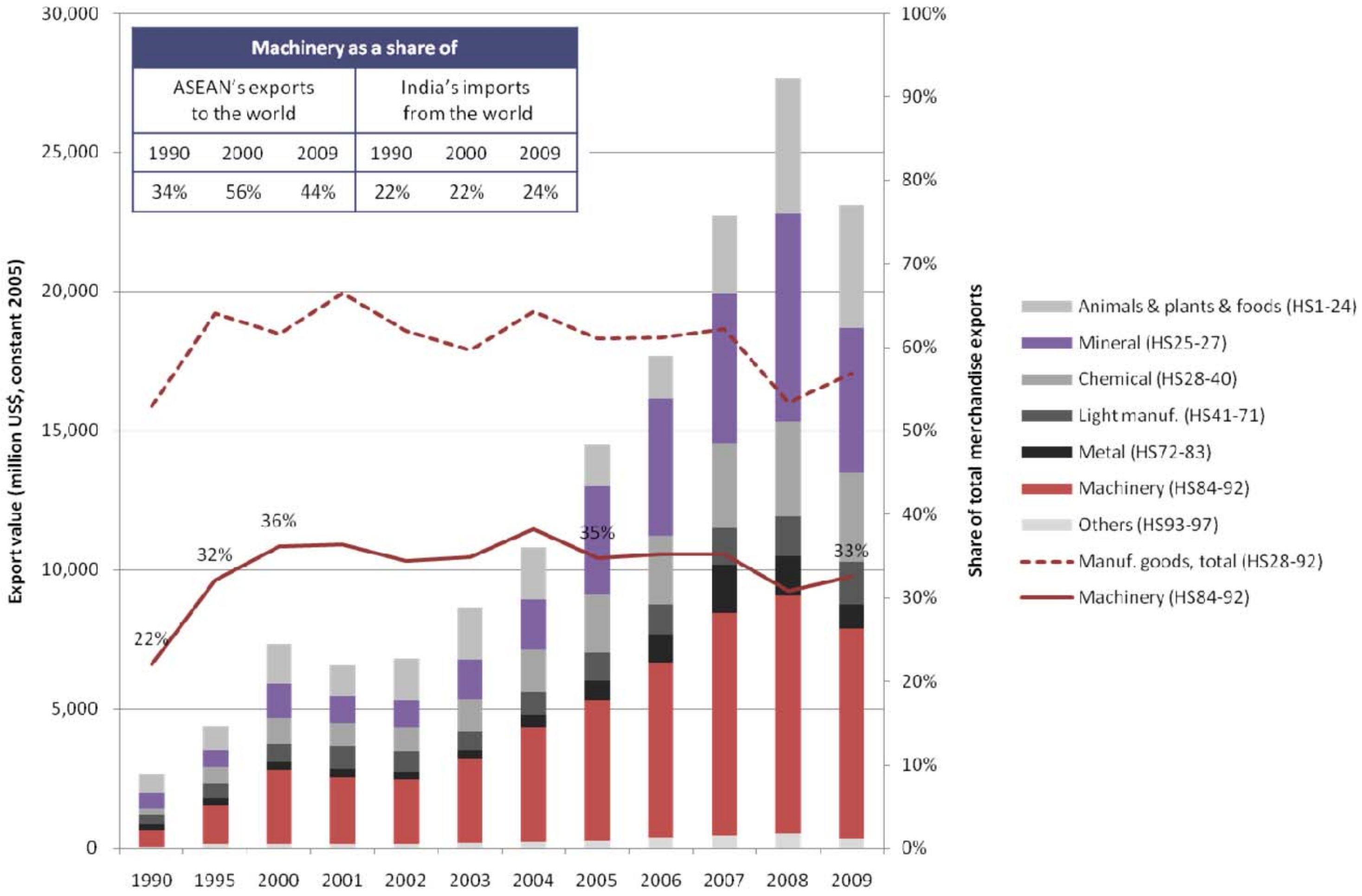
of primary commodity price increases, the section further considers the proportions of machinery in the ASEAN's trade in manufactured goods with India.

3-1. By Industry: All Commodities

A snapshot of the trend in the ASEAN's total merchandise exports to India in the years 1990, 1995, and 2000-2009 is provided in Figure 3. The stacked bar chart shows export values by industry, each industry is represented by a different color.[4] The solid line chart shows the proportions of machinery in the ASEAN's total merchandise exports to India, and the dashed line chart shows the corresponding percentages of manufactured goods including machinery. A substantial portion of the ASEAN's total merchandise exports to India has been accounted for by machinery throughout the period of interest. As shown by the solid line chart, the machinery's share has hovered around 35% over the last decade. In 2009, one third (32.6%) of the ASEAN's total merchandise exports to India were accounted for by machinery. Meanwhile, machinery goods constituted more than half of the ASEAN's exports of manufactured goods to India, which accounted for 56.8% of the total merchandise exports.

[4] The industry classification applied throughout this chapter is explained in Appendix A.1.

Figure 3: Industry Composition of the ASEAN's Total Merchandise Exports to India



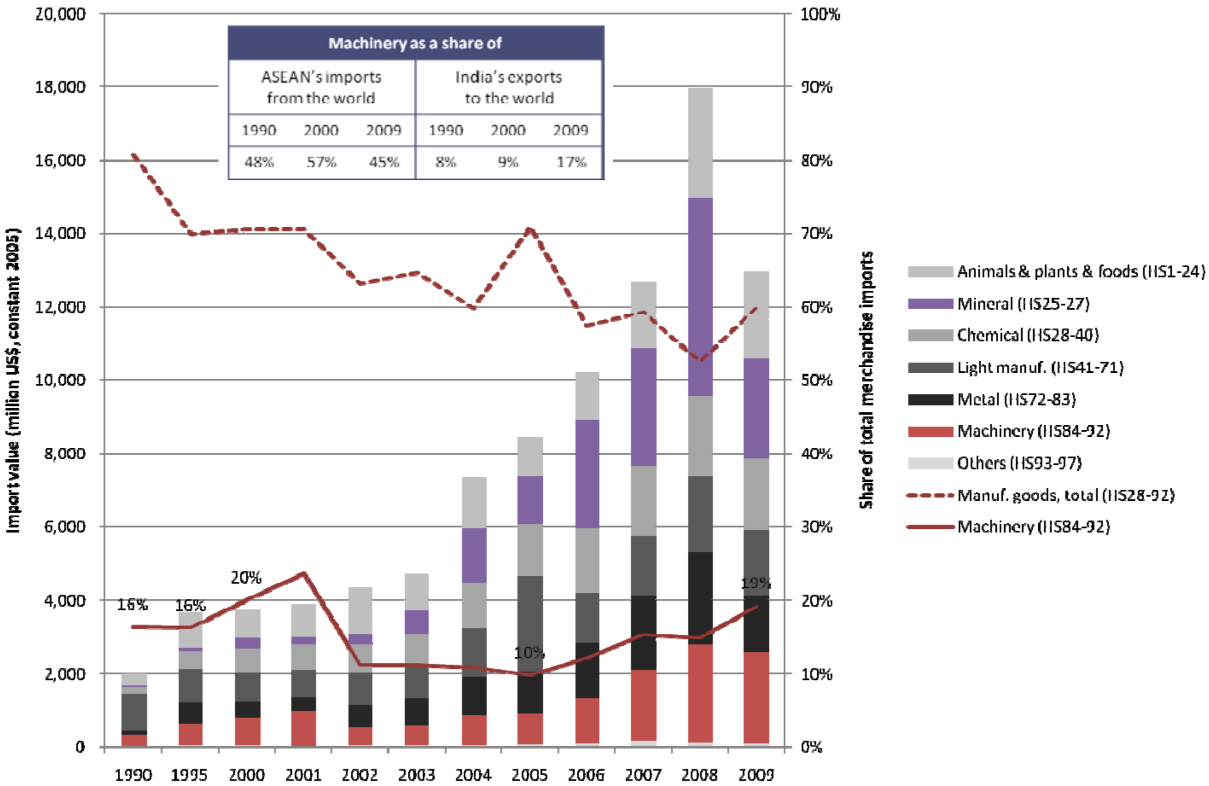
Source: UN Comtrade (export statistics for all commodities reported by the ASEAN member states, various versions of the HS classification).

For a reference, the table in the upper left part of Figure 3 shows the proportions of machinery in the ASEAN’s total merchandise exports to the world and those in India’s total merchandise imports from the world in 1990, 2000, and 2009. The machinery’s share in the ASEAN’s exports to India is limited compared to the ASEAN’s exports to the world, but is higher than in the India’s imports from the world. In 2009, the machinery’s share in the ASEAN’s exports to India (32.6%) was at the level intermediate between the ASEAN’s exports to the world (44.0%) and the India’s imports from the world (24.0%).

Due to crude oil price increases, the ASEAN’s exports of minerals and mineral products to India have increased largely in terms of value since 2004. Likewise, reflecting the worldwide food price increases since 2007, there was a significant increase in the value of the ASEAN’s exports of animals, plants, and foods to India. In spite of the increased export values of minerals and mineral products and that of animals, plants, and foods, it is noteworthy that the ASEAN’s machinery exports to India have increased continuously since 2002, after internet bubble, and the machinery’s share has remained steady at around 35%.

Figure 4 provides a snapshot of the trend in the ASEAN’s total merchandise imports from India, following the same format as Figure 3. The proportion of machinery in the ASEAN’stotal merchandise imports from India reached a peak at 23.7% in 2001 in times of internet bubble. After hovering around 11% for a few years, the machinery’s share has doubled from 9.8% in 2005 to 19.3% in 2009.In the face of crude oil price increases and worldwide food price increases, the ASEAN’s imports of machinery from India have increased significantly after internet bubble, at a pace exceeding the increase in the imports of other industries. In 2009, one fifth (19.3%) of the ASEAN's total merchandise imports from India were accounted for by machinery though the machinery's share is still limited compared to the ASEAN's export side. Machinery goods constituted one third of the ASEAN's imports of manufactured goods from India, which accounted for 60.0% of the total merchandise imports.

Figure 4: Industry Composition of the ASEAN's Total Merchandise Imports from India



Source: UN Comtrade (import statistics for all commodities reported by the ASEAN member states, various versions of the HS classification).

Compared to the ASEAN's export side, the proportion of machinery in the ASEAN's total merchandise imports from India is far below the machinery's share in the ASEAN's imports from the world, but is slightly higher than in India's exports to the world. In 2009, the machinery's share in the ASEAN's imports from India (19.3%) was less than half that in the ASEAN's imports from the world (45.5%), but was slightly above that in India’s exports to the world (16.9%).

In 2005, there was a noticeable surge in the proportion of manufactured goods in the ASEAN’s total merchandise imports from India, which was attributed to a sharp increase in Singapore’s imports of light manufactured goods from India. To be more precise, Singapore sharply increased imports of non-industrial diamonds (jewelry) worked but not mounted or set (No. 7102.39 in the HS 1996 classification) from India in 2005. And then in 2006, Singapore’s imports of jewelry from India returned to the same level as in 2004.[5] Interestingly, Singapore’s jewelry exports to the UAE increased sharply only in 2005 while neither India’s jewelry exports to the worldnor Singapore’s jewelry imports from the world experienced such a sharp increase. It appears that India shipped jewelry to Singapore in order to supply to the ultimate destination market of the UAE only in 2005 though we cannot examine such a possibility becausedata for re-exports by Singapore are not available.[6]

3-2. Machinery as a Share of Trade in Manufactured Goods

Excluding the possible effects on the trade values of crude oil price increases and worldwide food price increases, this subsection further examines relative importance of machinery in trade between the ASEAN and India, by focusing on exports and imports of manufactured goods. The solid line charts in Figures 3 and 4 are modified and combined into Figure 5. The blue bold line chart shows the proportions of machinery in the ASEAN’s exports of manufactured goods to India, and the blue thin line chart

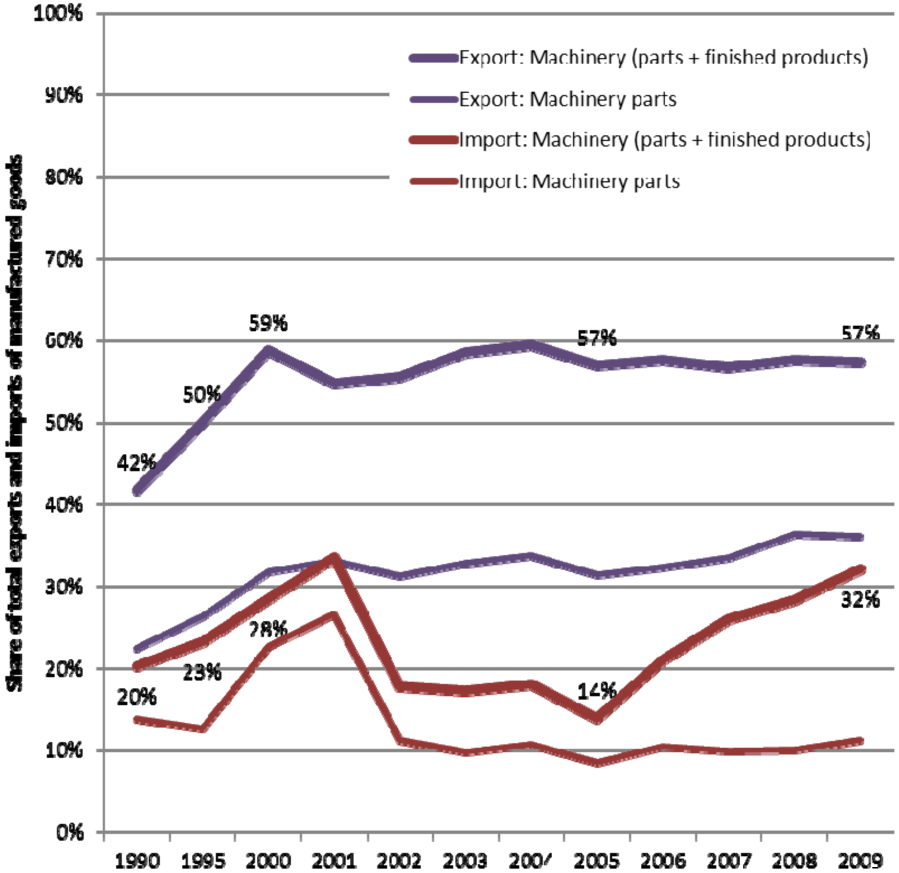
[5] Due to the scarcity of the quantity data, we cannot evaluate the effects of diamond price increases. Also, the surge in Singapore’s jewelry imports from India was not the result of the India-Singapore Comprehensive Economic Cooperation Agreement (CECA) because Singapore’s MNF tariff on goods classified under the category No. 7102.39 had already been zero before its effectuation.

[6] Note, however, that India’s jewelry exports to the UAE rather increased in 2005.

shows the percentages of machinery parts only.[7] Machinery as shown by the blue bold line includes both machinery parts and components and finished machinery products. The red line charts show the corresponding percentages for the ASEAN's imports of manufactured goods from India.

[7] For the details on the definition of machinery parts and components, see Appendix A.1.

Figure 5: Machinery as a Share of Total Exports and Imports of Manufactured Goods: The ASEAN's Exports to and Imports from India



Machinery as a share of (figures in parenthesis are for parts)					
ASEAN's manuf. exports to the world			India's manuf. imports from the world		
1990	2000	2009	1990	2000	2009
53%	69%	62%	33%	30%	40%
(27%)	(43%)	(40%)	(21%)	(15%)	(17%)

Machinery as a share of (figures in parenthesis are for parts)					
ASEAN's manuf. imports from the world			India's manuf. exports to the world		
1990	2000	2009	1990	2000	2009
60%	70%	63%	11%	11%	24%
(32%)	(50%)	(41%)	(6%)	(6%)	(9%)

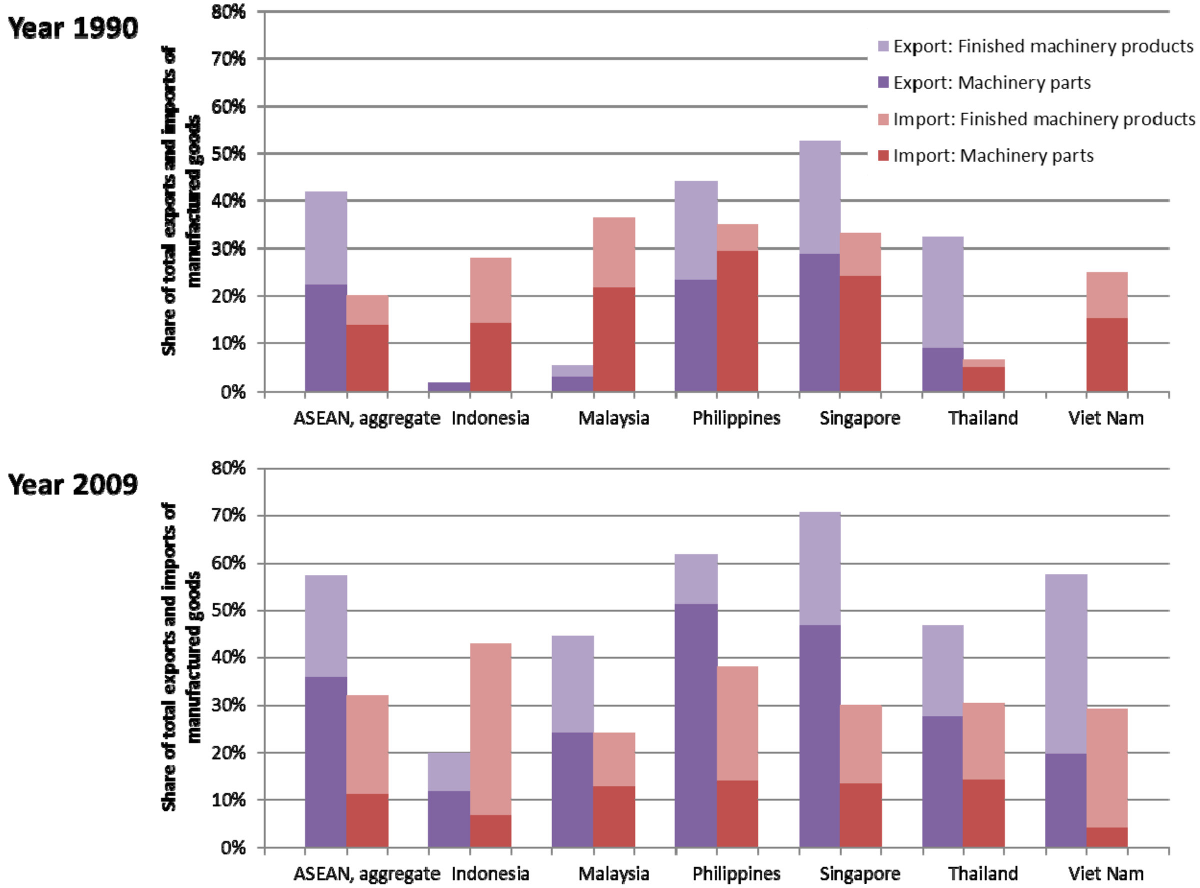
Source: UN Comtrade (export and import statistics for manufactured goods (HS28-92) reported by the ASEAN member states, various versions of the HS classification).

In the ASEAN's exports of manufactured goods to India, the proportion of machinery parts has increased gradually especially in the last several years while the percentage of machinery as a whole has hovered around 57% over the last decade. In 2009, 57.4% of the ASEAN's exports of manufactured goods to India were accounted for by machinery, and about two third of those, 36.1% of the exports of manufactured goods were machinery parts. For the ASEAN's import side, the increase and decrease in the machinery's share in times of internet bubble were largely due to those in the percentage of machinery parts. More noteworthy is a rapid increase in the machinery's share since 2005 as a turning point.[8] Meanwhile, the percentage of machinery parts has remained steady over the last several years. Since the gap between the bold and thin lines equals to the percentage of finished machinery products, the ASEAN has significantly increased relative importance of its imports of finished machinery products from India. The percentage of finished machinery products has quadrupled from 5.4% in 2005 to 20.9% in 2009.

The increased relative importance of machinery parts in the ASEAN's exports of manufactured goods to India and that of finished machinery products for the ASEAN's import side are common features shared among the ASEAN member states. Figure 6 shows the proportions of machinery in the ASEAN member states' exports and imports of manufactured goods to and from India in 1990 and 2009. The blue stacked bars indicate the percentages of machinery in the exports of manufactured goods to India for each ASEAN member state, and the red bars show the import side. For both the red and blue bars, the dark colored portions represent the percentages accounted for by machinery parts and the light colored portions for finished machinery products.

[8] Note that Singapore's jewelry imports from Indiasurged in 2005, which pushed down the percentage of machinery in the ASEAN's imports of manufactured goods from India.

Figure 6: Machinery as a Share of Total Exports and Imports of Manufactured Goods: The ASEAN Member States' Exports to and Imports from India



Source: UN Comtrade (export and import statistics for manufactured goods (HS28-92) reported by the ASEAN member states, various versions of the HS classification).

By comparing the stacked bars between the years 1990 and 2009, it is apparent that each of the ASEAN member states has increased relative importance of its exports of machinery parts to and its imports of finished machinery products from India, with the exception of Malaysia's imports. In addition, the proportions of machinery as a whole have increased simultaneously for the ASEAN member states' exports to and imports from India in the last two decades, with the exception of Malaysia and Singapore's imports.

4. ASEAN'S MACHINERY EXPORTS TO AND IMPORTS FROM INDIA

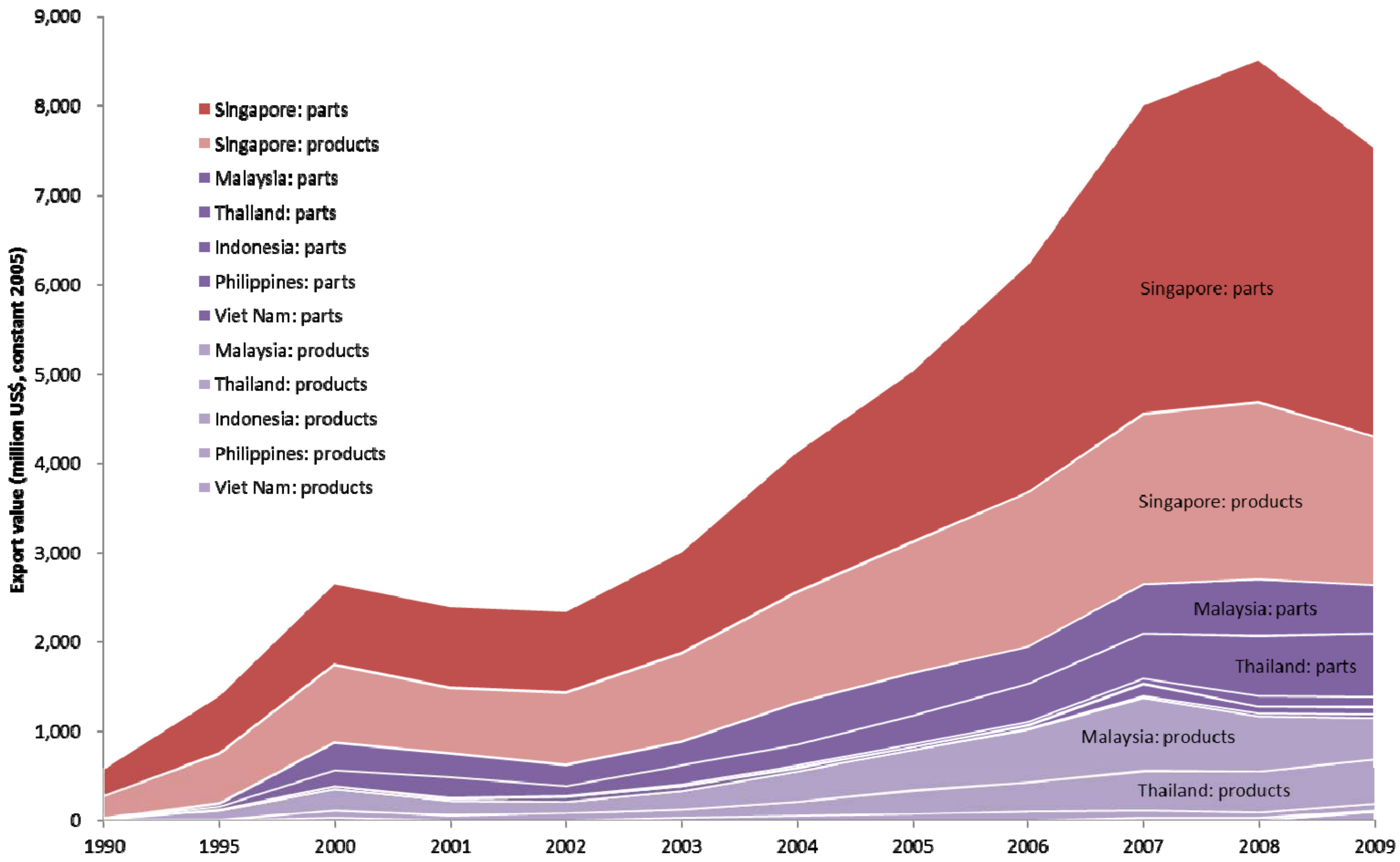
Focusing on the ASEAN's trade in machinery with India, this section looks into the ASEAN member states taking part in the machinery exports to and imports from India. The section also breaks down the ASEAN's machinery exports to and imports from India by machinery subsector.

4-1. By Country and Type of Goods

Figure 7 overviews the trend in the value of the ASEAN's exports of machinery to India by country and by the type of goods, i.e. machinery parts and components and finished machinery products. The dark colored portions, regardless of blue or red, represent the export values of machinery parts and components and the light colored portions for finished machinery products. The area chart indicates that Singapore has been a leading exporter in the ASEAN's machinery exports to India over the last two decades, with a significant increase in the export value of machinery parts in the last several years. Singapore is followed by Malaysia and Thailand. There were noticeable increases in the export values of both machinery parts and finished machinery products for those two countries since 2002. The machinery exports by other ASEAN member states to India are negligible amount of value.

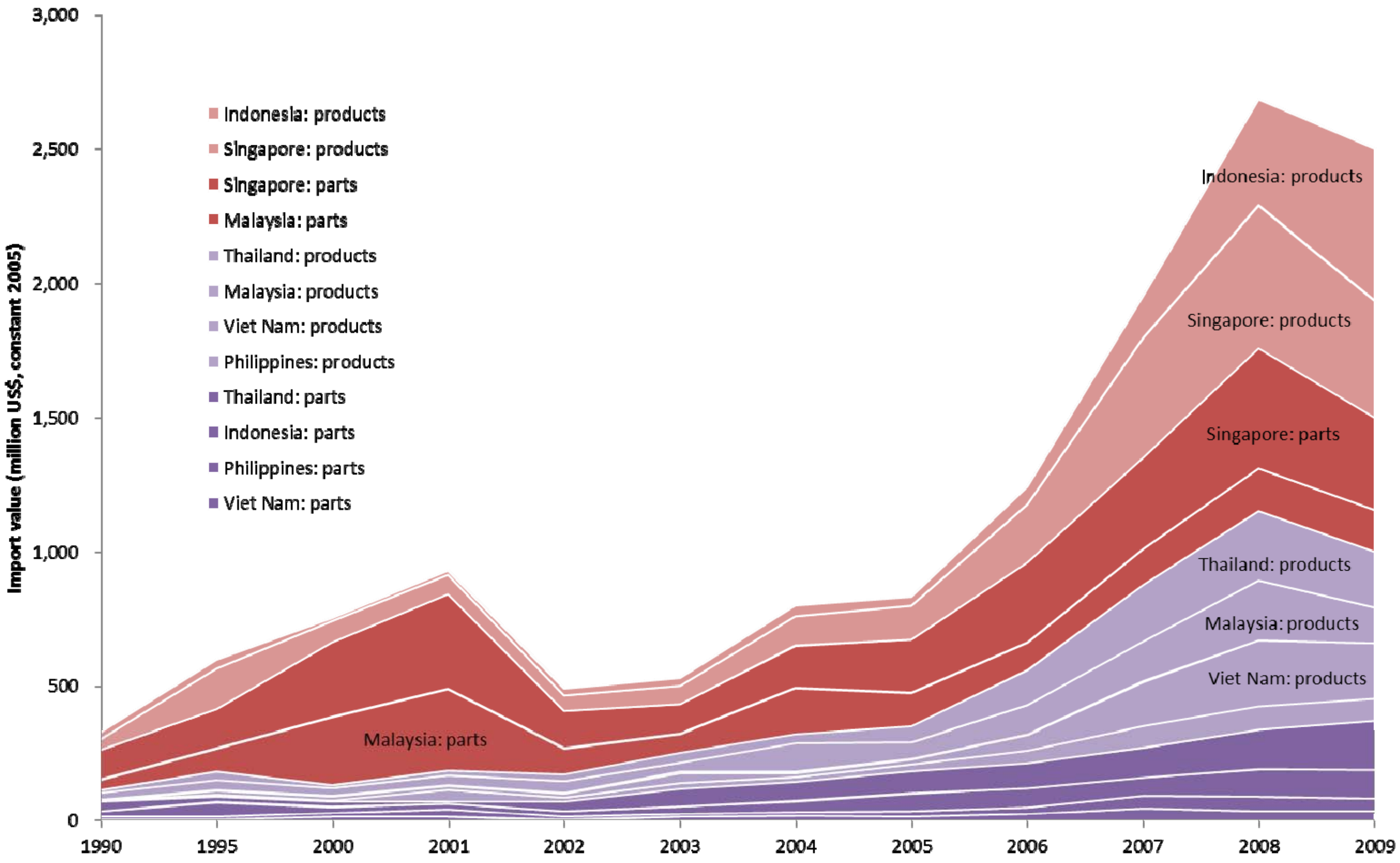
Figure 8 provides the area chart for the ASEAN's imports of machinery from India by country and by the type of goods. As in the export side, Singapore has been a leading importer in the ASEAN's machinery imports from India over the last two decade. It should be noted, however, that Indonesia's imports of finished machinery products from India has increased rapidly since 2006 and exceeded Singapore in value in 2009. Not only Indonesia but also Singapore, Thailand, Malaysia, and Viet Nam have experienced the increase in the import value of finished machinery products since 2005-2006. In contrast, the import values of machinery parts have remained largely unchanged for all the ASEAN member states, except that the parts imports by Singapore and Malaysia increased and decreased in times of internet bubble.

Figure 7: Exporter Country Composition of the ASEAN's Machinery Exports to India



Source: UN Comtrade (export statistics for machinery (HS84-92) reported by the ASEAN member states, various versions of the HS classification

Figure 8: Importer Country Composition of the ASEAN's Machinery Imports from India



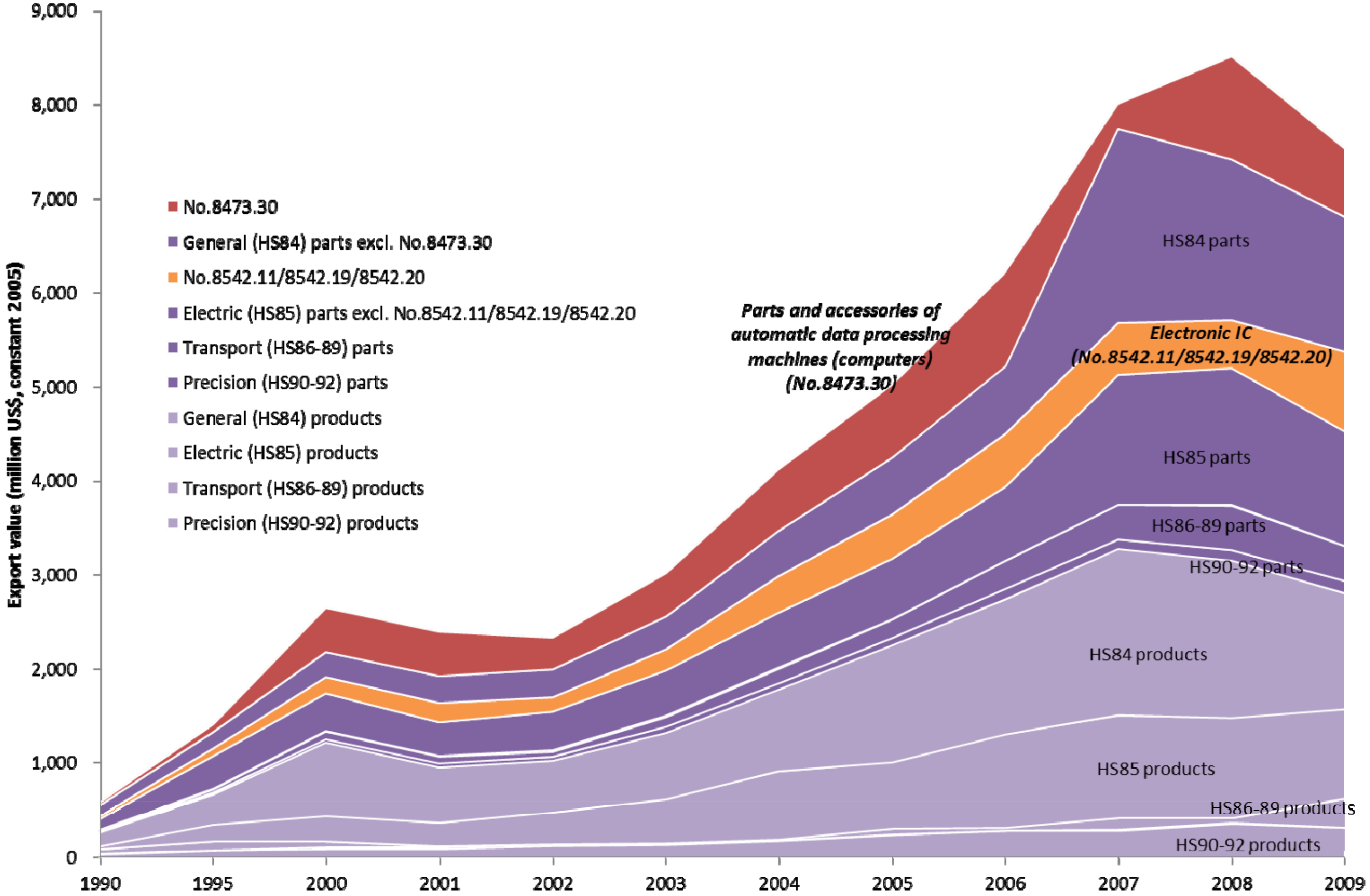
Source: UN Comtrade (import statistics for machinery (HS84-92) reported by the ASEAN member states, various versions of the HS classification).

4-2. By Sector and Type of Goods

As with Figure 7, the area chart of Figure 9 also shows the trend in the value of the ASEAN's exports of machinery to India, but by machinery subsector and by the type of goods.[9] The dark colored portions are machinery parts and components, and the light colored portions are finished machinery products, as before. Machinery is divided into four subsectors, namely, general machinery (HS84), electric machinery (HS85), transport equipment (HS86-89), and precision machinery (HS90-92) sectors. The export values of goods classified under the particular HS commodity codes are excluded from relevant subsectors and are highlighted as independent areas in order to look into the trend in the ASEAN's machinery exports to India.

[9] To examine changes in the commodity composition of exports over time, ideally we would like to use trade data based on a single constant commodity classification, which enables us not to concern about the censoring issue emerging from the complicated mergers and branching of codes due to the update of classification. For this area chart, I therefore used export statistics reported according to the HS 1992 classification, the oldest version. The same applies to Figure 10.

Figure 9: Product Composition of the ASEAN's Machinery Exports to India



Source: UN Comtrade (export statistics for machinery (HS84-92) reported by the ASEAN member states, the HS 1992 classification)

General machinery sector (HS84), followed by electric machinery sector (HS85), has been dominant in the ASEAN's exports of machinery to India and has increased constantly since 2002, after internet bubble. Behind this dominance of general machinery sector, the commodity code No. 8473.30 (parts and accessories of computers) has ranked first in the export value at the HS 6-digit level throughout the sample period except the year 1990, in which No. 8473.30 ranked second after No. 8471.93 (computer data storage units, which are classified as finished products).[10] For the electric machinery sector, electronic integrated circuits have been major exported goods. In the area chart, I united three commodity codes of No. 8542.11, 8542.19, and 8542.20 into an orange portion labeled as electronic integrated circuits.[11] Unlike with general machinery and electric machinery sectors, transport equipment (HS86-89) and precision machinery (HS90-92) sectors are still limited to negligible amount in value, regardless of parts or finished products.

For further reference, Table 2 looks at the details of major machinery goods exported by the ASEAN member states to India in 2009. Goods are listed in descending order of value by country, and the list focuses on the HS 6-digit commodity codes, each of which accounts for more than 10% of the country's machinery exports to India. Only Singapore, Malaysia, and Thailand are included in the list because, as is clear from Figure 7, the other ASEAN member states are negligible in the ASEAN's

[10] No. 8473.30 is defined as "parts and accessories of the machines of the heading No. 84.71, i.e. automatic data processing machines (computers)." More specifically, No. 84.71 is defined as "automatic data processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included."

[11] No. 8542.11, 8542.19, and 8542.20 is defined as monolithic integrated circuits, digital; monolithic digital integrated circuits, except digital; and hybrid integrated circuits; respectively. Although electronic integrated circuits are classified under the heading No. 85.42 regardless of the version of the HS classification, there have been complicated mergers and branching of codes at the 6-digit level. I united the three codes so as to avoid possibly misclassified data due to confusion over the changes in the commodity classification.

total machinery exports to India. For the leading exporter, Singapore, electronic integrated circuits (No. 8542.11/8542.19/8542.20) and parts and accessories of computers (No. 8473.30) ranked first and second, respectively, and the top two goods accounted for one fourth of Singapore's machinery exports to India. The leading goods were computer parts and accessories for Malaysia and electric integrated circuits for Thailand, which suggests that there is the compartmentalization of machinery subsectors between the two countries.

Table 2: Major Machinery Exports from ASEAN to India (2009)

Country	HS codes in the HS 1992 classification	Commodity description	Type	Value (million US$, constant 2005)	Share of the country's machinery exports to India
Singapore	No. 8542.11 /8542.19	Electronic IC	Parts	692	14%
	No. 8473.30	Parts and accessories of automatic data processing machines (computers)	Parts	501	10%
Malaysia	No. 8473.30	Parts and accessories of automatic data processing machines (computers)	Parts	186	19%
	No. 8471.20	Digital computers with CPU and input-output units	Products	115	11%
	No. 8540.11	Color cathode-ray television picture (including video monitor)tubes	Parts	105	10%
Thailand	No. 8542.11 /8542.19	Electronic IC	Parts	129	11%
	No. 8408.20	Engines, diesel, for motor vehicles of Chapter 87	Parts	117	10%

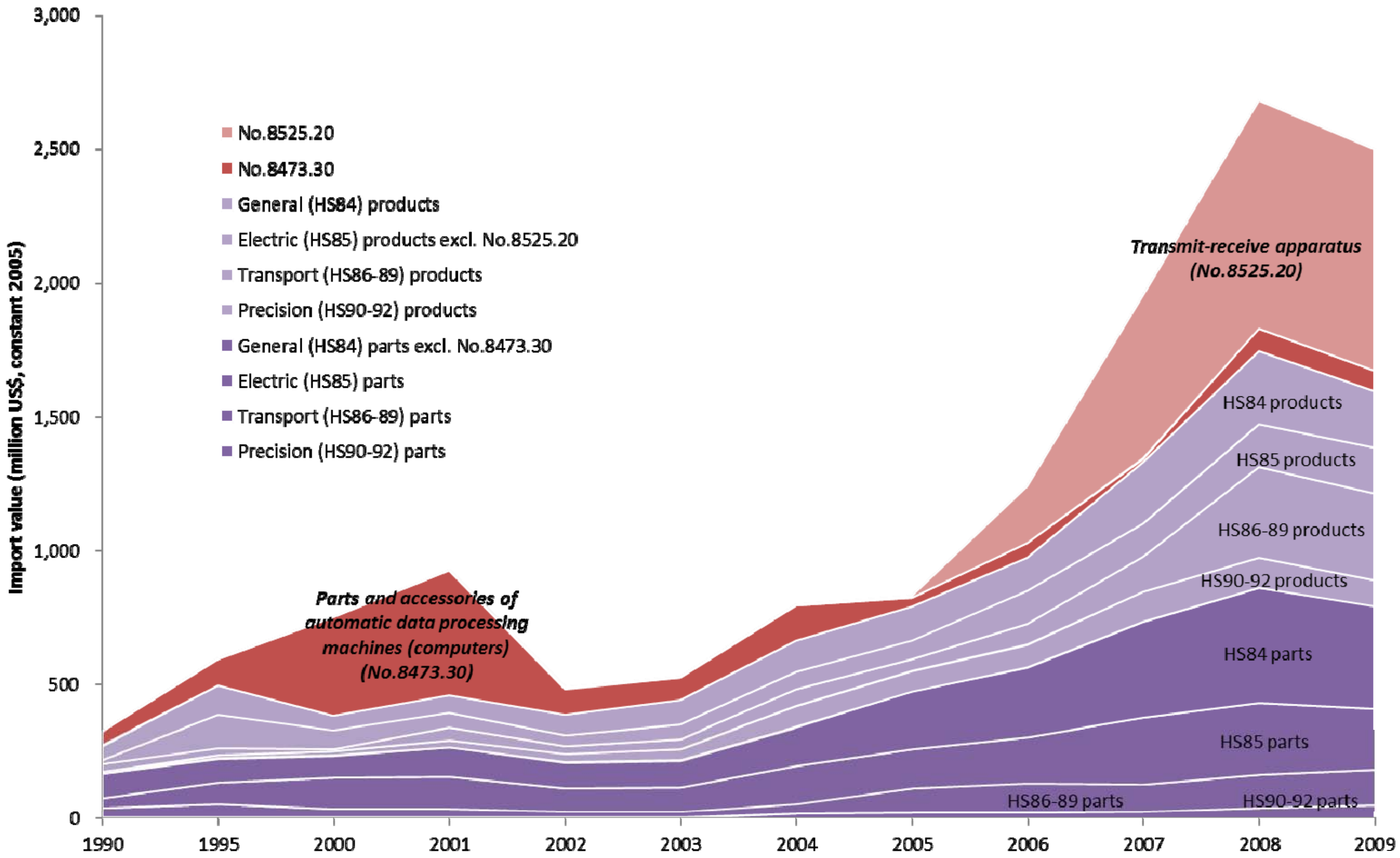
Note: No goods classified under the category No. 8542.20 are exported by Singapore or Thailand to India in 2009

Source: UN Comtrade (export statistics for machinery (HS84-92) reported by the ASEAN member states, the HS 1992 classification).

Figure 10 corresponds to Figure 8 and shows the trend in the value of the ASEAN's imports of machinery from India by machinery subsector and by the type of goods. There are two noticeable changes in the ASEAN's machinery imports from India in the last two decades. First, the increase and decrease of the ASEAN's machinery imports from India in times of internet bubble were due solely to the increase and decrease in the imports of parts and accessories of computers (No. 8473.30). Combined with the observed fact from Figure 8, it appears that Singapore and Malaysia engaged in these increased and decreased imports of computer parts and accessories. Second, the increase in the ASEAN's imports of finished machinery products from India since 2005 was due largely to a dramatic increase in a single commodity code of No.8525.20 (transmit-receive apparatus), which includes mobile phones.[12] Besides the surge in the imports of mobile phones, the ASEAN's imports of finished products of transport equipment (HS86-89) from India have increased significantly in the last few years.

[12] No. 8525.20 is defined as "transmission apparatus incorporating reception apparatus," which includes telephones for cellular networks or for other wireless networks (No. 8517.12 in the HS 2007 classification, the latest version), i.e. mobile phones.

Figure 10: Product Composition of the ASEAN's Machinery Imports from India



Source: UN Comtrade (import statistics for machinery (HS84-92) reported by the ASEAN member states, the HS 1992 classification)

The details of major machinery goods imported by the ASEAN member states from India in 2009 are provided in Table 3. Transmit-receive apparatus including mobile phones (No.8525.20) ranked first for all the non-negligible importers, namely, Singapore, Indonesia, Thailand, Malaysia, and Viet Nam. In particular, more than half (56.6%) of Indonesia's machinery imports from India were accounted for by mobile phones. Similarly, mobile phones constituted a substantial portion of the machinery imports by Viet Nam, Thailand, and Singapore. Besides mobile phones, large-scale vehicles were highly ranked, such as diesel powered trucks (No. 8704.23) for Singapore, dump trucks (No. 8704.10) for Indonesia, and cargo vessels (No. 8901.90) for Viet Nam.

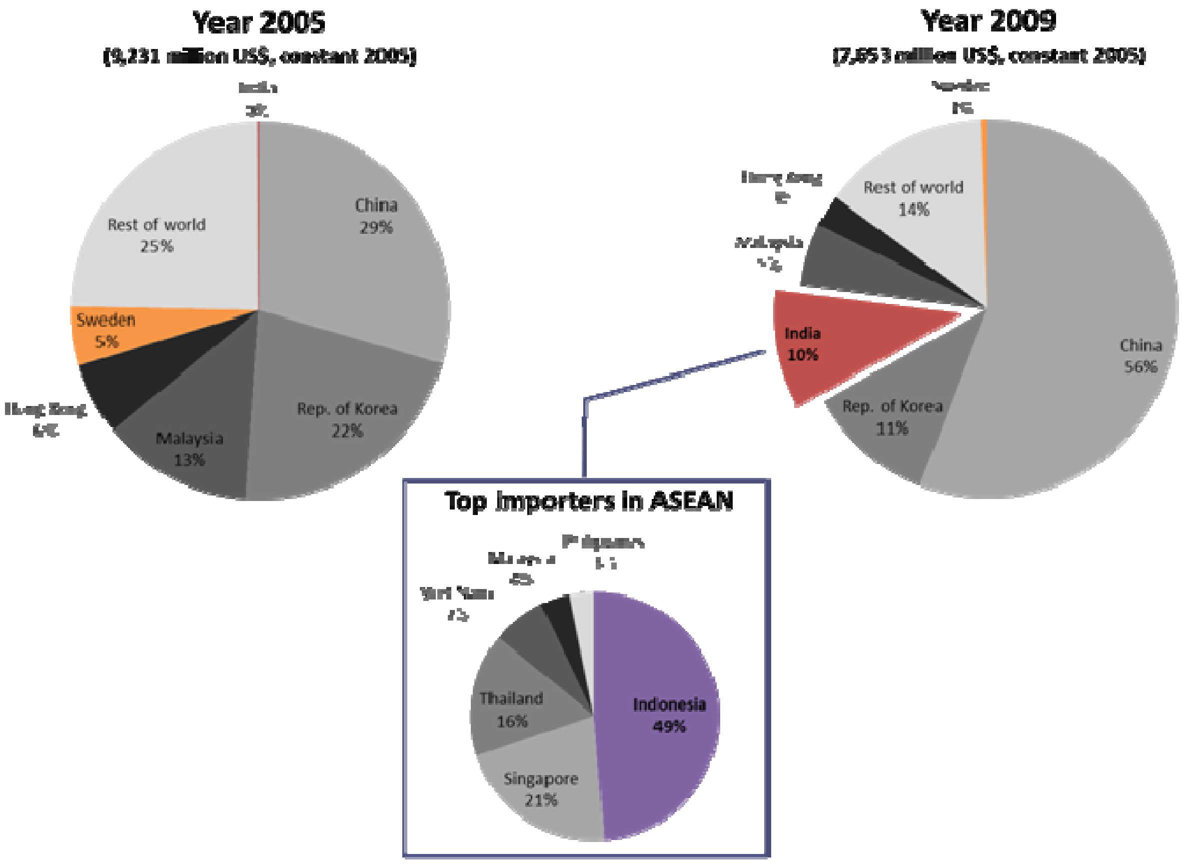
The surge in the ASEAN's imports of transmit-receive apparatus including mobile phones from India is further examined in Figure 11. From the ASEAN's perspective, the proportion of India as origin of its imports of mobile phones has increased sharply from 0.1% in 2005 to 10.2% in 2009. And in 2009, almost half (48.8%) of the ASEAN's mobile phones imports from India were destined for Indonesia, followed by Singapore (21.0%) and Thailand (16.1%). Piecing together these observed facts, it would appear that Nokia India has greatly affected the surge in the ASEAN's mobile phones imports from India.

Table 3: Major Machinery Goods Imported by the ASEAN Member States from India in 2009

Country	HS codes in the HS 1992 classification	Commodity description	Type	Value (million US$,constant 2005)	Share of the country's machinery imports from India
Singapore	No. 8525.20	Transmit-receive apparatus, including mobile phones	Products	163	21%
	No. 8704.23	Diesel powered trucks weighing > 20t	Products	77	10%
Indonesia	No. 8525.20	Transmit-receive apparatus, including mobile phones	Products	379	57%
	No. 8704.10	Dump trucks designed for off-highway use	Products	72	11%
Thailand	No. 8525.20	Transmit-receive apparatus, including mobile phones	Products	125	32%
	No. 8708.40	Transmissions for motor vehicles	Parts	58	15%
Malaysia	No. 8525.20	Transmit-receive apparatus, including mobile phones	Products	30	11%
Viet Nam	No. 8525.20	Transmit-receive apparatus, including mobile phones	Products	101	42%
	No. 8901.90	Cargo vessels other than tanker or refrigerated	Products	75	31%

Source: UN Comtrade (import statistics for machinery (HS84-92) reported by the ASEAN member states, the HS 1992 classification).

Figure 11: Top Import Origins of the ASEAN's Imports of Transmit-receive Apparatus (No.8525.20)



Source: UN Comtrade (import statistics reported by the ASEAN member states, the HS 1992 classification)

Nokia set up its mobile device manufacturing facility (Nokia Telecom SEZ Park) in Chennai, India, in January 2006. Nokia was the first global telecom company to launch a manufacturing plant for mobile phone handsets in India. Initially aimed to serve the demands of the rapidly growing India's domestic market, approximately half of the current production of the Nokia's Chennai facilities consumed domestically and the rest is exported to 100 countriescovering six continents.[13] Indonesia has been

[13] On May 5, 2011, Nokia announced that its manufacturing facility at Chennai has achieved production of 500 million mobile phone handsets after five years of its operations. Nokia's Chennai facility is based on the Nokia's global standards and can manage the production of all types of Nokia's handsets from low-end to high-end phones. For more information, see the webpage of

ranked as one of the top 10 major markets of Nokia, in terms of net sales, in spite of the fact that Nokia has no mobile device manufacturing facility in Indonesia. On another front, in Indonesia, Nokia has the largest market share, about 60%, for mobile phone sales.

5. CONCLUSION

This chapter has overviewed the development and current status of trade in machinery between the ASEAN and India. The observed facts are summarized as follows. First, the relative importance of the ASEAN as destination of India's exports of machinery has nearly doubled over the last few years; in 2009, almost one fifth of India's machinery exports were shipped to the ASEAN. Second, the proportion of machinery in the ASEAN's total imports from India has doubled over the last several years though not up to the level of the machinery's share for the ASEAN's export side. The increase in the machinery's share was due solely to the increased imports of finished machinery products by the ASEAN from India. Meanwhile, in the ASEAN's exports to India, the proportion of machinery parts has gradually increased over the last decade. Third, the ASEAN member statescentering on Singapore have become to export more machinery parts including computer parts and accessories and electric integrated circuits to India. On the other hand, the ASEAN member states have significantly increased imports of finished machinery products including mobile phones from India in the last several years, which is especially true for Indonesia and

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Nokia India:http://www.nokia.co.in/about-nokia/company/manufacturing-in-india.

Singapore.

What is interesting about the last point is that the Nokia's launch of mobile device manufacturing facility in India appears to greatly affect the volume of transactions between India and the ASEAN member states. The global production strategy of a single company could shape trade patterns between two countries with weak trade relationships. Such a Nokia's impact on the ASEAN's machinery imports from India would suggest that developing economies like India ultimately need to take serious and effective measures to attract foreign firms in order to enhance trade relations with other countries. Indeed, on its webpage, Nokia India announced high expectations regarding investment climate in Chennai. Due to the availability of skilled labor, support from the state government, and the existence of good logistics connections, Chennai was selected as the location for the Nokia's manufacturing facility. In addition to having a great impact on India's exports of mobile phones to the ASEAN, the Nokia's launch of mobile device manufacturing facility appears to serve as the catalyst for industrial development in Chennai. Other electronic manufacturing companies have announced to plan to invest in Chennai since the Nokia's launch. In the meantime, the Nokia Telecom SEZ Park houses five global component suppliers as of May 2011, creating employment opportunities exceeding 25,000. Domestic component suppliers and service providers are also expected to take part in and gain benefit from this emerging industrial agglomeration.

APPENDIX

A1. Data description

I used international trade data, obtained from the UN Comtrade online database, at the 6-digit level of the Harmonized System (HS) commodity classification, which is the most detailed disaggregated level of trade data that is both internationally comparable and publicly available. At the HS 6-digit level, since the annual data below $500 (current US$) are not reported before 2000, trade flows below $500 are treated as if there was no trade at all for all the years in the sample. After the cutoff value of $500 is applied, all trade data are deflated by the consumer price index (CPI) in the United States to obtain a constant dollar series. Versions of the HS classification vary by country and by year (see Table A1). Basically, I used data based on the latest version of the HS classification as reported in the UN Comtrade.

As for the Philippines' exports and imports in 1990 and 1995 and Viet Nam's exports and imports in 1990, 1995, and 2009, I used mirror data with appropriate modification. For example, to estimate the value of bilateral imports by the Philippines, the observed value of the corresponding bilateral exports by the trade counterpart is multiplied by 1.05. The multiplier 1.05 is employed as a proxy to adjust export values on an f.o.b. basis to import values on a c.i.f. basis, following Ando (2006).

As for the industry classification, the HS 2-digit tariff lines are classified into seven broad categories. The aggregated seven industries include animals, plants, and foods (HS1-24); minerals and mineral products (HS25-27); chemicals and chemical products (HS28-40); light manufactured goods (HS41-71); metals and metal products (HS72-83); machinery (HS84-92); and other products (HS93-97). The details of the industry classification are summarized in Table A2. Manufactured goods range from HS28 to HS92.

Table A1: Versions of the HS Classification Employed by the ASEAN Member States and India

	1900	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Indonesia	HS1992	HS1992	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996
Malaysia	HS1992	HS1992	HS1996	HS1996	HS2002	HS2002	HS2002	HS2002	HS2002	HS2002	HS2002	HS2007
Philippines	..	..	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS1996	HS2002	HS2002	HS2002
Singapore	HS1992	HS1992	HS1996	HS1996	HS2002	HS2002	HS2002	HS2002	HS2002	HS2007	HS2007	HS2007
Viet Nam	..	..	HS1996	HS1996	HS1996	HS1996	HS2002	HS2002	HS2002	HS2002	HS2007	..
Thailand	HS1992	HS1992	HS1996	HS1996	HS2002	HS2002	HS2002	HS2002	HS2002	HS2007	HS2007	HS2007
India	HS1992	HS1992	HS1996	HS1996	HS1996	HS2002	HS2002	HS2002	HS2002	HS2002	HS2002	HS2007

Source: UN Comtrade

Table A2: Industry Classification based on the HS Classification

Category of industry	Subcategories
Animals, plants and foods (HS1-24)	Live animals; edible products of animal origin (HS1-5) Live plants; edible vegetables and fruits; vegetable products (HS6-14) Animal or vegetable fats and oils (HS15) Edible preparations; beverages; tobacco (HS16-24)
Minerals and mineral products (HS25-27)	
Chemicals and chemical products (HS28-40)	Chemicals and chemical products (HS28-38) Plastics and articles thereof; rubber and articles thereof (HS39-40)
Light manufactured goods (HS41-71)	Raw hides and skins; leather and articles thereof; fur skins and fur products (HS41-43) Wood and articles thereof; wood charcoal; cork and articles thereof; straw and esparto products (HS44-46) Pulp, paper, and paperboard and articles thereof; products of printing industry (HS47-49) Textile fibers; yarn; textile and woven fabrics; articles of apparel and clothing accessories (HS50-63) Footwear; headgear; umbrellas and sticks (HS64-67) Articles of stone, plaster, cement, asbestos and mica; ceramic products; glass and glassware (HS68-70) Natural or cultured pearls, precious or semi-precious stones (HS71)
Category of industry	Subcategories
Metals and metal products (HS72-83)	
Machinery (HS84-92)	Machinery and mechanical appliances and parts thereof; electrical machinery and equipment and parts thereof (HS84-85) Vehicles and parts thereof; aircraft, spacecraft, and parts thereof; ships, boats and floating structures (HS86-89) Optical, photographic, cinematographic, measuring, checking, precision, medical instruments; clocks and watches and parts thereof; musical instruments and parts and accessories thereof (HS90-92)
Other products (HS93-97)	Arms and ammunition and parts and accessories thereof (HS93) Miscellaneous manufactured articles (HS94-96) Works of art, collectors‘ pieces and antiques (HS97)

Source: UN Comtrade

Machinery here includes all the goods classified as part of general machinery (HS84), electric machinery (HS85), transport equipment (HS86-89), and precision machinery (HS90-92) sectors. For this product group, we grouped the HS commodity codes into parts and components and finished products. As for the definition of machinery parts and components applied here, see Kimura and Obashi (2010). Kimura and Obashi provide the lists of machinery parts and components at the HS 4-digit and 6-digit levels for various versions of the HS classification, which are the modified versions of the list originally proposed by Ando and Kimura (2005).

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CHAPTER 3.

ASEAN-INDIA CONNECTIVITY: AN INDIAN PERSPECTIVE[1]

PRABIR DE

Abstract

Effective and efficient infrastructure is essential for industrial and services competitiveness. Improved connectivity lowers costs and increases reliability. This is of great importance for industrial transport and thus for production, cost effectiveness and reliability of supply. In absence of adequate connectivity, enormous opportunities generated by the dynamic growth centres of Asia may stop at their international borders. This study discusses challenges and opportunities in physical connectivity between ASEAN and India. It makes some important recommendations for enhancing physical connectivity between them. The study suggests that for the creation of a functional single market in Asia it is necessary to overcome missing links in transport corridors, lack of inter-operability and infrastructure gaps reducing the efficiency and weakening the global competitiveness of the Asian industry.

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1. WHY IS ASEAN-INDIA CONNECTIVITY SO IMPORTANT?

Connectivity promotes trade, brings people closer, and integrates the economies. We dream for a cherished world in which countries exchange goods, factors and ideas without barriers. Openness or globalization is potentially beneficial to all but requires appropriate policy designs to realize it. Improving connectivity is essential for the region's prosperity, continued growth and, most importantly, poverty reduction.[2]

Effective and efficient infrastructure is essential for industrial and services competitiveness. Improved connectivity lowers costs and increases reliability. This is of great importance for industrial transport and thus for production, cost effectiveness and reliability of supply. Undoubtedly, distance is exogenous, and it is a major determinant of a region's trade prospects. In absence of adequate connectivity, enormous opportunities generated by the dynamic growth centres of Asia may stop at their international borders. Trade and connectivity between India and ASEAN may be seen in this perspective.

In 2010, the East Asia Summit (EAS) countries adopted a comprehensive strategy for smart, sustainable and inclusive growth.[3] At the 17th ASEAN Summit in 2010, the leaders adopted the *Master Plan on ASEAN Connectivity*, which identifies key strategies and actions to enhance the region's connectivity in three dimensions: physical, institutional, and "people-to-people".[4] It shows the way ahead for Asia in regional integration. The Asia's aim to single market would depend on the existence of a seamless, flexible and efficient logistics and transportation system. Today, it is fragmented, and often it is an obstacle to free flow of goods and services, because of the administrative or technical barriers resulting in expensive mobility within Asia.

In the rail sector, track gauges, voltage and signaling systems differ from one country to another. Similarly, in the road sector, highway lanes, lighting system and quality of roads differ across countries in Asia. The port facilities in some countries are well equipped with technical and electronic equipment, whereas ports in many

[2] There are both short run and long run benefits of better connectivity. The literature confirms that the long-term impacts of connectivity are several times greater than those in the short-run. In the short-run, the benefits of regional connectivity emanate from reductions in transport cost and time, and increases in trade volumes. However, in the long-run, regional connectivity helps to unlock the tremendous potential of the region by removing constraints and bottlenecks to growth.

[3] Refer, Comprehensive Asia Development Plan (CADP), prepared by ERIA, August 2010.

[4] Refer, ASEAN Summit Declaration, October 2010.

countries in the region still belong to the ancient period and are far away from automation and modernization. While runways in some airports accommodate bigger airplanes, most of the Asian airports lack basic aviation infrastructure. For creation of a functional single market in Asia, it is necessary to overcome the missing links in transportation, the lack of inter-operability and infrastructure gaps reducing the efficiency and weakening the global competitiveness of the Asian industry.

The strong growth of the Indian economy has already made a significant impact on the Asian economy. A considerable part of Asia's supply of primary goods originates from India. India sources intermediate goods and natural resources from Asia. Therefore, growth is strong, and the netex port values are very important for Indian as well as Asian economy. Asia's supply of strategic resources and goods is a vital issue and, therefore, should be given greater attention.

India's trade, primarily due to FTAs, is expected to increase manifolds in the coming years. ASEAN-India FTA is central to India's growing engagement with her eastern neighbours. Accompanying this growth will be an increase in the demand of both national and international infrastructure, for both production and consumption, and international trade purposes. Undoubtedly, failure to respond to this demand will slow down India's trade and hamper the growth process. Therefore, infrastructure challenges, both hardware and software, require a better understanding and adequate support.

In order to deepen economic integration among East Asian countries, the Economic Research Institute of ASEAN and East Asia (ERIA) conducted a series of research projects in 2009 to develop a Comprehensive Asia Development Plan (CADP) in response to the request from the East Asia Summit (EAS)[5]. The CADP provides (i) a grand spatial design for infrastructure development in East Asia armed with a consistent conceptual framework based on new waves of international trade theory such as the fragmentation theory and new economic geography, (ii) simulation analyses on the impacts of logistic enhancement to the region, using the Geographical Simulation Model (ERIA/IDE-GSM), and (iii) a list of prospective infrastructure projects in consistence with the aforementioned conceptual framework.

Although the CADP has successfully fulfilled the initial mission, there still

[5] The final report of CADP was submitted to the East Asia Summit in October 2010. The report is available at ERIA, www.eria.org. Refer, ERIA research project report 2009, No. 7-1, October 2010.

remain a number of issues which require further studies. Out of these outstanding issues, a study to develop a basic strategy to enhance the ASEAN-India connectivity is selected as one of the sub-project under phase 2 of the CADP. As explicitly stated in the Master Plan on ASEAN Connectivity[6], ASEAN put an emphasis on connectivity with the neighboring countries, including China, India, and other EAS countries. While both China and India are the emerging economic superpowers in the region and the immediate neighbors to ASEAN, the extents of the connectivity with ASEAN differ significantly.

The benefits of better connectivity are plenty for both India and ASEAN. For example, with better connectivity, both India and ASEAN can infuse new dynamism in the regional production network. Stronger production network would enhance the trade and investment, and thereby deepen the East Asian integration process. To sustain the regional production network, we need to improve the trade costs and country's comparative advantage in trade. The catalyst to regional production network is the lowering trade costs. In the long-run, ASEAN-India connectivity would help to unlock the tremendous potential of the region by removing constraints and bottlenecks to growth.

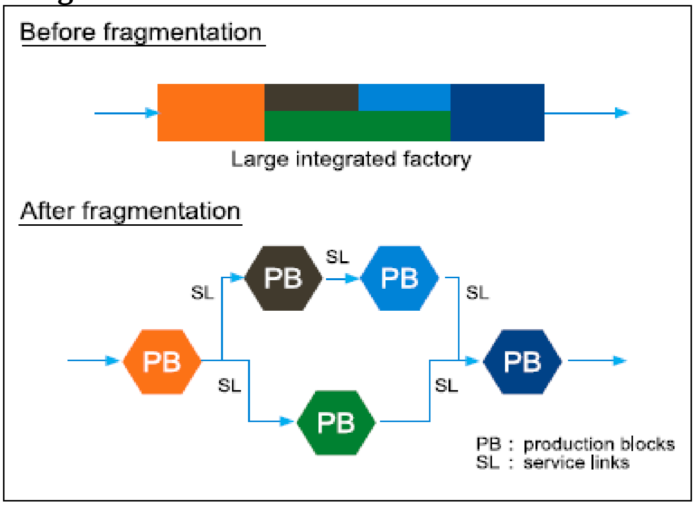
How do we then intensify production network (vertical intra-industry type) between India and ASEAN? By driving down real trade costs and trade and transport logistics barriers, India and ASEAN may realize the potential of higher production-sharing arrangements. The drivers of such trade go beyond relative factor endowments, to factors such as complementary use of information and communication technologies and natural geographies (clustering, agglomeration, and scale effects).[7] According to Kimura and Kobayashi (2009), the fragmentation theory argues that the key to attract fragmented production blocks is to (i) improve locational advantages by, for example, developing special economic zones (SEZs) coupled with improving local level investment climate; and (ii) reduce the cost of service links that connect remotely located production blocs by improving trade and transport facilitation. Figure 1 presents a graphical links between production blocks. Nonetheless, this exhibit shows why the improved service links between India and ASEAN is important to strengthen the production networks. In fragmentation of

[6] Refer, for example, ASEAN Secretariat, Master Plan on ASEAN Connectivity, December 2010, available at www.asean.org.

[7] Refer, for example, Kimura and Obashi (2007).

production, the improved service links, for example, an improved connectivity, is important for expansion of production networks across a region. However, there are many challenges to it. As noted in literature, the institutional cost (due to high tariffs) and the physical cost (due to inadequate physical connectivity) are the barriers to greater economic interactions between India and ASEAN.

Figure 1: Production Blocks and Service Links



Source: ERIA based on Kimura and Kobayashi (2009).

An improved infrastructure between India and ASEAN will be insufficient to foster the regional integration until and unless it is widely complemented by the appropriate policies and regulations, and participation of the private sector.[8] At the same time, we need policies and regulations to foster an effective cross-border movement of goods, services, and people. Harmonizing and simplifying the customs procedures, information sharing, customs modernization, establishing transparent transit rules, and improving logistics in general are also critical to infrastructure expansion.

At this very initial stage, the emerging regional physical connectivity architecture between India and ASEAN is showing two important features – first, the national connectivity having regional implications such as Delhi–Mumbai Industrial Corridor (DMIC), and second, the regional connectivity showing regional (or international)

[8] De *et al*. (2010) indicates that given the huge infrastructure investment needs of the region and insufficient government resources, the role of the private sector and public-private partnerships in enhancing regional and national infrastructure facilities in Asia is very crucial. A review of select case studies of cross-border infrastructure projects clearly indicates that the major reasons for slow progress of regional infrastructure development by private sector stem from both economic to non-economic issues that need to be addressed in order to promote seamless Asia.

implications such as Mekong–India Economic Corridor (MIEC), Trilateral Highway (TH) between India, Myanmar, and Thailand along the Asian Highway (AH) No. 1, and Kaladan Multimodal Transit Transport Project (KMTTP), to mention a few.

In view of the potential benefits for both ASEAN and India, it is highly important to develop an appropriate strategy to enhance the connectivity between them. At the same time, enhancing connectivity requires strong regional institutions to build and manage the cross-border infrastructure. This study considers these issues starting with assessments of connectivity in trade and transportation between India and ASEAN. This chapter also discusses the national and regional policies, and their potential for promoting connectivity between India and ASEAN.

2. RISING ASEAN - INDIA TRADE

ASEAN has become India's one of the largest trading partners in recent years. India's trade with ASEAN has increased from US$ 7.13 billion in 2000 to US$ 41.32 billion in 2009 (Table 1). Grown at 22 percent in the last decade, India's trade with ASEAN presently shares about 10 percent of India's global trade, compared to 8 percent of 2000. India's trade with ASEAN+3 countries is the most documented development that the world has witnessed in the contemporary period. Trade between India and ASEAN+3 countries increased from less than US$ 20 billion in 2000 to over US$ 110 billion in 2009, grown at a CAGR of about 23 percent in the last decade–perhaps the fastest trade growth ever witnessed by India with any economic bloc in the world in the last one decade. Today, ASEAN+3 countries contribute 1/4th of India's global trade, thus emerging as India's largest trading partner in the world. However, this growth in trade varies across countries within ASEAN.

India's export to ASEAN has been growing faster than her imports from ASEAN. In 2009, India's import from ASEAN was US$ 24 billion and the export to the region was US$ 17billion (Table 2(a), (b)). Except 2005, India had net trade deficit with ASEAN in the last decade. India's trade with China has witnessed a phenomenal rise in the last decade. India's export to China mainland increased from about US$ 1.5 billion in 2001 to US$ 10 billion in 2009, witnessing a CAGR of 27 percent per annum. In contrast, India's import from China expanded sharply. In 2009, India's import from China mainland touched US$ 29 billion, which was a mere US$ 2 billion in 2001, increasing with a CAGR of 39 percent since 2001. With a share of 6 percent in India's global export and 11 percent in India's global import, China has become India's largest trading partner. At the same time, India's trade with Indonesia, Malaysia, Singapore, Japan and Korea have also grown rapidly. Vietnam comes next. Today, ASEAN shares about 11 percent in India's global exports (which was 7 percent in 2001), and 9 percent of India's global imports (which was 11 percent in 2001). Compared to China and ASEAN, India's trade with CLMV countries has not yet picked-up the momentum. It also suggests further scope for trade expansion with CLMV countries in coming years. This is also not to deny that India's trade with ASEAN and ASEAN+3 countries would be driven by the short run trend. However, the structure of exports may change when the countries witness favorable trading environment such as improved and enabling trade costs. The current trends of ASEAN-India trade suggest that India could become an increasingly important market for ASEAN's exports and vice versa.

Table 1: Trends in India's Trade (Export+Import) with ASEAN and ASEAN+3

Year	ASEAN		ASEAN+3		World
	Value (US$ billion)	Share* (%)	Value (US$ billion)	Share* (%)	Value (US$ billion)
2000	7.13	7.67	18.02	19.38	92.96
2001	10.04	9.60	23.79	22.75	104.58
2002	9.29	8.49	22.81	20.84	109.43
2003	12.38	9.16	30.75	22.74	135.21
2004	15.91	9.08	40.23	22.96	175.22
2005	20.36	8.55	55.30	23.23	238.10
2006	28.36	9.54	73.45	24.71	297.23
2007	36.96	9.51	98.39	25.31	388.80
2008	43.26	9.42	117.42	25.57	459.17
2009	41.32	9.77	113.42	26.82	422.87
CAGR (%)	21.56		22.68		18.33

*Share in the world

Source: Calculated based on Direction of Trade Statistics Online Database, IMF

Table 2(a): India's Export to ASEAN+3

Country	2001		2005		2009		CAGR
	Value (US$ million)	Share* (%)	Value (US$ million)	Share* (%)	Value (US$ million)	Share* (%)	(2001-2009) (%)
Brunei	3.09	0.007	33.47	0.034	24.42	0.015	29.49
Cambodia	2.59	0.006	22.68	0.023	41.39	0.025	41.40
Indonesia	442.05	0.973	1368.30	1.393	2872.53	1.739	26.36
Lao PDR	5.52	0.012	4.77	0.005	20.65	0.013	17.93
Malaysia	702.19	1.546	1142.41	1.163	3463.78	2.097	22.08
Myanmar	53.05	0.117	111.32	0.113	209.78	0.127	18.75
Philippines	225.67	0.497	474.06	0.483	699.84	0.424	15.20
Singapore	1016.69	2.238	5069.12	5.161	6721.49	4.069	26.63
Thailand	611.72	1.346	1031.83	1.051	1592.29	0.964	12.70
Vietnam	207.26	0.456	657.00	0.669	1722.47	1.043	30.30
ASEAN	3269.84	7.197	9914.95	10.095	17368.64	10.513	23.21
China, *of which*	3635.33	8.002	10752.12	10.948	17134.27	10.372	21.39
China, Mainland	1545.20	3.401	6473.30	6.591	10155.00	6.147	26.54
China, Hong Kong	2087.54	4.595	4276.45	4.354	6938.38	4.200	16.20
China, Macao	2.59	0.006	2.37	0.002	40.85	0.025	41.17
Japan	2010.95	4.426	2392.92	2.436	3186.04	1.929	5.92
Korea	1005.12	2.212	1630.83	1.661	3732.14	2.259	17.82

Table 2(b): India's Import from ASEAN+3

Country	2001		2005		2009		CAGR
	Value (US$ million)	Share* (%)	Value (US$ million)	Share* (%)	Value (US$ million)	Share* (%)	(2001-2009) (%)
Brunei	0.19	0.00	0.79	0.00	486.16	0.19	166.69
Cambodia	0.11	0.00	0.64	0.00	3.72	0.00	55.29
Indonesia	1159.33	1.96	2910.52	2.08	7863.91	3.05	27.04
Lao PDR	0.01	0.00	0.09	0.00	0.20	0.00	45.42
Malaysia	1734.76	2.93	2386.46	1.71	4923.03	1.91	13.93
Myanmar	197.81	0.33	495.95	0.36	1195.26	0.46	25.21
Philippines	78.26	0.13	223.47	0.16	316.88	0.12	19.10
Singapore	3017.86	5.10	3178.18	2.27	6047.47	2.35	9.08
Thailand	530.08	0.90	1125.16	0.80	2683.95	1.04	22.48
Vietnam	49.90	0.08	120.16	0.09	426.97	0.17	30.78
ASEAN	6768.31	11.44	10441.43	7.46	23947.55	9.29	17.11
China, *of which*	3415.92	5.78	12013.42	8.59	33810.66	13.12	33.18
China, Mainland	2093.51	3.54	9925.53	7.10	28839.60	11.19	38.80
China, Hong Kong	1322.15	2.24	2087.77	1.49	4970.76	1.93	18.00
China, Macao	0.26	0.00	0.12	0.00	0.30	0.00	1.80
Japan	2133.59	3.61	3854.61	2.76	6385.90	2.48	14.69
Korea	1548.50	2.62	4300.08	3.07	7856.36	3.05	22.51

*Share in the world

Source: Calculated based on Direction of Trade Statistics Online Database, IMF

Table 3(a): India's Trade with ASEAN+3: Product Compositions

Flow	Product	Year: 2003		
		ASEAN	World	ASEAN's Share* (%)
		Value (US$ billion)	Value (US$ billion)	
Export	Capital goods	0.68	5.05	13.37
	Consumer goods	2.42	23.83	10.17
	Intermediate goods	4.77	24.10	19.78
	Raw materials	1.97	5.33	37.04
Import	Capital goods	6.13	14.63	41.92
	Consumer goods	1.89	6.82	27.68
	Intermediate goods	5.63	21.60	26.05
	Raw materials	1.21	28.60	4.24
Flow	**Product**	**Year: 2009**		
		ASEAN	**World**	**ASEAN's Share* (%)**
		Value (US$ billion)	**Value (US$ billion)**	
Export	Capital goods	6.10	22.68	26.89
	Consumer goods	8.85	76.74	11.53
	Intermediate goods	10.81	53.44	20.23
	Raw materials	8.18	15.55	52.62
Import	Capital goods	28.27	56.60	49.94
	Consumer goods	9.86	25.28	39.00
	Intermediate goods	21.17	88.30	23.97
	Raw materials	7.49	90.35	8.28

*Products are grouped according to WTO classification (WTO SoP1 to SoP4)
Source: WITS based on UN COMTRADE

Table 3(b): India's Export to ASEAN+3 in 2009: Commodity Compositions (Top 20Products)

HS Code	Product	Export (million US$)	Share* (%)
2710	Petroleum oils and oils obtained from.	6028.95	3.41
2601	Iron ores and concentrates, including	4885.28	2.76
7102	Diamonds, whether or not worked, but	1787.18	1.01
8901	Cruise ships, excursion boats, ferry	1418.65	0.80
8525	Transmission apparatus for radio-tel	972.84	0.55
2304	Oil-cake and other solid residues,	936.62	0.53
5201	Cotton, not carded or combed.	633.60	0.36
7403	Refined copper and copper alloys,	632.10	0.36
7113	Articles of jewellery and parts the	618.36	0.35
8905	Light-vessels, fire-floats, dredger	576.04	0.33
2902	Cyclic hydrocarbons.	504.56	0.29
7202	Ferro-alloys.	494.47	0.28
0202	Meat of bovine animals, frozen.	478.85	0.27
7601	Unwrought aluminium.	439.35	0.25
8904	Tugs and pusher craft.	374.38	0.21
5205	Cotton yarn (other than sewing thread	333.19	0.19
3004	Medicaments (excluding goods	276.21	0.16
1005	Maize (corn).	264.86	0.15
2942	Other organic compounds.	244.15	0.14
1515	Other fixed vegetable fats and oils	237.29	0.13

*Share in India's world export
Source: WITS based on UN COMTRADE

Table 3(c): India's Import from ASEAN+3 in 2009: Commodity Composition (Top 20Products)

HS Code	Product	Import (million US$)	Share* (%)
8517	Electrical apparatus for line telephone	3627.19	1.36
1511	Palm oil and its fractions, whether	3497.26	1.31
8525	Transmission apparatus for radio-tel.	3224.59	1.21
2701	Coal; briquettes, ovoids and similar	2494.42	0.94
2709	Petroleum oils and oils obtained from	2245.77	0.84
2710	Petroleum oils and oils obtained from	2061.34	0.77
8471	Automatic data processing machines	1898.12	0.71
8708	Parts and accessories of the motor	1452.38	0.55
8542	Electronic integrated circuits and	1279.47	0.48
8901	Cruise ships, excursion boats, ferry	991.27	0.37
0713	Dried leguminous vegetables, shell.	984.35	0.37
8473	Parts and accessories (other than	977.36	0.37
8523	Prepared unrecorded media for sound	975.15	0.37
7208	Flat-rolled products of iron or non	964.48	0.36
2603	Copper ores and concentrates.	836.87	0.31
7102	Diamonds, whether or not worked	793.82	0.30
4403	Wood in the rough, whether or not	722.97	0.27
8529	Parts suitable for use solely or pr.	582.36	0.22
2941	Antibiotics.	550.46	0.21
8504	Electrical transformers, static con	537.16	0.20

*Share in India's global imports
Source: WITS based on UN COMTRADE

India's trade with ASEAN+3 countries has been witnessing a compositional shift. Traditionally, India's export and import with ASEAN+3 countries are driven by intermediate and capital goods respectively, in absolute term. However, over time, ASEAN+3 countries have appeared as a major supplier of capital goods to India. Today, ASEAN supplies half of India's global imports in capital goods, the share increased from about 42 percent in 2003 (Table 3(a)). Although India is a major exporter of raw materials to ASEAN+3 countries (read, driven by China's huge import demand), India's major achievement is export of capital goods to ASEAN, which has increased from less than a billion in 2003 to over US$ 6 billion in 2009, thereby contributing 1/4th of India's global exports. ASEAN is also a bulk supplier of intermediate goods to India. To a great extent, intermediate and capital goods are driving the trade between India and ASEAN.[9] Barring minerals and gems and jewelry, commodities such as electrical machinery, transmission apparatus, cotton yarn, etc. have emerged as important Indian exports to ASEAN (Table 3(b)). On the other, India's imports from ASEAN are primarily driven by electrical machinery, palm oil, mineral fuels, etc. (Table 3(c)).

Unlike the European Union, East Asian integration has been market driven and has followed a 'hub and spoke' process. With regional and bilateral FTAs, Asia has now been witnessing an enlarged market. When trade barriers between countries have been disappearing with varied pace, we expect a bigger market size in horizon. ASEAN is a major trading partner for India and accounts for about 10 percent of its global trade. With India-ASEAN FTA in goods in operation since January 2010[10], expansion of market size may be achieved provided the trade liberalization is complemented by effective trade facilitation on time.

Finally, regional cooperation has been in the forefront of India's foreign policy. India has signed FTAs with Korea, Japan, Malaysia, Singapore and Thailand in East

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[9] The usual disclaimer is that this may be subject to aggregation bias.

[10] Under the ASEAN-India FTA, the ASEAN member countries and India have agreed to lift import tariffs on more than 80 percent of traded products between 2013 and 2016, starting from January 1, 2010. Also, tariffs on sensitive goods will be reduced to 5 percent in 2016, while tariffs will be maintained on up to 489 items of very sensitive products. The agreement has provided flexibilities to India and ASEAN countries to exclude some of the products from tariff concessions or eliminations to address their respective domestic sensitivity. India, on its part, has excluded 489 items from the list of tariff concessions and 590 items from the list of tariff elimination to address sensitivities in agriculture, textiles, auto, chemicals, crude and refined palm oil, coffee, tea, pepper etc. ASEAN countries have also maintained similar exclusion list from the proposed tariff concessions or eliminations.

Asia. India's several FTAs with some other countries are in the advanced stages of negotiation. The signing and negotiating of these agreements with Asian countries signal India's firm commitment to its 'Look East' policy of building upon its historical links with the countries of the East Asian region and further deepening and widening the partnership. While India's engagement with ASEAN is getting deeper, its two regions occupy the prime axis, viz. India's Southern and Northeastern regions. This study discusses physical connectivity projects in these two regions in later part of the study.

2-1. International Trade of Southern India

Southern India comprises four major states, namely, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. All of them together present about 30 percent of India's GDP, 40 percent of population and 30 percent of India's surface area[11]. These states have been playing an important role in India's growth and development, of which Tamil Nadu needs a special mention for its trade links with ASEAN.

The state of Tamil Nadu has an area of 130,058 sq. km and population of 72.13 million[12] (2011 census, provisional numbers), recording population density of 555 per sq. km. (against national average of 382). The decadal growth rate of the state is 15.6 percent (against 17.64 percent for the country). The state ranks 7thin terms of population size. It is the most urbanized state in the country, with over 44 percent population living in urban areas (2001 census).

Tamil Nadu is also one of the fastest growing states in India. In the last decade, the state has grown at 13.2 percent per annum.[13] It is one of the major industrialized states in India, having three major seaports and one international airport. Along its about 1000 km. coastline, there are 18 seaports, of which 3 are major and 15 are non-major ports.[14] In terms of the total value of foreign trade of Tamil Nadu, sea ports contribute more than 90 percent of the total value of exports in 2008-09.

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[11] Calculated based on CSO's National Accounts 2011, Population Census 2011 and Statistical Abstract of Government of India, 2008, respectively.

[12] Annual population growth for Tamil Nadu over 2001-2011 is 1.46 percent per annum (1.64 percent per annum for the country)

[13] Measured in terms of average GSDP (Gross State Domestic Product) growth rate from 2001-02 to 2008-09; data taken from CSO.

[14] The three major ports are Ennore, Chennai and Tuticorin and 15 non-major (minor) ports at Cuddalore, Nagapattinam, Pamban, Rameswaram, Valinokkam, Kanyakumari, Colachel, Kattupalli, Ennore, Thiruchopuram, PY-03 Oil Field, Thirukkadaiyur, Punnakkayal, Koodankulam and Manappad.

Table 4: Tamil Nadu's Trade

Year	Exports	Imports
	(US$ million)	
1991-92	220.23	218.98
1992-93	224.62	238.53
1993-94	289.67	258.62
1994-95	396.84	399.43
1995-96	473.33	520.68
1996-97	495.67	421.59
1997-98	444.77	992.28
1998-99	446.19	558.18
1999-00	622.71	590.78
2000-01	256.91	411.99
2001-02	264.85	390.59
2002-03	517.38	737.61
2003-04	719.63	953.13
2004-05	774.11	1752.45
2005-06	1158.66	2551.93
2006-07	1496.28	3511.88
2007-08	2280.31	4725.55
2008-09	1973.19	5030.53
CAGR (%)	13.77	20.25

Source: Statistical Handbook, (various issues), Department of Economics and Statistics, Tamil Nadu

Tamil Nadu's exports have exhibited remarkable resilience and dynamism in recent years. As shown in Table 4, Tamil Naidu's exports reached a level of US$ 1973.19 million in 2008-09. The exports recorded a CAGR of 13.77 percent during the period from 1991-92 to 2008-09. Imports in 2008-09 were US$ 5030.53 million as against US$ 4725.55 million in 2007-08 registering a positive annual growth of 6.45 percent. The compounded growth of Tamil Nadu imports during 1991-92 to 2008-09 was 20.25 percent (Table 4).

As given in Table 5 (a, b), the value of Tamil Nadu's exports and imports through seaports with ASEAN+3 countries picked-up momentum since the late 1990s. Among the ASEAN countries, Tamil Nadu has active trade links with Malaysia, Singapore, Philippines, Indonesia, Thailand and Vietnam. The active foreign trade link with Malaysia and Singapore can be traced to the presence of substantial presence of Tamil Diaspora in these countries. The value of exports to ASEAN+3 countries through airports of Tamil Nadu is less compared to the same using the sea ports. On the other, imports through seaports are mainly from China, Korea, Japan, Indonesia and Malaysia (Tables (5b) and 6(b)). Similar trend is observed in the case of imports through airport from China. The growth rate of the value of imports through seaports has been fluctuating in most of the years.

Table5(a):Exports through Tamil Nadu Seaports to ASEAN+3Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
					(US$ million)				
2000-01	12.79	20.36	1.18	6.56	4.18	2.95	43.26	0.52	36.68
2005-06	-	11.97	14.91	9.49	58.05	29.14	140.49	95.54	61.21
2006-07	8.61	24.73	31.36	54.99	54.76	28.04	149.72	116.37	70.88
2007-08	39.26	38.52	51.44	63.62	75.30	59.89	132.95	113.57	46.97
2008-09	100.62	50.96	85.59	106.50	83.19	72.74	164.21	207.98	43.77

Source: Statistical Handbook, (various issues), Department of Economics and Statistics, Tamil Nadu

Table 5(b): Imports through Tamil Nadu Seaports from ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
					(US$ million)				
2000-01	22.24	61.00	-	35.43	4.74	-	60.76	79.53	118.54
2005-06	376.75	129.20	-	277.59	244.84	-	728.65	601.04	270.59
2006-07	496.63	734.90	16.56	375.40	151.49	-	636.19	558.91	246.44
2007-08	791.48	829.75	14.91	468.18	174.20	-	2224.10	575.04	281.80
2008-09	679.92	644.64	52.27	543.15	153.32	2.61	1960.93	953.24	251.32

Source: Statistical Handbook (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6(a): Exports through TamilNaduAirports to ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	China	Korea	Japan
					(US$ million)				
2000-01	-	1.64	0.03	9.77	1.41	-	0.44	11.10	6.06
2005-06	3.84	2.48	-	7.23	-	10.16	16.94	18.30	4.97
2006-07	1.99	-	-	1.77	2.65	9.50	11.26	14.80	6.85
2007-08	1.99	-	-	17.40	8.45	15.66	32.31	18.89	3.48
2008-09	4.14	-	-	9.36	5.44	14.59	26.57	11.98	4.79

Source: Statistical Handbook, (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6(b): Imports through TamilNaduAirports from ASEAN+3 Countries

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	China	Korea	Japan
				(US$ million)				
2000-01	-	0.10	-	57.68	53.58	3.48	1.15	17.43
2005-06	2.71	13.10	-	260.87	-	217.51	210.73	35.91
2006-07	9.49	45.05	-	172.02	-	378.71	68.45	36.87
2007-08	4.72	72.07	-	368.28	10.18	808.37	62.37	48.45
2008-09	3.92	47.04	-	325.80	-	781.19	108.02	59.01

Source: Statistical Handbook (various issues), Department of Economics and Statistics, Tamil Nadu

Table 6: Export Intensity of Selected Products of Tamil Nadu (2007-08)

Products	Share of Tamil Nadu in India (%)
Electronic hardware and IT software	10.64
Engineering goods	11.05
Textile and garments	18.30
Leather and leather goods	33.00
Agro and processed goods	5.52
Chemical and allied products	10.95
Ores and minerals	18.30
Marine products	21.15

Source: Tamil Nadu Guidance Bureau Statistics

Exports from Tamil Nadu consists of both labour-intensive and technology-intensive goods. The main items of export through seaports are food products, tobacco and beverages, metals, minerals and fuel, leather, pharmaceutical products, chemicals, rubber and plastic, non-metallic mineral products, basic metals and alloys, transport equipment, textile products, wood and paper products, and cotton. In case of export, the major commodity exported through seaport is the transport equipment. This is not surprising, since Tamil Nadu is the fast becoming the major destination of automobile and components manufacturers of the world. The major items of labour intensive exports are textiles and leather. On the international textile sector, Tamil Nadu has gained a prominent place. In contrast, the value of exports through airports of Tamil Nadu is much less. Among the commodities, exports of leather ranks first, followed by textiles. The same trend was visible earlier that exports through seaports dominate the trading activities from Tamil Nadu. The estimated export intensity indices in Table 6 suggest Tamil Nadu is one of the leading exporters of textiles, leather and marine products from India.

Tamil Nadu has recorded a healthy growth in both exports and imports. Besides Chennai seaport, other ports like Tuticorin and Ennore are emerging as key facilitators of trading activities in Tamil Nadu. Tamil Nadu has also established strong trade links with some of the ASEAN countries like Singapore, Malaysia, and Indonesia. The key challenge in Tamil Nadu's trade is to increase its exports. To address this challenge, Tamil Nadu has to improve its trading infrastructure, both hardware and software. It, therefore, provides a lot of scope for setting up infrastructure facilities in the state such as special economic zone (SEZ).

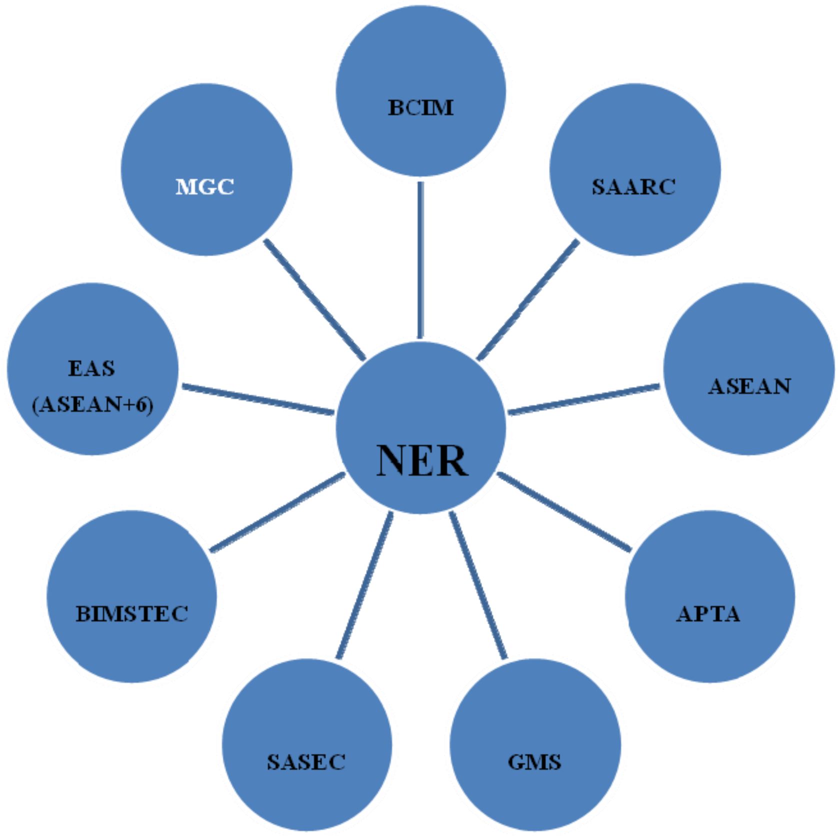
2-2. International Trade of Northeastern India

India's North Eastern Region (NER) and West Bengal state links India's eastern neighbours such as Bangladesh, China and Myanmar with rest part of India. The NER comprises of eight states, namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Before the partition of the Indian subcontinent in 1947, the NER was linked with the rest part of India through present day Bangladesh. The multimodal communication channels between the NER and rest of India used to run through Bangladesh plain. Following the partition, these traditional channels of communication got disrupted making the NER a land-locked territory in India. In post-partition India, the NER is connected with the rest of India through the narrow "Chicken's Neck" (popularly known as Siliguri Corridor) which has widened the geographical distance between the NER and eastern entry port of India - Kolkata. Although the NER is rich in resources like hydrocarbons, forest, hydro-electricity, and other minerals, high transportation cost did not allow her to grow according to her comparative advantages. The connectivity bottlenecks have made the region perpetually underdeveloped and hence politically volatile.[15]

Barring Sikkim, per capita income of most of the NER states is lower than that of national average. The slow progress of NER's economy is reflected in the low growth in income. However, the NER is unique in terms of opportunities. While it is an industrial desert where almost all immediate consumables are imported from outside the region, it is the focal point of trade within a vast area. About 98 percent of this region's borders form India's international boundaries; it shares borders with the China in the north, Bangladesh in the southwest, Bhutan in the northwest, and Myanmar in the east. NER's locational advantage and rich natural resources provide a backdrop to its development as a base for cooperation not only with ASEAN, but also with neighboring countries such as Bangladesh, Bhutan, and Nepal. And through Myanmar, regional cooperation centering the NER can be extended to Mekong region, comprising Cambodia, Lao PDR, Thailand, and Viet Nam.

[15] Refer, for example, Bhattacharya and De (2006), and De (2008).

Figure 2: NER as India's Gateway to East

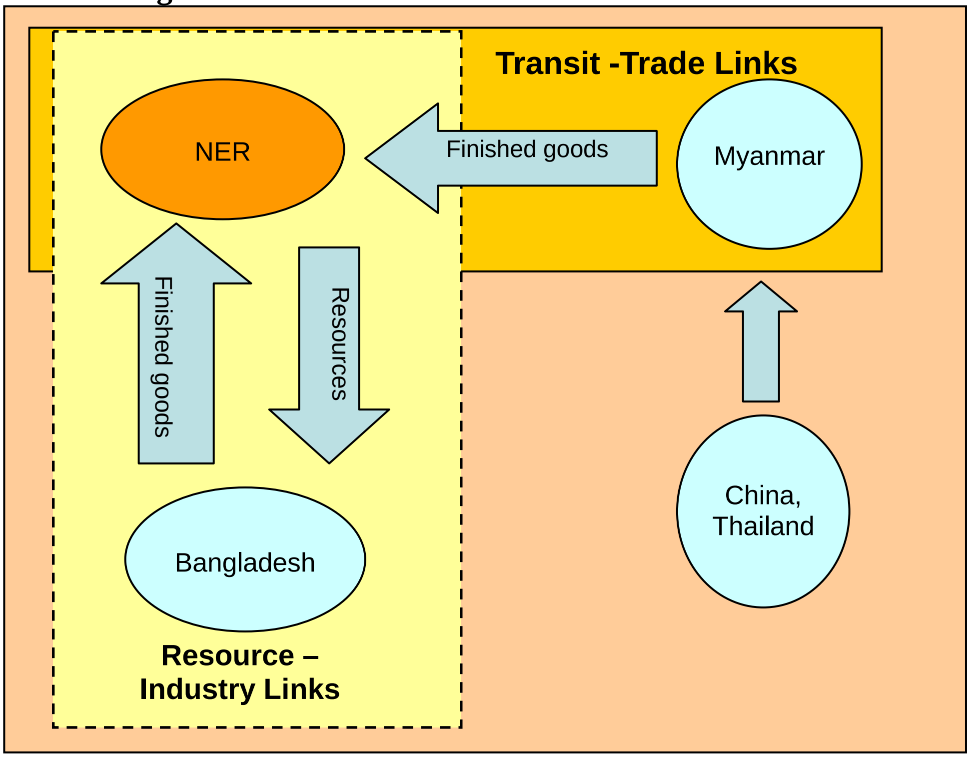


Source: RIS (2011)

Since early 1990s, with the adoption of Look East Policy (LEP), India-Myanmar engagement has been growing on substantive ground and is increasingly being structured. Myanmar is the land-bridge that connects world's two largest markets – South and Southeast Asia. Figure 2 presents the region's strategic location in the backdrop of India's growing engagement with her eastern neighbors. NER is, therefore, an important region that geographically links India with ASEAN.

India's change in policy towards Myanmar has paid a rich dividend. Trade between the two countries increased heavily in last decade, allowing Myanmar to get higher market access in India. Figure 3 shows an overview of the region's trade linkages with neighbouring Myanmar and Bangladesh. However, composition of Indian imports from Myanmar has not changed much over time. India's trade with Myanmar witnessed a higher growth in the last decade, which indirectly suggests existence of a large trade potential between the two countries.

Figure 3: Functional Classification of Trade in NER



Source: RIS (2011)

2-2-1. Trade Flows between NER and Bangladesh

India and Bangladesh share about 4091 km long international borders. Out of which the NER shares almost 1880 km border with Bangladesh (wherein 1434 km is land border and 446 km is riverine tract). Four states of the NER, namely, Assam, Meghalaya, Tripura, and Mizoram, share international borders with Bangladesh. However, a large part of this international border with Bangladesh is porous.

The first Trade Agreement between India and Bangladesh was signed in 1972. The India-Bangladesh Trade Agreement (IBTA) has been renewed for a period of three years up to March 31, 2012. It governs the present trading arrangements between the two countries. To facilitate the NER-Bangladesh border trade in goods and services, the Government of India through the Office of the Commissioner of Customs in Shillong has setup 26 Land Customs Stations (LCS) along the NER-Bangladesh borders, of which, 20 are functional and remaining 6 are non-functional LCSs.

Out of the four NER states having international borders with Bangladesh, except Mizoram, the NER-Bangladesh trade mainly flows through Assam, Meghalaya and Tripura. A 2-year average (2006-08) of the NER-Bangladesh trade shows that the share of Meghalaya in the NER-Bangladesh trade is the highest (Table 7). The contribution of Meghalaya to the total volume of the NER-Bangladesh trade stands at 63.83 percent; the same for Tripura and Assam are 18.26 and 17.91 percent respectively. While both Assam-Bangladesh and Meghalaya-Bangladesh trade are characterized by higher export and negligible import, Tripura-Bangladesh trade exhibits just opposite trends, i.e., higher import and lower export.

Table 7: NER-Bangladesh Border Trade Volume

States	Volume (2-years Average, 2006-08) (US$ million)	Share in Total Trade (%)
Assam	15.66	17.91
Meghalaya	55.82	63.83
Tripura	15.97	18.26
NER total	87.46	100.00

Source: RIS based on Office of the Commissioners of Customs, Shillong

Trade between NER and Bangladesh is uneven and not diversified. The official trade between NER and Bangladesh is concentrated in agricultural commodities, processed foods, minerals and garments. While the NER's export to Bangladesh is dominated by raw materials like coal, limestone, boulders and agro-horticultural products like ginger and citrus fruits, import from Bangladesh is mostly finished goods like cement, synthetic fabric, readymade garments, and processed food. The NER's export products to Bangladesh are distinctly different from major export lines from the rest part of India to Bangladesh. A quick look at the product-wise trade between the NER and Bangladesh indicates complementarities between the resource structure of the NER and demand structure of Bangladesh (Figure 3).[16] Bangladesh lacks in mineral resources like coal and limestone which the country imports from the NER. Due to weak resource industry-linkages, manufacturing base of the NER remained underdeveloped and hence in return the NER imports manufacturing goods from Bangladesh. This provides a firm basis for trade expansion between the two regions.[17]

16 This was also widely discussed in Das and Thomas (2008).

17 According to Brunner (2010), export potential lies in food or fruit processing, bamboo and cane products, jute, floriculture, aromatic plants, aromatic and medicinal herbs, spices, rubber, forest products, natural resource products, tea and other plantation crops, inland freshwater fishing, among others.

2-2-2. Trade Flows between NER and Myanmar

India and Myanmar share a common border of 1,643 km. Four states of the NER, namely, Arunachal Pradesh, Manipur, Mizoram, and Nagaland, shares international borders with Myanmar. However, a large part of this international border with Myanmar is porous, mountainous and inhabited. Till date, four LCSs are in operation, serving the trade between the two countries, of which Moreh in Manipur is the busiest LCS, handling almost 99 percent of the NER's trade with Myanmar.

In general, India-Myanmar border trade mainly flows through Moreh in Manipur state. In the last decade, NER's average annual export to Myanmar was about US$ 2.36 million, whereas the average annual import from Myanmar was US$ 1.88 million. It contributed a miniscule 2.08 percent and 0.49 percent in country's total export to and import from Myanmar respectively in the last decade (Table 8). In US$ term, while Indian export and import with Myanmar witnessed a massive 76 percent and 116 percent, respectively in the last decade, the same from the NER faced consistently negative growth in the same period.[18] Unlike the NER-Bangladesh trade, the NER's trade with Myanmar has always remained less than a percent of India's total trade with Myanmar since opening of LCS at Moreh in 1995. Moreh in Manipur is the largest LCS handling about US$ 3.59 million India-Myanmar merchandise trade, of which export and import contribute 41 percent and 59 percent respectively. Therefore, border trade potential between India and Myanmar is yet to be realized.

[18] However, in Indian rupee term, NER's export to Myanmar witnessed positive growth, but the NER's import from Myanmar couldn't escape negative growth rate in the last decade.

Table 8: NER's Trade with Myanmar+

Year#	Indian export to Myanmar	Indian import from Myanmar	NER export to Myanmar	NER import from Myanmar	NER Share* (%)	
	(US$ million)				Export	Import
2000	48.05	179.18	1.23	2.75	2.56	1.53
2001	53.05	197.81	0.26	1.61	0.49	0.81
2002	71.53	345.64	1.03	2.43	1.44	0.70
2003	86.00	390.77	2.02	1.90	2.35	0.49
2004	104.71	400.05	1.43	1.19	1.37	0.30
2005	111.32	495.95	0.88	1.18	0.79	0.24
2006	132.72	718.40	13.52	0.59	10.18	0.08
2007	174.02	802.79	0.75	3.26	0.43	0.41
2008	212.23	893.92	1.06	1.79	0.50	0.20
2009	209.78	1195.26	1.47	2.12	0.70	0.18
Average**	120.34	561.98	2.36	1.88	2.08	0.49
CAGR (%)	75.96	115.83	-14.51	-194.96		

*Share in India. **Average for the period 2000-2009. +NER export and import consider trade through Moreh only. #Trade data for India counts calendar year while the same for NER consider financial year.
Sources: IMF for India's trade with Myanmar, and Indian Customs for NER's trade with Myanmar.

Table 9: Facilities at the Moreh LCS*

Facility	Available (Y)	Not Available (N)
Food testing laboratory		N
Availability of electricity		N
Telephone	Y	
Internet		N
EDI (Icegate)		N
Weighbridge		N
Warehouse		N
Cold storage		N
Parking place	Y	
Transshipment platform / Transit sheds		N
Secretarial assistance (fax, photocopy etc.)		N
Drinking water		N
Drivers' rest room	Y	
Health centre		N
Hotels and restaurants		N
Separate entry and exit gates		N
Banks	Y	N
Courier / Post Office		N
Servicing centre / Vehicle repair shops		N

Source: RIS (2011).

There are a lot of differences in the commodity compositions of trade in the Moreh LCS. Important commodities being imported from Myanmar consist of betel nuts, dry ginger, pulses, whereas Soya bari, Cumin seed, Soya grid and skimmed milk powder are some major exported items.[19] The formal trade volume at Moreh is appeared to be less than the informal trade volume.[20]With the change in demand pattern in both sides of the border, trade at Moreh LCS is carried out more in negative list items than the positive list items. While a formal trade at Moreh shows trade in traditional primary goods, informal trade, if factored in, indicates a compositional change in border trade that has undergone between the two countries. Barter trade of 22 agreed items has lost its relevance while the normal or regular trade has gained the popularity over time. One of the primary reasons for a low level of border trade at Moreh LCS is perhaps the unfavourable trading environment. Trade at Moreh LCS suffers not only due to lack in modern trade infrastructure, both hardware and software, but also due to the absence of adequate security, thus making the entire trade very unsecured. Table 9 provides a list of infrastructure facilities available at Moreh LCS. On top, the unfriendly exchange rate between India and Myanmar prohibits the formal trade to grow, resulting which governments in both sides are losing revenue.

2-2-3. Trade Flows between NER and China

The re-opening of the border trade with China at Nathu La in Sikkim state of India is a significant achievement in strengthening the relationship between the two countries. Nathu La is historically a very important border in respect of trade with Tibet Autonomous Region of China.[21] Border trade through Nathu La formally resumed on 6th July 2006.[22]

Trade at Nathu La is carried out in liberal terms. For example, Import-Export

[19] In terms of value also the trade at the LCS is a miniscule of the estimated value of informal trade occurring at Gate No. 2 connecting Moreh to Namphalong in Myanmar.

[20] The total volume of trade at Moreh is certainly more than official trade of Rs. 150 million. A quick estimate shows total trade including informal volume is about Rs. 2800 million (Source: RIS). This does not include the clandestine trade in drugs and small arms whose value also would be substantive.

[21] Border trades have been started more than one decade back at Sipkila in Himachal Pradesh and Gunji in Uttaranchal with a restricted list of items.

[22] The corresponding Chinese site is Renqinggang. Border trade markets remain open from Monday to Thursday every week from 7:30 am to 3:30 pm in Indian time and 10 am to 6 pm in Chinese time.

Code (IEC) is not required for the border trade because persons importing or exporting from/to China are authorized to trade in Indian currency value of Rs. 100,000 per day per trader. The issue is the list of permissible items of trade. The permissible list is comprised of 29 export items from India to China and 15 export items of China to India. It is clear to us that the list of permissible items is driven purely by the local need. As a result, the volume of trade has been small. In 2009, about US$ 9000 was the total trade at Nathu La between India and China (Table 10). Therefore, border trade is yet to take a good shape between India and China.

Table 10: NER-China Border Trade at Nathu La

Period	Export from India to China	Import from China to India	Visit of Indian traders to trade mart at Renquingang (China)	Visit of Chinese Traders to trade mark at Sherathang (India)
	(US$)			
7th July to 29th September 2006	19,567.62	23,891.46	696	1253
1st May to 29th November 2007	67,498.18	16,662.63	2117	3701
19th May to 27th November 2008	21,8793.2	3,109.166	1034	3948
1st May to 30th November 2009	2,791.563	6,120.761	Data not available	

Source: RIS based on Department of Industries, Sikkim Government

To conclude, the pattern of India-Bangladesh border trade that flows through the NER-Bangladesh sector is characterized by resource-industry linkages. The rationale of the trade lies in free trade principle. Some critical minerals which are available in the NER but not available in Bangladesh provide the basis of the NER-Bangladesh trade. What follows is that NER's export products to Bangladesh are distinctly different from major export lines from the rest of India to Bangladesh. The product-wise trade between the NER and Bangladesh indicates complementarities between the resource structure of the NER and demand structure of Bangladesh. Bangladesh lacks in mineral resources like coal and limestone which the country imports from the NER. Due to weak resource industry-linkages, manufacturing base of the NER remained underdeveloped and hence in return the NER imports manufacturing goods from Bangladesh. This provides a firm basis for trade expansion between the two regions.

Border trade between India and Myanmar has not progressed further since opening of the Moreh LCS in 1995. Trading environment between India and Myanmar is unfavorable and not supporting the border trade. Unlike the NER-Bangladesh trade, the NER's trade with Myanmar has always remained less than a percent of India's total trade with Myanmar. Barter trade of 22 agreed items has lost its relevance while the normal or regular trade has gained popularity over time. One of the primary reasons for low level of border trade at Moreh LCS is perhaps the unfavourable trading environment in general and unfriendly currency arrangement in particular. Trade at Moreh LCS suffers not only due to lack in modern trade infrastructure, both hardware and software, but also absence of adequate security, thus making the entire trade very unsecured. On top, the unfriendly exchange rate between India and Myanmar prohibits the formal trade to grow, resulting which government is losing revenue. In a sense, the border trade potential between India and Myanmar is yet to be realized.

The re-opening of border trade with China at Nathu La in Sikkim state of India is a significant achievement in recent years. Contrary to popular belief, border trade with China is carried out on limited items only which are purely driven by the local need. As a result, volume of trade between India and China at Nathu La has not been grown much since reopening of the border trade in 2006.

3. Connectivity and Industrial Clusters in Tamil Nadu

Tamil Nadu is one of the industrialized states in India. The state has a well-developed network of roads, railways and air services, and is an important maritime state of the country. Chennai is considered as the gateway to southern India.

Tamil Nadu has a road network covering about 153 km per 100 sq.km. area, significantly higher than the country's average road network coverage of 103 km per 100 sq.km. area[23]. It has 4,873 km of the National Highways, 9,384 km of the state highways, 11,288 km of the major district roads, 61,641 km of the other district roads, and 137,399 of rural roads. Tamil Nadu has 27 National Highways and is an important terminus on the Golden Quadrilateral project of the National Highway Authority of India (NHAI).

[23] Demand No-21, Policy Note on Roads, Bridges (2010-2011), Highways and Minor Ports Department, Government of Tamil Nadu.

Tamil Nadu also has a well-developed railway network with 541 railway stations and the same falls under the jurisdiction of Southern Railways. The state has a total of 4,106 route km of railway network, out of which nearly 1,235 route km is electrified as on December 2009.[24] Out of the total, nearly 78.5 percent network is broad gauge and the balance meter gauge. The railway network connects the state with most of the major cities in India. Main rail junctions in the state include Chennai, Coimbatore, Madurai, Tiruchirapalli (Trichy) and Salem.

Table 11: Commodity-wise Port Traffic of Major Ports of Tamil Nadu

Major Ports	Period	POL Crude & Product	IronOre	Fertilizer	Coal	Container	Others	Total
				(million tonnes)				
Ennore	2009-10	0.39	0.94	0.00	9.28	0.00	0.09	10.70
	2008-09	0.36	1.11	0.00	9.71	0.00	0.32	11.50
Chennai	2009-10	13.32	8.03	0.61	3.06	23.48	12.56	61.06
	2008-09	13.13	8.36	0.78	4.10	20.58	10.54	57.49
Tuticorin	2009-10	0.51	0.04	2.08	5.60	6.60	8.96	23.79
	2008-09	0.50	0.00	1.83	5.71	5.48	8.49	22.01
All Indian	2009-10	175.08	100.33	17.72	71.71	101.24	95.01	561.09
Major ports	2008-09	176.14	94.04	18.22	70.40	93.14	78.59	530.53

Source: Ministry of Shipping, Government of India

Along its coastline of 1,076 km, Tamil Nadu has three major ports (Chennai, Ennore and Tuticorin) and 20 minor (non-major) ports.[25] All minor ports in the state are anchorage ports without berthing facilities. Thus, cargo is transshipped from the vessels at mid-stream to the shore and vice-versa through barges. Considering the high growth expected in the future, major capacity up gradation works are being implemented or are being planned at both, major and minor ports in the state. The current commodity-wise traffic handled at these ports is given in Table 11.

In the year 2010-11, the three major ports in Tamil Nadu handled about 98.2 million tonnes (MT) of cargo, which is about 17.2 percent of the total traffic of all major ports in India. While total cargo at all Indian ports together witnessed a meager growth of 1.57 percent over the period 2009-10 to 2010-11, the ports of Chennai, Ennore and Tuticorin registered the cargo growth of 2.86 percent, 0.66 percent and

[24] Ministry of Railways (Railway Board), Government of India

[25] **Government Ports**: Cuddalore, Nagapattinam, Pamban, Rameswaram, Valinokkam, Kanyakumari, Colachel. **Captive Ports**: Kattupalli, Ennore (Minor), Mugaiyur, Thiruchopuram, Silambimangalam, Shipyard port, P Y-03 Oil Field, Kaveri Port, Vanagiri Port, Thirukkadaiyur, Thirukkuvalai, Punnakkayal, Manappad, Koodankulam. **Ports under consideration**: Cheyyur (Panaiyur), Parangipettai, Udangudi

8.16 percent respectively. Chennai port was the busiest amongst the major ports in Tamil Nadu, and in the year 2009-10, catered to nearly 10.9 percent of the total cargo handled by all Indian ports together. According to the Ministry of Shipping, the capacity of Chennai, Ennore and Tuticorin ports as on March 2010 was 71.32 million tonnes, 16 million tonnes and 23.72 million tonnes respectively, indicating fairly high utilization rates, whereas the current capacity of all Indian ports together is 628.03 million tonnes.[26] The share of traffic catered by non-major ports in the state of Tamil Nadu is low in comparison to traffic catered by all non-major ports in India. In 2009-10, non-major ports in the state catered to 1.17 million tonnes (0.4 percent of all non-major ports traffic).

Table 12: Trade links with EAS Countries through Chennai Seaport in 2010

	Export		Import	
Country	**No. of**	**Share**	**No. of**	**Share**
Singapore	11858	7.159	516061	24.775
Malaysia	7830	4.727	15263	0.733
Australia	5921	3.575	2991	0.144
China	4111	2.482	232753	11.174
Japan	3604	2.176	315715	15.157
Thailand	1808	1.092	122739	5.892
Hong Kong, China	1696	1.024	76717	3.683
Taiwan, China	1228	0.741	39512	1.897
South Korea	1081	0.653	307738	14.774
Indonesia	1052	0.635	8997	0.432
Vietnam	632	0.382	1744	0.084
Philippines	455	0.275	1298	0.062
Myanmar	359	0.217	5	0.000
Cambodia	48	0.029	0	0.000
New Zealand	21	0.013	2	0.000
EAS total	41704	25.178	1641535	78.81
Rest of World	123931	74.822	441450	21.19
Total through Chennai seaport	165635	100.000	2082985	100.000

Source: RIS based on Chennai Customs

In terms of shipping linkages with India's partner countries, Chennai seaport has truly emerged as India's gateway port to ASEAN and East Asia. This port handled about 79 percent of import vessels in 2010 which originated in the EAS region (Table 12). In export, about 25 percent of the cargo vessels originated at this port for the EAS region.

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[26] Transport Research Wing, Ministry of Shipping, Government of India.

The state has five airports at Chennai, Trichy (Tiruchirapalli), Madurai, Coimbatore and Tutocorin. ChennaiAirport is a major hub airport in Southern India and caters to both domestic and international traffic through the Kamaraj domestic terminal and Anna international terminal, located at Meenambakkam. During 2009-10, this airport handled about 10.53 million passengers and 323 thousand tonnes of cargo. It was the third busiest airport in the country, catering to nearly 8.5 percent of the total passenger traffic in India, after Delhi and Mumbai airports.[27]

The manufacturing sector in Tamil Nadu grew at an average rate of 8.4 percent from 2006-2007 to 2009-2010.[28] The growth of industries in manufacturing sector in Tamil Nadu over the past five years has been impressive. Tamil Nadu has attracted several industrial sectors and has become one the most industrialized states in India. The state has attracted cumulative FDI inflows of US$ 5.7 billion between April 2000 and May 2010 and is amongst the highest FDI attracting states.[29] FDI inflows have helped achieve greater technological advancement and more exportable products. With increasing competitiveness among states to attract investments, the state has initiated a strategy that includes key thrust areas like focusing on core infrastructure sector, targeting strategic industries, developing knowledge/technology driven industries and encouraging private sector initiative and participation in infrastructure projects.[30]

Around 3,000 foreign companies have set up their facilities in the state so far, out of which 34 are Fortune 500 companies.[31] There are around 26,000 factories in manufacturing sector in the state.[32] The state has rich pool of labour with average wages lower than similar in most developed countries. Figure 4 presents the location of industries in Tamil Nadu.

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[27] According to the Ministry of Civil Aviation, the Chennai airport is projected to handle about 11.9 million passengers in 2010-11 and 27.6 million passengers by the year 2020.

[28] Source: Statistical Handbook of Tamil Nadu, 2010

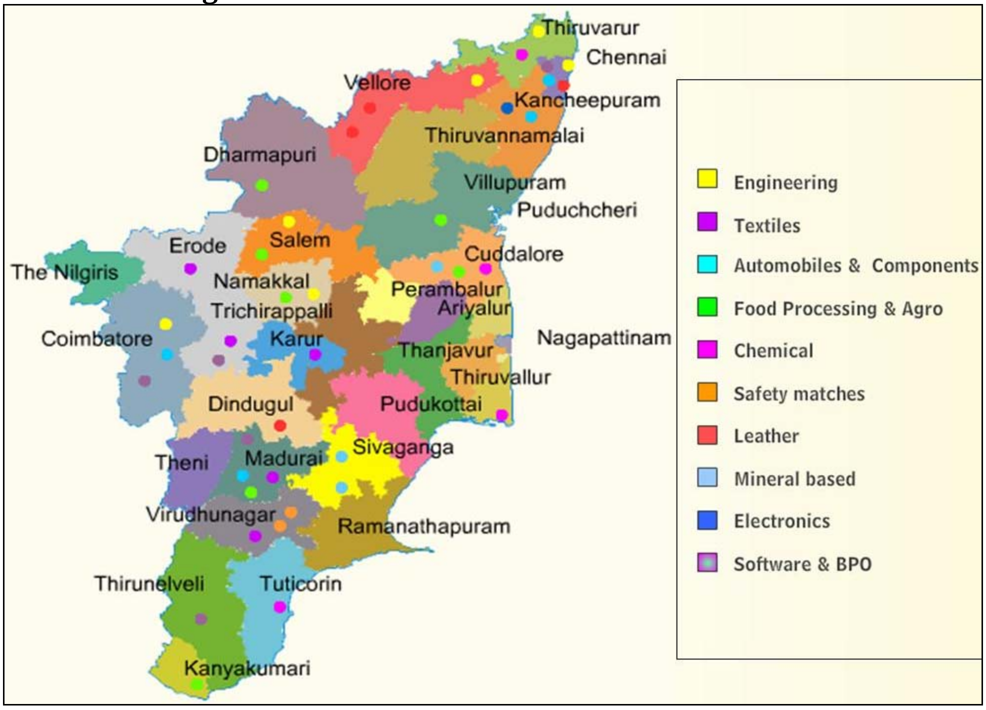
[29] Total investments in pipeline as of March 2009 in the state were of the order of Rs.5.79 trillion, according to Ministry of Commerce and Industry, Government of India.

[30] Tamil Nadu Industrial Development Corporation Limited (TIDCO), State Industries Promotion Corporation of Tamil Nadu (SIPCOT) and Tamil Nadu Small Industries Development Corporation Limited (SIDCO) are jointly responsible for developing industrial infrastructure in the state. Tamil Nadu Industrial Guidance & Export Promotion Bureau has been constituted with the objective of attracting major investment proposals into the state.

[31] Source: TIDCO

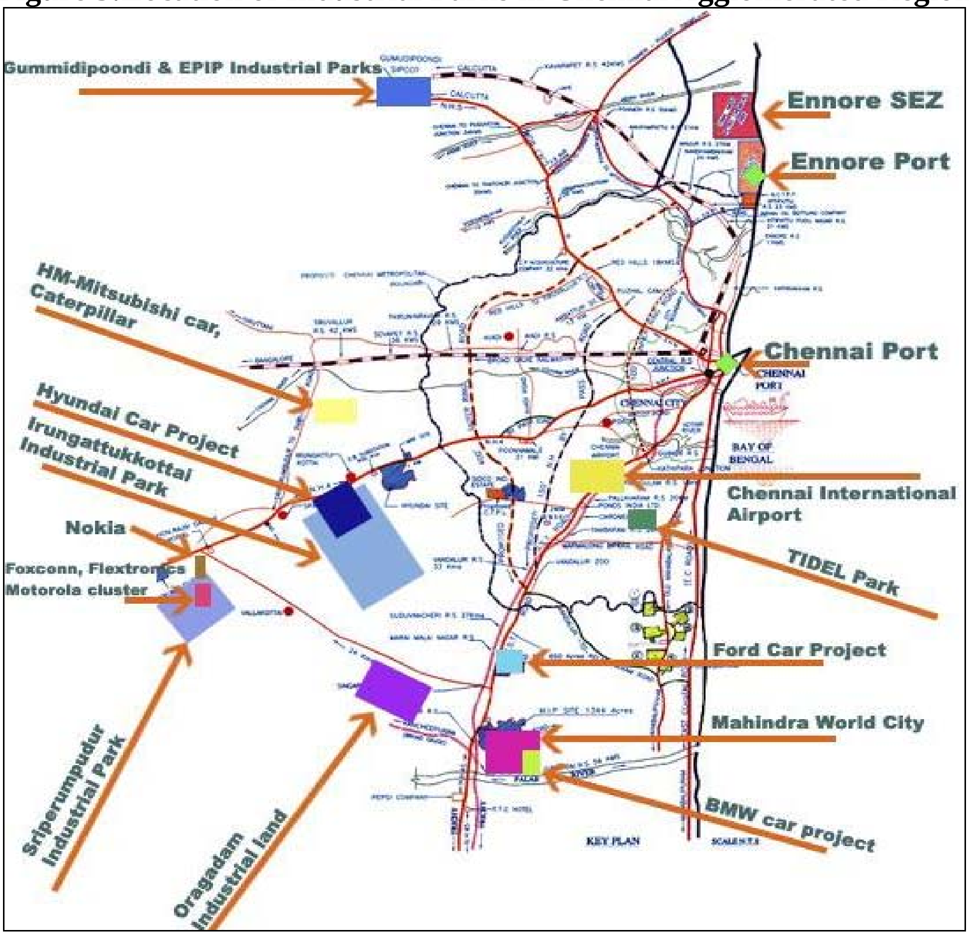
[32] Ibid.

Figure 4: Location of Industries in Tamil Nadu



Source: RIS based on TIDCO

Figure 5:Location of Industrial Parks in Chennai Agglomerated Region



Source: RIS based on TIDCO

Tamil Nadu is also an important IT hub. It is the second-largest software exporters by value in India, after Karnataka. The software exports from Tamil Nadu have increased from US$ 3 billion in 2005-06 to US$ 8.9 billion in 2009-2010 (CAGR of 31.2 percent).[33] Figure 5 presents location of industrial parks and SEZs in Chennai agglomerated region. In the last two decades, Tamil Nadu has attracted significant investments in the automotive industry, particularly in cars, railway coaches, tractors, motorcycles, automobile spare parts and accessories, tires and heavy vehicles. The automotive industry has a capacity to produce 1.5 million cars and 360,000 commercial vehicles, and it contributes nearly 8 percent to the GSDP, providing direct employment opportunities to about 300,000 people.[34] Tamil Nadu has a 30 percent share in the Indian automotive industry[35].

Table 13: List of Operational SEZs is Tamil Nadu

Industry	Location	Number
IT, hardware & bio-informatics	Chennai, Kancheepuram, Chengalpet, Coimbatore	10
Automotive	Chennai	1
Apparel and fashion accessories	Chennai, Cheyyar	2
Telecom equipments, R&D	Sriperumbudur	1
Electronics hardware	Sriperumbudur, Oragadom	3
Hi-tech engineering	Coimbatore	1

Source: RIS based on TIDCO

The state is also attracting several new emerging industries like mineral based industries, engineering, leather, pharmaceuticals, cotton textiles and hosiery, ready-made garment industries, wood-products, agro-based industries, chemical based industries, electronics, software, consumer durable, biotech products, food processing, rubber and plastic products, tourism, hotels and financial services. Minerals like limestone, lignite, granite, clay, gypsum, feldspar and graphite are found abundantly in the state. Many industrial units have been set up for optimum utilization of these mineral resources. As shown in Table 13, out of the total 130 operational SEZs in the country, nearly 18 are located in Tamil Nadu. Further, formal approval for setting up 71 SEZs and in-principle approval for 19 SEZs has been accorded.[36] A multi-product SEZs is being developed at Nanguneri in Tirunelveli district and one in Perambalur district. In addition, new industrial parks are proposed to be developed in Madurai

[33] Source: NASSCOM
[34] Source: SIAM, New Delhi.
[35] Ibid.
[36] Source: Ministry of Commerce and Industry, Department of Commerce, Government of India.

district, Perundurai in Erode district and Cheyyar in Tiruvannamalai district.In January 2011, the Government of Tamil Nadu signed a Letter of Intent (LoI) with the Japanese government to facilitate more investments from the latter into the state. As of now, about 725 Japanese companies are present in India, and out of this more than 240 are located in Tamil Nadu.

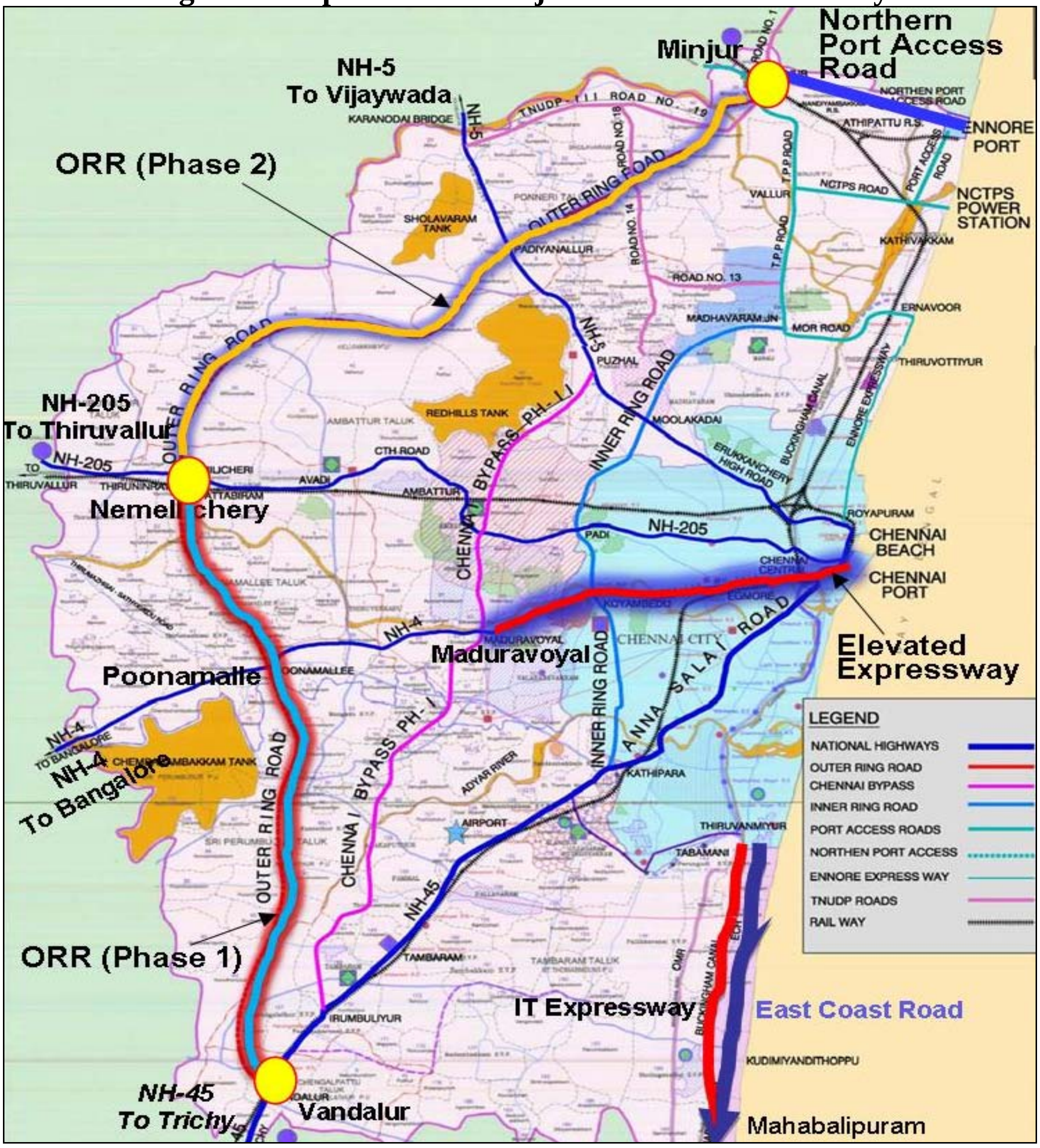
4. PHYSICAL INFRASTRUCTURE PROJECTS SUPPORTING ASEAN-INDIA CONNECTIVITY

4-1. Road/Highway Projects in Tamil Nadu

Efficient road network connectivity for dispersal of traffic from the Chennai and Ennore ports is imperative for ASEAN-India connectivity. Widening and improvement of NH 4 and NH46 on Chennai-Mumbai section and NH 5 on the Chennai-Kolkata section of Golden Quadrilateral of the NHDP program has been completed. Further, most of the 4-laning work related to North-South corridor of the NHDP linking Chennai to the south and northern parts of the country has also been completed (balance work on few sections is expected to be soon completed). Thus, a 4-lane connectivity for movement of traffic from Chennai area to the rest of the country is available. However, dispersal of traffic from the seaports of Chennai/ Ennore and the rest of the NH network is not efficient since freight traffic has to traverse the urban limits of Chennai city. Further, the road network in the immediate surrounding areas of the ports is not adequate. Figure 6 provides a schematic overview of important road projects in and around Chennai. Several road connectivity projects are being implemented in Tamil Nadu[37], of which Chennai-Ennore Port Road Connectivity Project (formerly EMRIP) needs a special mention.

[37] The important ones are Dedicated Elevated Expressway Connecting Chennai Port to Maduravoyal Junction, NCTPS (North Chennai Thermal Power Station) Road, Northern Port Access Road, Chennai Outer Ring Road, Rajiv Gandhi Salai (IT Corridor) - Phase II, and Tamil Nadu Road Sector Project (TNRSP).

Figure 6:Proposed Road Projects around Chennai City



Source: RIS based on TNRDC

4-1-1. Chennai-Ennore Port Road Connectivity Project (formerly EMRIP)

This project (30 km in length) is included under the Port Connectivity Scheme of NHDP. For project execution, the Government of Tamil Nadu, Chennai Port Trust, EnnorePort and NHAI have jointly established an SPV called Chennai Ennore Port Road Company. The project was formulated with an objective to provide seamless connectivity from Chennai and Ennore ports and Ennore SEZ to the NH system.[38] Estimated cost for the project is Rs.6 billion. Land acquisition process is currently in

[38] A multi-product SEZ at Ennore on 3,185 acres area is coming-up. It is located next to Ennore Port and shores with Chennai Port as well (source: TIDCO).

progress. The project cost is being shared by Government of Tami, Nadu, Chennai and Ennore Port Trusts and NHAI. As of date, shore protection work has been completed. Contract for road works has been recently awarded. The project is expected to be completed by 2012. The project is vital for the future development of Chennai and Ennore ports as it would provide smooth connectivity to the hinterland and improve the efficiency of cargo evacuation.

4-2. National Highway Development Programme (NHDP), Phase VI

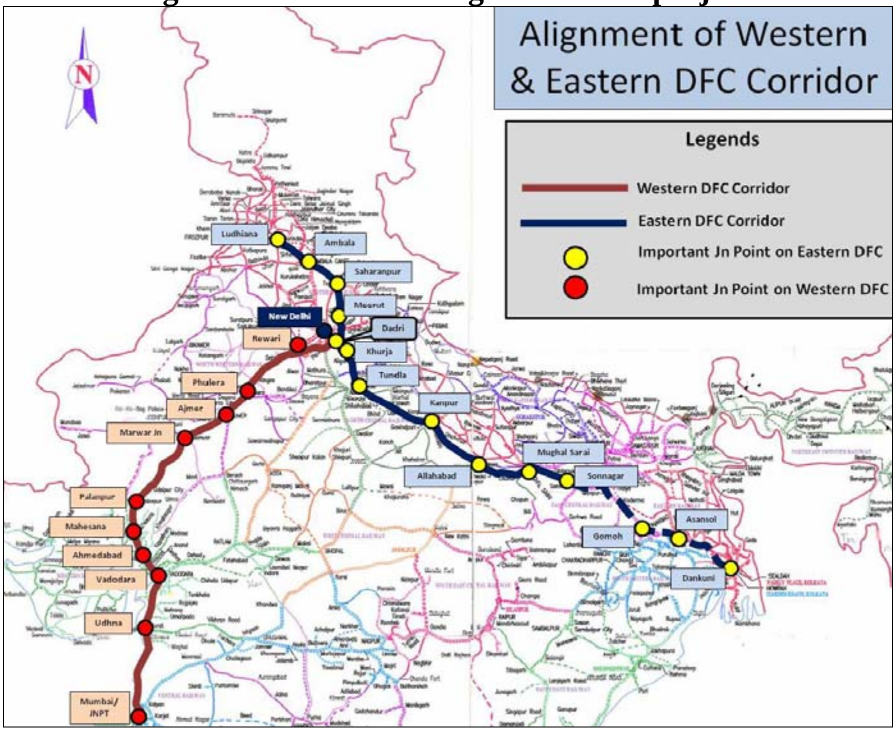
Under the NHDP VI, about 1,000 km of the greenfield expressways are planned to be developed through the PPP route on BOT (Toll) mode following DBFOT pattern with the maximum Viability Gap Funding (VGF) of 40 percent. The indicative cost is about Rs.166.8 billion. These expressways would be constructed on new alignments.Besides Vadodara (Gujarat)-Mumbai (Maharashtra) section (400 km), expressway corridors linking Chennai with Bangalore (Karnataka) (334 km), Dhanbad (Jharkhand) with Kolkata (West Bengal) (277 km) and Delhi-Meerut (Uttar Pradesh) (66 km) are planned.

The Ministry of Road Transport and Highways, Government of India prepared a project report for the formulation of the Master Plan for expressway network in India. The Final Report submitted by the Consultant in November 2009 identified a list of 60 projects totaling about 18,637 km. The report recommended a three phase plan for development of the expressway network. This includes Phase I (upto 2012), Phase II (by 2017) and Phase III (by 2022). The following corridors were recommended for the state of Tamil Nadu: (i) Trichur– anyakumari (400 km): Phase 1, (ii) Coimbatore–Erode–Salem (175 km): Phase I, (iii) Salem–Cuddalore (190 km): Phase III, and (iv) Kanyakumari–Tirunelveli–Pondi-Chennai (700 km): Phase III.

4-3. Dedicated Freight Corridors (DFC)

At present, both passengers and freight trains move on the same tracks. With preference to movement of passenger trains, freight traffic gets delayed. Further, important trunk routes of the Indian railway networks observe serious capacity constraints. The Golden Quadrilateral and the North-South-East-West corridors of the rail system that constitute about 16 percent of the total railway network, caters to nearly 58 percent of freight and 52 percent of passenger traffic respectively. The Western (Delhi-Mumbai) and Eastern (Delhi-Howrah) corridors of the Indian Railway are highly saturated in terms of line capacity utilization. Accelerated economic growth is further expected to congest these routes. With an objective to meet the burgeoning freight demand, the Government of India has initiated the Dedicated Freight Corridor (DFC) Project (Figure 7). This is one of the most ambitious projects taken up in modern times and once completed would meet the transport requirements of the two busy trunk routes for the next 15-20 years. The DFC project would also help segregating passenger and freight traffic on these routes.

Figure 7: Dedicated Freight Corridor projects



Source: RIS based on DFCCIL

A Special Purpose Vehicle (SPV) by the name of Dedicated Freight Corridor Corporation of India Limited (DFCCIL) was set up in October 2006 under the administrative control of the Ministry of Railways, Government of India to undertake planning and development, mobilization of financial resources and construction, maintenance and operation of the DFCs. Planning, construction and maintenance of the freight corridors is the responsibility of DFCCIL. On the other hand, development of the feeder routes along with train operations on the DFC would be handled by the Indian Railways. Both Indian Railways and DFCCIL would pay access charges to each other for the traffic carried on each other's tracks. DFCCIL would be responsible for movement of trains on the DFCs.

The Phase I stretch between Rewari to Vadodara of Western corridor is 920 km long. The Phase I is expected to be completed by 2016. The Phase II project comprises the stretch between Rewari to Dadri (127 km), with a spur from Pirthala to Tughlakabad (32 km), and Vadodara to Jawaharlal Nehru Port (426 km) section. The Phase II project is expected to be completed by 2017. The Eastern corridor (1839 km) would run between Ludhiana in Punjab to Dankuni near Kolkata, to be extended in future to serve the new deep sea port proposed in Southern Bengal, and would cater to the coal and steel traffic. The corridor would run through six states of Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand and West Bengal. It will be an electrified single line on the Ludhiana–Khurja section (397 km) and electrified double line on the balance portion. The Eastern corridor is targeted for completion by 2016–17. Besides the Western and Eastern Freight corridors as above, the Vision 2020 for Indian Railways recommended (also announced in the Railway Budget 2010) to develop DFCs along four new corridors totaling about 6,163 km. These comprise the North-South corridor (Delhi to Chennai – 2,173 km), East-West corridor (Howrah to Mumbai – 2,000 km), Southern corridor (Chennai to Goa – 890 km) and East-Coast corridor (Kharagpur to Vijaywada – 1,100 km).

4-4. Capacity Augmentation of Airports in Tamil Nadu

Traffic at Chennai airport, both domestic and international, has been growing significantly. In order to meet the future demand, modernization and expansion of the international and domestic terminal has been taken up by the Airports Authority of India (AAI) at an estimated cost of Rs. 18.08 billion. The project includes construction of the Kamraj Domestic Terminal Phase II, expansion of the international terminal and associated facilities, extension of the airport's second runway, new and upgraded taxiways, additional parking bays, construction of a flyover connecting domestic and international terminals, multi-level car park, etc. The construction activities are in the final stages of completion. After its completion, the passenger capacity of the international and domestic terminals at Chennai would increase to 14 million and 10 million respectively. The proposed Chennai Metro Rail Project would connect the Chennai International Airport with various parts of the city.

The domestic terminal is expected to reach its maximum handling capacity or saturation by the year 2019 and the international terminal by 2015. Thus, with an objective to cater to the future traffic demand, the state government is planning to establish a greenfield airport at Sriperumbudur, an important industrial hub in the state. The same is currently in initial formulation stages. The improvement of Trichy, Madurai and CoimbatoreAirports is being taken up under the modernization of 35 non-metro airports project. While upgradation work at Trichy and Madurai has been completed, the work at Coimbatore airport is soon expected to be completed.

4-5. Capacity Augmentation at Ports in Tamil Nadu

The Chennai and Ennore ports would form the gateway for transport linkage with ASEAN. This, in addition to the natural growth, is expected to increase the traffic to be handled by these ports significantly in years to come. The Chennai and Ennore ports handled 61.46 million tonnes and 11.01 million tonnes of the cargo in the year 2010-11, respectively. The existing capacity at these ports is 71.32 million tonnes and 16 million tonnes respectively. Thus, utilization of these ports is in the range of 70-85 percent. The commodity-wise capacity estimated for the coming years at Chennai and Ennore ports is given in Table 14.

Table 14:Commodity-wise capacity estimated for Chennai and Ennore ports

Port	Year	POL	IronOre	Coal		Containers		General/ Break Bulk	Total
				Thermal	Coking	Tonnage	TEUs		
		(million tonnes)							
Chennai	2011-12	11.80	-	-	-	33.60	2.68	22.92	68.32
	2015-16	12.80	-	-	-	53.60	4.29	26.42	92.82
	2019-20	12.80	-	-	-	99.60	7.97	27.92	140.32
Ennore	2011-12	3.00	12.00	16.00	8.00	-	-	0.50	39.50
	2015-16	8.50	12.00	26.00	8.00	18.00	1.44	0.50	73.00
	2019-20	8.50	12.00	26.00	8.00	18.00	1.44	0.50	73.00

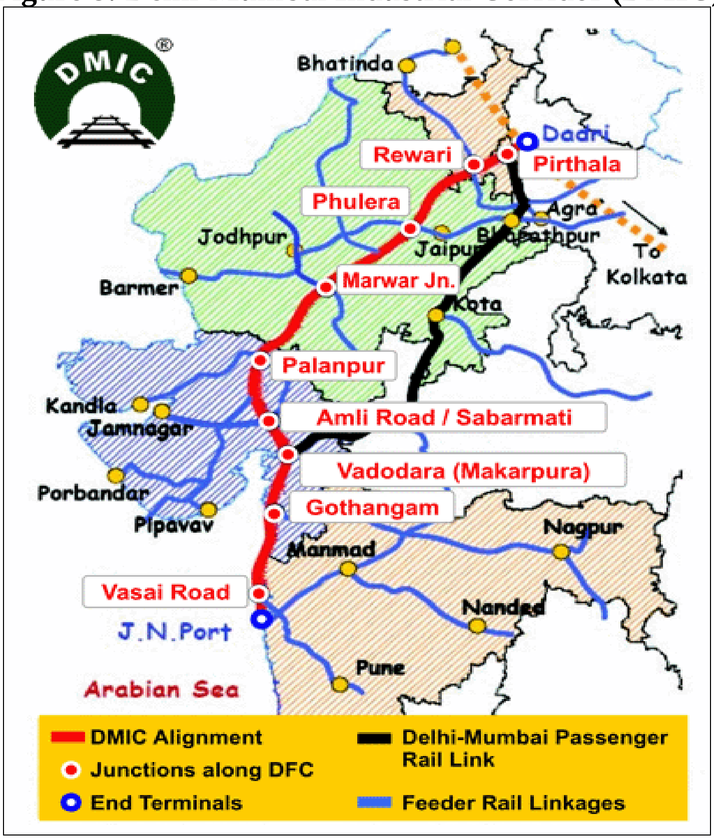
Source: Maritime Agenda 2020, Government of India

4-6. Delhi-Mumbai Industrial Corridor (DMIC)

The Delhi-Mumbai Industrial Corridor (DMIC) is a mega infrastructure project of US$ 90 billion that has been initiated by the Government of India to leverage the economic benefits arising from the Western DFC project. The project being developed with financial & technical aid from Japan, envisages developing an industrial belt between Delhi and Mumbai, along 150 to 200 km (Influence region) on either sides of the alignment of Western DFC. The project Influence area of DMIC comprises 436,486 sq. km. area, constituting about 13.8 percent of the geographical area of India. The project covers seven states (Delhi, Uttar Pradesh, Haryana, Rajasthan, Gujarat, Madhya Pradesh and Maharashtra).

An SPV called Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) was incorporated in January 2008 as the project development agency. The Government of India holds 49 percent equity, the Infrastructure Leasing & Financial Services Limited (IL&FS) about 41 percent, and the remaining is held by Infrastructure Development Finance Company Limited (IDFC). The DMICDC is mainly responsible for facilitating, promoting and establishing industrial, investments and allied regions, project development services and raising financial instruments. In addition, the DMIC would also include development of requisite feeder rail/road connectivity to hinterland/markets and select ports along the western coast.

Figure 8: Delhi-Mumbai Industrial Corridor (DMIC)



Source: RIS based on DMICDC

The DMIC is conceived to be developed as a model industrial corridor of international standards with emphasis on expanding the manufacturing and services base and develop DMIC as the 'Global Manufacturing and Trading Hub' supported by the world class infrastructure and enabling policy framework. The vision for DMIC is to create strong economic base in this band with globally competitive environment and state-of-the-art infrastructure to activate local commerce, enhance foreign investments and attain sustainable development.

The project is planned to be developed in two phases, Phase I is likely to be implemented over 2008-12 and Phase II over 2013-18. However, project activities have been delayed considerably and as per current plan, the Phase I is expected to be completed by 2017. The project incorporates 9 mega industrial zones of about 200-250 sq.km., high speed freight line, 3 ports and 6 airports; a 6-lane intersection-free expressway between Delhi and Mumbai and a 4,000 MW power plant. Several industrial estates and clusters, industrial hubs, with top-of-the-line infrastructure would be developed along this corridor to attract foreign investment.

Out of the total project cost, the Government of India would finance 35 percent, while the rest is expected to be drawn from the private sector. A provision of Rs. 3.3 billion was made during the Twelfth Five Year Plan towards Project Development Fund (PDF) of DMIC. Besides, the Japan Bank for International Cooperation (JBIC) has also provided a commercial loan of US$ 75 million for the project.

In April 2010, MoUs were signed by DMICDC and the state governments of Haryana, Gujarat and Maharashtra with Japanese companies for development of smart communities or eco-friendly townships (townships with optimized energy supplies, 24-hour drinking water supply, bicycle and walking tracks and waste and water recycling system). As per the agreement, Japanese consultants will prepare feasibility studies for development of these townships in Manesar-Bawal region of Haryana, Dahej and Chandogar in Gujarat and Shendra Industrial region in Maharashtra.

Further, MoUs have been signed with all the states. Early Bird projects from the Indian side have been finalized for the DMIC states. Also, six early bird projects have been announced by the Japanese side. Master planning consultants for these areas/ projects have been appointed. Aiming to achieve double employment potential, triple industrial output and quadruple exports from the region in five years, the DMIC would provide substantial boost to the economy.

4-7. Chennai-Bangalore-Mumbai Industrial Corridor(CBMIC)

On similar lines to the DMIC, an industrial corridor is proposed between Chennai to Bangalore (Karnataka). The proposal is to develop the project in two phases. The first phase would include Chennai-Sriperumbudur–Ranipet section, while the second phase would include Ranipet-Hosur-Bangalore section. Industrial parks, Special Economic Zones, information technology parks and integrated townships are expected to come along the corridor. The Chennai-Bangalore section of the industrial corridor is also called as Industrial Corridor of Excellence and is the same for the PRIDe corridor described later. The Indian Railways have a long term plan to construct High Speed Railway, while the NHDP VI proposes a 6-lane greenfield expressway between Chennai and Bangalore. Further, extension of metro rail between Chennai and Bangalore are also being discussed. A feasibility study for the Chennai-Bangalore Industrial Corridor project has also been initiated. Based on request from the Government of Karnataka, the Government of India has agreed in-principally for extending the industrial corridor beyond Bangalore up to Mumbai, passing through Davangere and Hubli-Dharward regions of Karnakata.

Development of the Chennai-Bangalore-Mumbai Industrial corridor and integrating it with the Delhi-Mumbai Industrial Corridor, currently under implementation, would provide significant boost to the industrial and economic growth, not only for these regions, but for the country as a whole. Further, construction of the Chennai-Bangalore-Mumbai Dedicated Freight corridor and its integration with the Western DFC between Delhi and Mumbai would provide seamless connectivity for movement of cargo between the Chennai/Ennore ports and Jawaharlal Nehru port through the railway network. Efficient connectivity between manufacturing hubs along the Chennai-Bangalore- Mumbai region, on the one side, and the East Asian countries, on the other, would considerably boost trade potential between India and ASEAN.

4-8. PRIDe (Peninsular Region Industrial Development) Corridor

The PRIDe (Peninsular Region Industrial Development) Corridor project has been conceived on similar lines of the DMIC and covers industrialized as well as backward areas of Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra states to invite investments and generate employment with the development of extensive infrastructure including hard transportation, soft logistics and business environment improvements. The targeted core nodal areas are Chennai and Bangalore and 250 km intra city corridor is identified as the potential region by effectively leveraging the existing strengths of the IT, electronics, and automobile industries of the region.A number of industrial zones like Tumkur, Hosur, Sriperumbudur, Krishnapatnam and the Chennai and Ennore ports are located along this corridor.

Development of PRIDe corridor is divided into two phases. The Phase I shall include; (a) development of focused project along Chennai-Sriperumbudur-Ranipet-Hosur (along NHs 4, 46 and 7), also called as Industrial Corridor of Excellence, that aims to accommodate IPs, SEZs, IT parks, integrated townships, etc; (b) Bangalore-Chitradurga (NH 4); and (c) Nellore-Chennai (NH 5) connecting 3 eastern ports. While Phase II shall include (a) Nellore-Cuddapah-Kadri-Bangalore (SHs and NH 7); (b) Chitradurga-Kolhapur-Pune-Mumbai (NH 4); and (c) Chennai-Cuddalore (NH 45). Industrial nodes along the corridor are classified into Industrial Project Zones (size more than 100 sq km) and Industrial Areas (size 50-100 sq km).

5. DEVELOPMENT OF NATIONAL CONNECTIVITY IN INDIA: INSTITUTIONAL INITIATIVES

The provision of quality and efficient infrastructure services is essential to realize the full potential of the growth impulses surging through the economy. The efforts towards infrastructure development is continued to focus on the key areas of physical and social infrastructure. India, while stepping up public investment in infrastructure, has been actively engaged in involving private sector to meet the growing demand. As shown in Table 15, the demand for infrastructure investment during the 11th Five Year Plan (2007-2011) was about US$ 514 billion (Planning Commission, 2010), a large portion of which is sourced from the private sector (Table 15).

According to the Planning Commission (Planning Commission, 2011), the economy will enter the Twelfth Plan (2012-17) in a much stronger position as far as infrastructure is concerned than existed at the start of the Eleventh Plan. Investment in infrastructure will be around 8.37 percent of GDP in the base year of the Twelfth Plan (2011-12). If GDP in the Twelfth Plan period grows at a rate above 9 percent, it should be possible to increase the rate of investment in infrastructure to around 10.70 percent in the terminal year of the Twelfth Plan period as indicated in Table 16. These projections imply that the investment in the infrastructure sector during the Twelfth Plan would be of the order of US$ 1,024.81 billion. At least 50 percent of this should come from the private sector. This would imply that public sector investment in infrastructure would increase from in the Twelfth Plan at 2006-07 prices. This requires an annual increase of about 9.34 percent in real terms.

Table 15: Investment in Infrastructure in 11th Five Year Plan (2007-2011)

Sector	Tenth Plan (2002-2006)		Eleventh Plan (2007-2011)	
	US$ billion	Shares (%)	US$ billion	Shares (%)
Electricity	72.960	33.490	166.630	32.420
Roads and Bridges	36.220	16.630	78.540	15.280
Telecommunication	25.840	11.860	64.610	12.570
Railways	29.910	13.730	65.450	12.730
Irrigation	27.880	12.800	63.320	12.320
Water Supply and Sanitation	16.200	7.440	35.930	6.990
Ports	3.520	1.610	22.000	4.280
Airports	1.690	0.780	7.740	1.510
Storage	1.200	0.550	5.590	1.090
Gas	2.430	1.110	4.210	0.820
Total	**217.860**	**100.000**	**514.040**	**100.000**

Source: Planning Commission

Table 16: Projected investment in infrastructure in the 12th Five Year Plan

Year	GDP Growth (%)	Infrastructure Investment (as % of GDP)	Infrastructure investment (US$ billion)
2011-12 (Base year)	9.00	8.37	132.08
2012-13	9.00	9.00	154.86
2013-14	9.00	9.50	178.17
2014-15	9.00	9.90	202.38
2015-16	9.00	10.30	229.51
2016-17	9.00	10.70	259.88
12th Plan Total	9.00	9.95	1,024.81

Note: Taken at 2006-07 prices.
Source: RIS based on Planning Commission

5-1. Public Private Partnership (PPPs) in infrastructure: Policy initiatives to Promote Private Participation in Infrastructure[39]

Government is actively pursuing PPPs to bridge the infrastructure deficit in the country. Several initiatives have been taken during the last three years to promote

[39] Adapted from Planning Commission (2011)

PPPs in sectors like power, ports, highways, airports, tourism and urban infrastructure. Under the overall guidance of the Committee of Infrastructure headed by the Prime Minister, the PPP programme has been finalized and the implementation of the various schemes is being closely monitored by the constituent Ministries/Departments under this programme. A number of initiatives were taken in the course of the Eleventh Five Year Plan to accelerate the pace of investment in infrastructure. In particular, the government has taken several initiatives for standardizing the documents and processes for structuring and award of PPP projects in a transparent and competitive manner.[40]

(i) Committee on Infrastructure (COI)

The Committee on Infrastructure (COI) was constituted on 31 August, 2004 under the chairmanship of the Prime Minister. Its members included the Finance Minister, the Deputy Chairman, Planning Commission and the Ministers-in-charge of infrastructure ministries. The objective of COI was to initiate policies that would ensure time-bound creation of world class infrastructure, develop structures that maxims the role of PPPs, and monitor the progress of key infrastructure projects to ensure that established targets are realized.

(ii) Cabinet Committee on Infrastructure (CCI)

In July 2009 the COI was replaced by a Cabinet Committee on Infrastructure chaired by the Prime Minister to give further impetus to initiatives for development of infrastructure. CCI approves and reviews policies and projects across infrastructure sectors. It considers and decides financial, institutional and legal measures required to enhance investment in infrastructure sectors.

(iii) Public–Private Partnership Appraisal Committee (PPPAC)

With a view to streamlining and simplifying the appraisal and approval process for PPP projects, a Public Private Partnership Appraisal Committee (PPPAC) had been constituted under the chairmanship of Secretary, Department of Economic Affairs with Secretary, Planning Commission as one of the members. PPP proposals are

[40] A website on the PPPs in India has been set up by the Department of Economic Affairs in the Ministry of Finance. The updated status of the above programmes is available on the website www.pppinindia.com. A database on PPP projects in India is also being developed and the task has been outsourced to a private firm that will be responsible for collection, compilation and maintenance of the database.

appraised by the Planning Commission and approved by the PPPAC. The PPPAC conducts a thorough scrutiny and due diligence in the formulation, appraisal and approval of PPP projects. It has approved 192 projects with estimated project cost of Rs. 1.63 trillion by May 2010.

(iv) Empowered Committee/ Institution (EC/EI)

An institutional framework comprising an inter-ministerial Empowered Committee has been established for the purpose of appraising and approving projects for availing the Viability Gap Funding (VGF) grant of up to 20 percent of the cost of infrastructure projects undertaken through PPP. Until May 2010, it has approved 63 projects in the State sector involving a total capital investment of Rs. 414.22 billion.

(v) Viability Gap Funding (VGF)

Recognizing that the externalities engendered by infrastructure projects cannot always be captured by project sponsors, a VGF Scheme was notified in 2006 to enhance the financial viability of competitively bid infrastructure projects. Under the scheme, grant assistance of up to 20 percent of capital cost is provided by the Central Government to PPP projects undertaken by any Central Ministry, State Government, statutory entity or local body. An additional grant of up to 20 percent of project costs can be provided by the sponsoring Ministry, State Government or project authority. Up to May 2010, 255 projects had been approved by the PPPAC and EC/EI with a capital investment of Rs. 2.04 trillion.

(vi) India Infrastructure Finance Company Ltd (IIFCL)

IIFCL, was established by the Central Government for providing long-term loans for financing infrastructure projects that typically involve long gestation periods, provides financial assistance of up to 20 percent of the project costs, both through direct lending to project companies and by refinancing banks and financial institutions. It has raised Rs. 205.69 billion and approved 139 projects involving total investment of Rs. 2.01 trillion by May 2010. Out of these 139 projects, financial closure has been achieved in 126 projects with investment of Rs. 1.75 trillion.

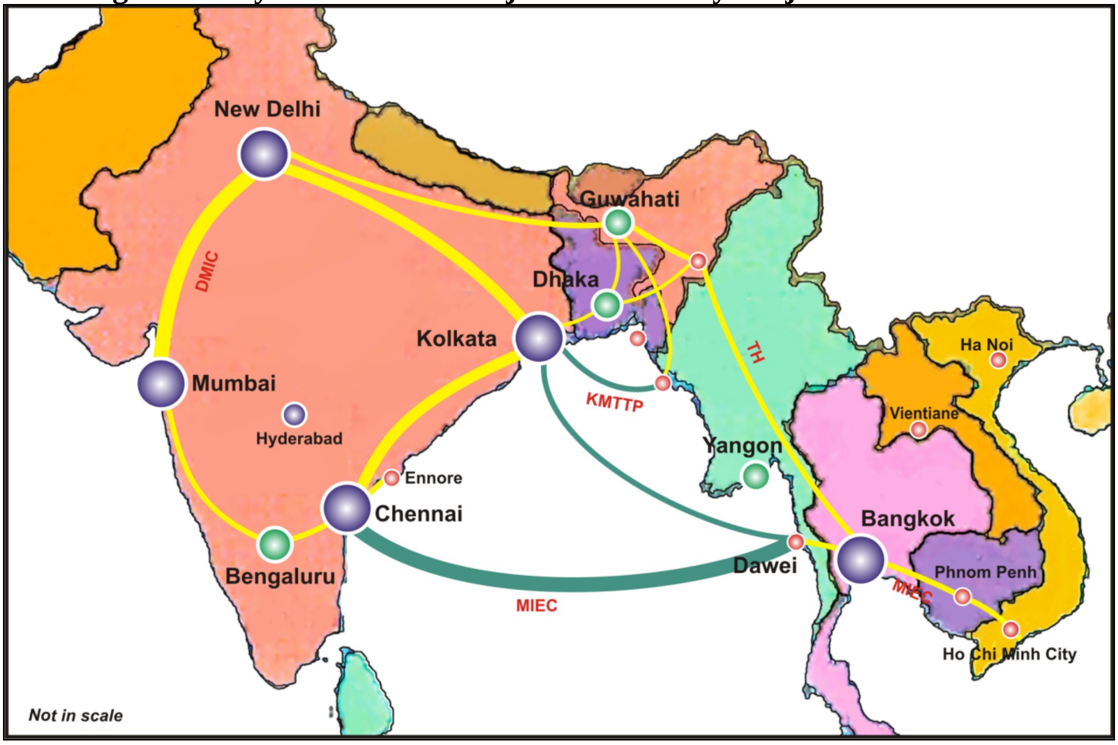
(vii) Model Documents

Recognizing the need for a standardized framework for PPPs, the COI encouraged the creation of standard documents for bidding and also for award of concessions. Creation of a standardized framework ensures transparency in the allocation of risk, clarity in the obligation of the concessionaire and minimization of possibilities of disputes arising from the agreement. It enables robust competitive bidding for individual projects with a reasonable commonality in approach across projects, which is an important aspect of good governance.

6. INDIA'S REGIONAL CONNECTIVITY PROJECTS WITH ASEAN

Trade between India and ASEAN depends on effective transportation links. India and ASEAN have initiated some important transportation projects to link each other's markets (Figure 9). Some of the challenges to ASEAN-India physical connectivity are as follows: (i) absence of harmonization of railway networks, (ii) lack in standardization of all-weather paved roads, (iii) inefficient and underdeveloped border (land) customs stations, (iv) absence of enabling software such as transit, (v) inadequate security, (vi) cumbersome trade documentations, to mention a few. The approach we have been following in planning ASEAN-India connectivity is the development of transport corridors. The corridors have the advantage of combining infrastructure investments with activities to streamline cross-border trade and transit procedures. Some of the prominent physical connectivity projects linking ASEAN and Indian markets are briefed below.

Figure 9: Layout of India's Major Connectivity Projects with ASEAN



Source: RIS

6-1. India–Myanmar–Thailand Trilateral Highway (IMTTH)

India–Myanmar–Thailand Trilateral Highway (IMTTH) is a cross-border transportation network being financed by the Governments of India, Myanmar and Thailand.[41] This highway links Moreh (in India) with Mae Sot (in Thailand) through Bagan (in Myanmar), which is often termed as land bridge between South with Southeast Asia. The alignment of this trilateral highway falls within the Asian Highway 1, being pursued by UNESCAP. The agreed route of IMTTH (1360 km) is identified as follows: Moreh (India)–Tamu–Kalewa–Chaungma–Yinmabin–Pale–Kyadat–Lingadow–Pakokku–Bagan–Kyaukpadaung–Meiktilabypass–Taungoo–Oktwin – Payagyi – Theinzayat – Thaton–Hypaan– Kawkareik–Myawaddy–Mae Sot (Thailand).

The IMTTH is divided into three phases; the first phase includes 78 km of new roads, upgradation of about 400 km of roads, construction of all-weather approach lanes, rehabilitation/reconstruction of weak or distressed bridges and a detailed examination of a project on the Ayeyarwaddy river as well as a causeway. The entire project is being funded through government resources. Phase-I of the IMTTA was

[41] Refer, De (2005) for further details.

taken up in early 2005. India assumes responsibility of 78 km. of missing links and 58 km. of upgradation as part of Phase-I. India may also take up additional 132 km of upgradation. Thailand would take up upgradation of 136 km. and 62 km. sectors of Phase-I and another 100 km as part of Phase-II. Myanmar has indicated willingness to take up intermediary approach roads, reconstruction/ rehabilitation of weak bridges.

India has agreed to offer credit at concessional terms to Myanmar for financing new constructions of Chaungma – Yinmabin (30 km) and Lingadaw – Letsegan – Pakokku (48 km) highways. India has also agreed to consider similar financing for upgradation to two-lane standard of the Yinmabin – Pale – Lingadaw (50 km) road section inside Myanmar. Further, India has agreed to consider, financing of the upgradation of the Bagan – Meiktila (132 km) segment in Myanmar. India has also undertaken the preparation of a Detailed Project Report (DPR) for construction of a bridge on the Ayeyarwaddy river and for the causeways near Kyadet. Thailand has agreed to extend concessional loans for financing the upgradation to two-lane standard of the Thaton – Hpa-an – Kawkareik section (136 km) and Kawkareik – Myawaddy section (62 km). These sections are part of the western side of the East West Economic Corridor in GMS between Myanmar and Thailand. The Thailandgovernment has agreed to assist Myanmar in financing of the route Thaton – Mawlamyine – Mudon – Kawkareik as a second phase of the project. Myanmar has agreed to finance construction of all-weather intermediate lane approach roads at both ends from Pakokku to Bagan up to the existing ferry crossing and the rehabilitation/ reconstruction of distressed and weak bridges. Myanmar has decided to explore the possibility of important commercial segments of the highway being constructed, operated and maintained by operators on a commercial basis.

Indian government-owned Border Roads Organisation (BRO) had upgraded the Tamu – Kalewa – Kalemyo (TKK) road (160 km) in Myanmar from the Indian northeastern border at a cost of Rs. 1.20 billion (about US$ 27.28 million). The Government of India is also responsible for upkeep of the TKK road in Myanmar. Taking up of construction of 30 km. stretch of road is under consideration. The Government of India has taken initiatives to prepare the DPR for following sections of the road:

- construction Chaungma – Yinmabin section (30 km)
- construction of Lingadaw – Letsegan – Pakokku section (48 km)

- upgradation from single lane to double lane of Yinmabin– Pale – Lingadaw section (50 km)
- upgradation from single lane to double lane of Bagan – Meiktila section (132 km)
- construction of Ayeyarwaddy bridge near Pokokku and causeways near Kyadet

Lack of essential institutional support and government commitments are some of the reasons for slowing down the development of this trilateral highway. It has been argued that deeper regional cooperation among the three countries would help restart the development of the trilateral highway.

6-2. Delhi–Hanoi Railway Link (DHRL)

Railways can play a positive role in integrating India with ASEAN, which will promote bulk trans-national movement amongst the neighbouring countries. Needs are two folds – (a) to link India's Manipur with India's main railway corridor, and (b) to re-establish and renovate railway networks in Myanmar. Harmonisation of railway track in the region is very much essential. Without having a compatible and strong railway system inside Myanmar and Bangladesh, closer communication between India and its immediate neighbours will be unfulfilled. Indian consulting engineering company, RITES, has already completed a preliminary study to establish Delhi–Hanoi railway link in 2006. Indian Railways is engaged in harmonization of railway tracks in the northeastern India and also construction of new lines. Indian government has come forward and extended US$ 56 million credit line to the Myanmar government for upgradation of 640 km railway system between Mandalay and Yangon section. Similar initiative should be taken up for up-gradation of railway network system in southern (Yangon to Dawei) and northern (Mandalay to Kalay) Myanmar. A possible connection between Myanmar and Thailand could be via Thanbyuzayat and Three Pagoda Pass, and between India and Myanmar could be by constructing new railway line between Tamu and Kalay. Considering the projects already sanctioned and under construction, Diphu – Karong – Imphal – Moreh rail link is identified for development, which will link India with ASEAN. Although at present construction work is being carried out in Diphu – Karong section, linking Karong with Morea via

Imphal would link India with ASEAN provided railway system in other side (Myanmar) is also developed simultaneously.Considering a rather short distance, Imphal – Moreh link could be undertaken on a priority basis in the short-term. On completion of these projects there could be possibilities for (i) India – Myanmar – Thailand – Malaysia - Singapore rail link, and (ii) India – Myanmar – Thailand – Ha Noi rail link.

6-3. Kaladan Multimodal Transit Transport Project (KMTTP)

The Kaladan Multimodal Transit Transport Project (KMTTP) in Myanmar envisages connectivity between Indian ports and Sittwe port in Myanmar, and road and inland waterway links from Sittwe to India's NER (Figure 10). The Kaladan project would provide an alternate route for transportation of goods to NER through Myanmar. The Agreement and the Protocols were signed between India and Myanmar in 2008. The Ministry of External Affairs of Government of India and the Foreign Affairs Ministry of Government of Myanmar are the nodal agencies. Indian public sector company, IWAI, is the project development consultant of this project. The entire project is funded by the Government of India. The approximate cost of the project is expected to be Rs. 5.45 billion. The timeframe for the project is five years from the date of actual commencement of the project.

It has two major components: (i) port and IWT development between Sittwe and Kaletwa in Myanmar along Kaladan river, (ii) highway (129 km) from Kaletwa to India – Myanmar border in Mizoram. The Government of Myanmar has provided land for setting up contractor's camp, and land for construction of Sittwe in September 2010. Clearances of permissions and approvals of import of construction equipment and materials and opening of bank account were received by the Indian contractor. Construction work has been started in December 2010.[42] On Indian side, construction of 100 km new road from Lawngtlai on NH 54 to India-Myanmar border is taken-up under SARDP-NE Phase A, which is likely to be completed by September 2014.

[42] Based on personal discussion with IWAI, New Delhi. Also refer, BIMSTEC Newsletter, January 2011, available at http://www.bimstec.org.

Figure 10: Kaladan Multimodal Transit Transport project

Source: RIS based on IWAI, New Delhi

6-4. Mekong–India Economic Corridor (MIEC)

MIEC involves integrating the four Mekong countries, namely, Myanmar, Thailand, Cambodia and Vietnam with India. It connects Ho Chi Minh City (Vietnam) with Dawei (Myanmar) via Bangkok (Thailand) and Phnom Penh (Cambodia) and further linking to Chennai in India. MIEC corridor is conceptualized to be the region around the main highway connecting Vung Tau inVietnam to Dawei in Myanmar passing through Ho Chi Minh City, Phnom Penh and Bangkok. The highway passes through three borders of (i) Moc Bai – Bavet (Cambodia – Vietnam); (ii) Poipet – Aranyaprathet border (Cambodia – Thailand); and (iii) Sai Yok – Bong Tee (Thailand – Myanmar). There is an existing road from Vung Tau to Bong Tee on Thailand – Myanmar border, after which there isonly unpaved path till Dawei.In addition to several major cities it covers key towns - such as of BienHoa (in Vietnam), Battambang, Sisophon (in Cambodia), Chachoengsao, Prachinburi and Kanchanaburi (in Thailand).

Figure 17:Mekong – India Economic Corridor (MIEC)

Source: ERIA

This corridor, when completed, is expected to augment trade with India by reducing travel distance between India and MIEC countries and removing supply side bottlenecks. As noted by ERIA, the corridor would provide opportunities to individual countries of Myanmar, Thailand, Cambodia and Vietnam to build a strong economic and industrial base and a world-class infrastructure. The emphasis of the corridor is on expanding the manufacturing base and trade with rest of the world, particularly with India. The corridor will enable these economies to further integrate and collectively emerge as a globally competitive economic bloc.

7. Conclusions

One of the major obstacles to the expansion of trade between India and ASEAN is the high cost of moving goods across the borders. Improved connectivity would lead to reduce trade costs, raise country's comparative advantage and trade flows, expand markets, reduced poverty, and increase country's welfare and quality of life of its citizens. Multiple effective cross-border and national transport projects mean stronger ASEAN-India connectivity. An integrated connectivity would also provide substantial benefits to landlocked and small island countries in the region as well as poor, small countries by giving them access to world market at lower costs.

The study suggests that ASEAN and India are becoming more economically integrated and there is ample scope for deepening this integration process. The experiences of Europe and Latin America, where the presence of cross-border infrastructure is comparatively high, and to a lesser extent, Africa, where the development of cross-border infrastructure has taken a new shape, suggest that regional cooperation promotes greater prosperity and stability for participating countries. A major success factor is their ability to build regional initiatives that are based on shared strategic vision, as captured in the Initiative for the Integration of Regional Infrastructure in South America (IIRSA).[43] Thus, India – ASEAN regional cooperation programmes have to be much stronger to address the regional infrastructure needs and enabling institutions and policies.

Given India's diversity and geographical contrasts, an integrated regional transport network with ASEAN in particular would yield much larger economic benefits, while minimizing risks. Asia-wide connectivity projects like the AH and TAR should be complemented by cross-border transport projects linking India with ASEAN. Intermodality in transportation is essential in many of the transportation chains between India and ASEAN. At the same time, it is important to exploit synergies across various types of cross-border infrastructure.

ASEAN countries and India have to identify the missing links and investment needs from a region-wide perspective. To a great extent, missing rail and roadways in Myanmar is hindering the overland connectivity between India and ASEAN. Therefore, average road condition and railway system inside Myanmar needs to be rebuilt. Roads leading from Myanmar to India and Thailand require widening and better maintenance to allow efficient movement of larger vehicles. Development of economic corridors taking countries in the region will facilitate investments as well as spur economic growth in India's Southern and Northeastern regions as well as in Myanmar and Mekong countries.

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[43] The Initiative for the Integration of Regional Infrastructure in South America is a dialog forum among South American countries, which seeks to promote the development of transport, energy, and telecommunication infrastructure from a regional viewpoint, aimed at physical integration of the 12 South American countries and the achievement of an equitable and sustainable territorial development pattern. About US$68.27 billion, comprised of 508 infrastructure projects having direct or indirect cross-border implications, have been identified for investments across 12 Latin American countries, of which 12 projects are being executed under public-private partnerships (IIRSA 2010).

The proposed connectivity between ASEAN and India would throw many challenges for its development. Further, during and after its implementation, the link would open considerable avenues and opportunities to manufacturing and trade between these regions. Indian ports are heading for a better future with growing international trade. Thus, operational efficiency of the ports have to be competitive and on par with the best ports in the world. Modern cargo handling techniques must be introduced to improve port performance. Efforts must be made to enhance the quality of service and productivity levels. While upgradation of the Chennai and Kolkata airports (both domestic and international terminals) is in progress, it is essential for the second airport in these cities. In the context of Indian Railways, technological upgradation and modernization for the current assets is essential for realizing maximum benefits. Completion of the Western and Eastern DFCs in a timely manner would provide significant boost to economic development in the region and bring confidence for planning of other DFCs along the trunk routes. Plans for Chennai – Bangalore – Mumbai Industrial Corridor must be evolved by closely studying best practices from DMIC project and similar projects developed elsewhere in the world. Funding requirement for infrastructure is huge and a considerable amount of future investment is expected to come from the private sector. So far, response from the private sector has been good. However, efforts to enable level playing field to the private entrepreneur by fair allocation of risks is highly essential. In this connection, greater economic and/or commercial cooperation is desired from developed and developing countries which have technological expertise on transport and communications.

To sum up, trade liberalization is important, but sometimes it is not adequate enough to enhance country’s trade. Improved connectivity and trade facilitation can complement that effort. It is the way forward for regional trade and economic partnership between India and ASEAN.

In order to fund the large infrastructure investments required to boost ASEAN – India connectivity, the region needs to further develop mechanisms for the financial intermediation between its large savings and its equally large investment needs. The region should support expanding the use of public-private partnerships (PPPs) for investment in infrastructure and creation of a large regional infrastructure development fund to channel the region’s foreign exchange reserves into much needed infrastructure investments.

Enhancing connectivity between India and ASEAN is a multi faceted task that will require the implementation of strong policy initiatives. Development of the ASEAN - India connectivity would throw up significant opportunities to industrial development in India and its trade potential with South and East Asian countries. Chennai has already established itself as a gateway to Southern India. The ASEAN connectivity would link the Chennai region to the rest of the world through its maritime infrastructure. Thus, Chennai has a great potential for becoming the greater gateway for India and function as a core node providing as centre of business activities with industrial clusters, and work as engine to promote regional economic growth.

APPENDIX. ONGOING AND PROSPECTIVE INFRASTRUCTURE PROJECTS FOR ASEAN-INDIA CONNECTIVITY: INDIA

Tier	Type	Sector	Sub−Sector	Project Name	Cost (US$ mil)	Status
1	Public	Logistics	Railway	Chennai Metro rail project	4,500.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Creation of additional open storage yards by reclamation	45.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Deepening of channels, basin and berths	32.0	Ongoing
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Mega Container Terminal	695.0	Ongoing
1	Public	Logistics	Port / Maritime	Chennai Port : Modernization	45.0	Ongoing
1	Public	Logistics	Road/ Bridge	Chennai-Ennore Port road connectivity project (formerly EMRIP)	135.0	Ongoing
1	Public	Logistics	Railway	Construction of new railway line between Chennai-Mahabalipuram-Cuddalore	116.0	Ongoing
1	PPP	Logistics	Road/ Bridge	Dedicated elevated expressway connecting Chennai Port to Maduravoyal Junction	370.0	Ongoing
1	Public	Logistics	Railway	Dedicated Freight Corridors (Western & Eastern corridors)	10,350.0	Ongoing
1	Public	Logistics	Port / Maritime	Ennore Port : Development of coal berth III	44.5	Ongoing
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of container terminal, phase 1	312.7	Ongoing
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of iron ore terminal	106.7	Ongoing
1	Public	Logistics	Railway	Ennore Port : New chord line linking Puttur - Attipattu	99.1	Ongoing
1	Public	Logistics	Railway	Ennore Port : Rail connectivity	19.6	Ongoing
1	Public/PPP	Logistics	Airport	Green field airport - Navi Mumbai	890.0	ongoing
1	Public	Logistics	Airport	Modernization of Chennai Airport	400.0	Ongoing
1	Public	Logistics	Road/ Bridge	Tamil Nadu road sector project (TNRSP)	542.0	Ongoing
1	Public	Logistics	Other Logistics	Transport sector improvement program in Chennai Metropolitan Development Area	16,120.0	Ongoing
1	Public	Logistics	Road/ Bridge	Chennai Outer Ring Road (Phase 2)	240.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of new Berth	11.1	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of new Jetty	11.1	Prospective
1	Public	Logistics	Port / Maritime	Chennai Port : Construction of roads inside port Area	50.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Construction of Ro-Ro Berth and Multi-level Car parking	21.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of 3rd Container Terminal	166.7	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Barge handling facilities	8.9	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of container terminal	111.1	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Development of Integrated Dry Port and Multi Model Logistics Hub near Sriperumbudur	86.1	Prospective
1	Public	Logistics	Port / Maritime	Chennai Port : Dredging related to Mega Container Terminal	125.0	Prospective
1	PPP	Logistics	Port / Maritime	Chennai Port : Others (fishing harbour, EPZ, trade convention centre, etc)	88.9	Prospective

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US$ mil)	Status
1	PPP	Logistics	Road/ Bridge	Chennai-Bangalore Expressway	NA	Prospective
1	Public/PPP	Economic	Industrial Estate / SEZ	Chennai-Bangalore-Mumbai Industrial Corridor	NA	Prospective
1	Public	Logistics	Railway	Dedicated Freight Corridors (Chennai-Goa, Chennai-Delhi, Kolkata-Vijaywada)	NA	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Capital Dredging Phase III	48.7	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Capital dredging, phase 2	49.1	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Construction of 2nd marine liquid terminal	44.5	Prospective
1	PPP	Logistics	Port / Maritime	Ennore Port : Development of LNG terminal	22.2	Prospective
1	Public	Logistics	Port / Maritime	Ennore Port : Upgradation of coal handling facility	12.7	Prospective
1	Public	Logistics	Railway	High Speed Rail (HSR) system between Chennai-Bangalore-Coimbatore-Ernakulam	NA	Prospective
1	Public	Logistics	Railway	High Speed Rail (HSR) system between Hyderabad-Dornakal-Vijayawada-Chennai	NA	Prospective
1	NA	Logistics	Road/ Bridge	Kanyakumari-Tirunelveli-Pondi-Chennai Expressway	NA	Prospective
1	Public/PPP	Logistics	Airport	New International Airport at Sriperumbedur	NA	Prospective
1	Public	Logistics	Road/ Bridge	North Chennai Thermal Power Station (NCTPS) Road	18.5	Prospective
1	PPP	Logistics	Road/ Bridge	Northern Port Access Road	100.0	Prospective
1	PPP	Logistics	Road/ Bridge	Rajiv Gandhi Salai (IT Corridor), phase II	122.0	Prospective
1	Public	Logistics	Railway	Upgradation of passenger railway system along Chennai-Bangalore truck route	NA	Prospective
2	Public/PPP	Logistics	Port / Maritime	Conversion /development of 7th berth into coal terminal at Mormugao Port	63.1	ongoing
2	Public/PPP	Economic	Industrial Estate / SEZ	Delhi-Mumbai Industrial Corridor	90,000.0	Ongoing
2	Public/PPP	Logistics	Port / Maritime	Development of deep draught coal berth at Paradip Port	119.8	ongoing
2	Public/PPP	Logistics	Port / Maritime	Development of deep draught iron ore berth at Paradip Port	129.8	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Bijapur	50.0	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Durgapur	150.0	ongoing
2	PPP	Logistics	Airport	Green field airport - Kannaur	232.5	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Pakyoung	77.4	ongoing
2	Public/PPP	Logistics	Airport	Green field airport - Sindhudurg	43.8	ongoing
2	Public/PPP	Logistics	Port / Maritime	Haldia Port Development	NA	ongoing
2	Public/PPP	Logistics	Port / Maritime	International container trans-shipment terminal (ICTT) at Cochin Port	296.0	ongoing
2	Public/PPP	Logistics	Port / Maritime	Mechanization of iron ore handling facility as a backup requirement at deep draught berth No. 14 at New Mangalore Port	74.0	ongoing
2	Public/PPP	Logistics	Road/ Bridge	National Highway Development Plan (NHDP), phase 1 & 2	16,159.8	Ongoing
2	Public/PPP	Logistics	Road/ Bridge	NHDP, phase 3	20,156.5	Ongoing
2	PPP	Logistics	Road/ Bridge	NHDP, phase 5	10,302.5	Ongoing
2	PPP	Logistics	Road/ Bridge	NHDP, phase 6	4,170.0	Ongoing
2	Public/PPP	Logistics	Road/ Bridge	NHDP, phase 7	4,170.0	Ongoing
2	Public/PPP	Logistics	Port / Maritime	The Vishakapatnam Port	28.6	ongoing

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US$ mil)	Status
2	NA	Logistics	Road/ Bridge	Coimbatore-Erode-Salem Expressway	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Dabra	525.0	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Gulbarga	19.1	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Hassan	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Kushi Nagar	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Palladi	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Shimoga	NA	Prospective
2	Public/PPP	Logistics	Airport	Green field airport - Mopa (Goa)	400.0	Prospective
2	PPP	Logistics	Road/ Bridge	NHDP, phase 4	6,950.0	Prospective
2	NA	Logistics	Road/ Bridge	Salem-Cuddalore Expressway	NA	Prospective
2	Public	Logistics	Port / Maritime	Sethusamundram project	1,213.5	Prospective
2	NA	Logistics	Road/ Bridge	Trichur – Kanyakumari Expressway	NA	Prospective
3	Public	Logistics	Road	Construction of 100 km road connecting Lawngtlai on NH 54 to India-Myanmar border in Mizoram	128.0	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Akhaura, Tripura	1.1	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Dawki, Meghalaya	1.1	Ongoing
3	Public	Logistics	Dry port	Integrated check-post (ICP) at Moreah, Manipur	30.2	Ongoing
3	Public	Logistics	Railways	New railway line between Jiribum and Imphal, Manipur	554.0	Ongoing
3	Public	Logistics	Road	Upgradation 110 km of Imphal - Moreh connectivity on NH 39	NA	Ongoing
3	Public/PPP	Logistics	Road/ Bridge	Accelerated road development programme for the North East Region	3,030.8	Prospective

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CHAPTER 4.

ASEAN-INDIA CONNECTIVITY: A MYANMAR PERSPECTIVE

KYAW MIN HTUN

NU NU LWIN

TIN HTOO NAING

KHINE TUN

Abstract

Since the 1990s, Asian economies have been moving towards deeper regional integration to enjoy growth together and to share prosperity. Although size of the economy and level of development in the region are quite diverse, it does not matter to such integration. This integration will not only expand the production possibility frontiers but also promote the flow of ideas and cultural exchanges within the region. Southeast Asia and India have become two of the fastest growing and most dynamic regions in the world. As Asia becomes the engine of growth for the global economy, the ASEAN and India must capitalize on their partnership through enhanced connectivity to reap the benefits most. In this scenario, Myanmar is the only land bridge between ASEAN and India so that the country has a great potential to be an important player in shaping future economic, political and security environment in this region. The connectivity projects will enhance the strategic importance of Myanmar as a regional logistics and trading hub and will be definitely beneficial for Myanmar as well as India and ASEAN, and for the entire region, Asia. To realize the positive outcomes, Myanmar needs to respond to the opportunities offered by its geographical and natural advantages and to capture the competitive advantages brought about by regional and global market chain.

1. OVERVIEW

Asian Economies have grown rapidly over the last few decades. Several scholars have noted its economic success as the rise of Asia particularly led by seven economies; China, India, Indonesia, Japan, Republic of Korea, Malaysia and Thailand. These leading economies have combined total population of 3.1 billion (78 percent of Asia) and a GDP of USD 14.2 trillion (87 percent of Asia) in 2010 (ADB 2011a). While those countries have achieved high growth rates and caught up with wealthier countries, some others, however, have achieved little or no growth. Since the 1990s, Asian economies have been moving towards deeper regional integration to enjoy growth together and to share prosperity. Although size of the economy and level of development in the region are quite diverse, it does not matter to such integration.

A number of studies on regional integration have generated a wide range of theories, models and methodologies of which most of them are centering on a single-discipline perspective, namely economics. Recent regional integration literature has been developed by considering from a multi-disciplinary perspective that comprises: (1) market (e.g., regional economic dynamism facilitated by liberalization of foreign trade, direct investment, capital accounts, and financial systems); (2) policy (e.g., regional intergovernmental cooperation, development of common institutions); (3) geopolitics (e.g., causal relationships between political power and geographic space). This integration will not only expand the production possibility frontiers but also promote the flow of ideas and cultural exchanges within the region.

Among economic regions in the world, Southeast Asia has been widely noted as the fastest growing and dynamic region. Meanwhile, India demonstrates its economic and technological capacities to compete in the 21st century. As India has aimed to transform to become a developed nation by 2020, it has continued to implement domestic reforms and initiatives for further integration with the regional and global economy. ASEAN deputy Secretary General also noted in the Regional Security and Cooperation Dialogue that "As Asia becomes the engine of growth for the global economy, the ASEAN and India must capitalize on their partnership through enhanced connectivity to reap the benefits[1]". In this scenario, Myanmar is the only land bridge between ASEAN and India so that the country has a great potential to be an important player in shaping future economic, political and security environment in this region.

2. ECONOMIC BACKGROUND OF MYANMAR

Myanmar is the largest country in the mainland Southeast Asia bordering Bangladesh and India in the west and northwest, China in the north and northeast, Laos PDR and Thailand in the east and southeast. Similarly, the Andaman Sea and the Bay of Bengal bound Myanmar in the south and southwest. Myanmar is adjoining to Himaliyan ranges, which divided Myanmar against India in the western part of the country. Generally, the topographic condition of Myanmar can be divided into three parts – western ranges, central plains and eastern hilly regions. With the collapse of centrally planned economy in 1988, the country has adopted a market-oriented economic system and initiated various economic reform measures. The broad idea of implementing such reforms was to restore and enhance economic growth, which generates more benefits to the general public. It was stabilization period between 1989 and 1991, in which plan was formulated to generate economic growth through wide range of private sector participation including foreign investments. With the consistent efforts made by the government and the extensive participation of private sector, the economy rapidly began to recover. Then, the economy has been guided by a series of five-year short term plans with annual sector-wise plans. The plans are based on the guideline principles of the ruling government coping with the political, economic and social challenges. Significant efforts aiming at increasing economic activities included: improving legal and regulatory framework, permission for the opening of private (local and foreign) commercial banks, attracting financial and technological resources from foreign countries, lifting some restrictions on trade, allowing the establishment of joint-ventures with state enterprises, and investing heavily in the development of physical infrastructure (Von Hauff 2009). Since the economic reforms associated with encouraging both public and private sector development, the economy has revealed

1 S. Pushpanathan, ASEAN deputy Secretary-General, Delhi Dialogue II, Regional Security and Cooperation Dialogue January 21-22 2010, New Delhi.

changes in a broad spectrum of sectors such as infrastructure, institutional and business environment and officially recorded high growth over the period.

Among the varieties of economic performances, GDP growth during the past decade has been controversial. According to the official data, Myanmar has achieved sustained double-digit growth rates of GDP since 1999/2000. Yet some other indicators have little evidences to show the support for such a long-lasted high growth. Thus, international organizations and research institutions have adjusted the country's growth rate but it has been still comparable with regional average.

Another controversy is unfavorable economic structure with minimal formal activities beyond primary sector. Myanmar economy has been dominated by agriculture sector with around 50-40 percent of GDP and its 70 percent of population have been living in rural areas. Thus the government sought all possible ways and means to achieve remarkable development in the agriculture sector. However, an assessable achievement has been gained only in pulses and beans, for which the government did less intervention. Myanmar has been listed as a leading country in production, and export of pulses and beans ranks at second after Canada throughout the world.

The economy still relies on the resource-based industries because the most contributed sectors to the GDP are extractive industries, especially oil and gas, mining, and forest products, which tend to happen resource curse including serious environmental degradation. As industrialization showed a little development in its beginning stage, structural change appeared less significant with a share of industry sector in GDP below 20 percent. The manufacturing and other modern facilitating sectors, which Myanmar must exploit in order to catch-up growth status of its neighbors, contributed a small portion to the economy. The stagnation or very slow-growth of manufacturing, transportation, communications, power generation and financial institutions was, to some extent, indicative of a flaw of inconsistent and incompetent policies in promoting industrialization (Myat 2004) although they started to gain momentum in these days.

Very recently, the country experienced a great turning point from military administration to a quasi-civil government as a consequence of the national election held in 2010. Myanmar is on the threshold of new system and new era under the Union

Government and the Region and State Governments formed on 30 March 2011. In accordance with the change of government system, ideology and procedures are also to be altered. Myanmar is trying its utmost in mobilizing the participation of local people and foreign investors by clarifying the economic policy and securing the rule of laws. The State Constitution of the Republic of the Union of Myanmar was ratified and promulgated by the National Referendum in 2008. The constitution also covers the Basic Principles of the Union in Chapter 1, in which articles 35 and 36 declare apparently Myanmar to be a market economy as the followings;

Article (35) The economic system of the Union is market economy system.

Article (36) The Union shall:

(a) permit economic forces such as the State, regional organizations, cooperatives, joint-venture, private individual, so forth, to take part in economic activities for the development of National economy;

(b) prospect and prevent acts that injure public interests through monopolization or manipulation of prices by an individual or group with intent to endanger fair competition in economic activities;

(c) strive to improve the living standards of the people and development of investments;

(d) not nationalize economic enterprises;

(e) not demonetize the currency legally in circulation.

3. Foreign Investment and International Trade

After adopting market oriented economic system in 1988, Myanmar government then exercised various economic reform measures aiming at achieving greater participation of private national investment, larger foreign capital inflows and effective channeling these resources to their most productive uses. Foreign investment law was enacted in November 1988 in order to bring foreign capital into the country. Although eagerness was given to attract foreign investors, Myanmar was not such a large recipient of FDI as expected because it was regarded as a highly risky destination due to the uncooperative policymaking, inconsistent measures, poor infrastructure, unstable financial market, multiple exchange rates, and, of course, economic sanctions of some developed countries. These factors deterred foreign investors to pay much attention to Myanmar.

Though, FDI inflow into Myanmar seems suddenly increased in recent days. Total permitted foreign investment amounted to USD 35,518.44 million as at 31 January 2011, which increased from USD 16,055.62 million as at 31 March 2010. Top three country-origins of FDI into Myanmar are China (27.04%), Thailand (26.94%), and Hong Kong (16.63%) in 2011. About 90 percent of total FDI into Myanmar came from Asia in which ASEAN investment was nearly 36 percent (Table 1).

Table 1: Foreign Investment of Permitted Enterprises as of 31.1.2011 (By Country)

(USD million)

Sr. No.	Particulars	Number	Permitted Enterprises Approved Amount	%
	ASEAN	**188**	**12658.84**	**35.64**
1	Thailand	61	9568.093	26.94
2	Singapore	74	1778.543	5.01
3	Malaysia	36	898.347	2.53
4	Indonesia	12	241.497	0.68
5	Philippines	2	146.667	0.41
6	Vietnam	2	23.649	0.07
7	Brunei Darussalam	1	2.04	0.01
	Other Asia	**143**	**18812.91**	**52.97**
8	China	32	9603.168	27.04
9	Hong Kong	36	5907.918	16.63
10	Republic of Korea	45	2904.106	8.18
11	Japan	22	204.762	0.58
12	India	5	189	0.53
13	Bangladesh	2	2.957	0.01
14	Sri Lanka	1	1	0.00
	Rest of the World	**117**	**4046.693**	**11.39**
	Total	**448**	**35518.44**	**100.00**

Source: CSO, Selected Monthly Economic Indicators, April 2011

From sectoral perspective, as high as 80 percent of total foreign investments are channeled to power industry, and oil and gas industry. On the other hand, manufacturing sector is less attractive to the foreign investors counting only about 4.7 percent of total FDI (see Table 2). In fact manufacturing sector contributed 21.7 percent to the GDP and 11.0 percent to the labor force in the fiscal year 2008/09 (MNPED). The sector was dominated by private enterprises, which produced 92 percent of total industrial output. Transport and communication, which is identified by several scholars as the most important sector to be developed in order to catch up global market changes, received only 0.88 percent of total foreign investments or USD 313.27 million in early 2011.

Table 2: Foreign Investment of Permitted Enterprises as of 31.1.2011 (By Sector)

(USD million)

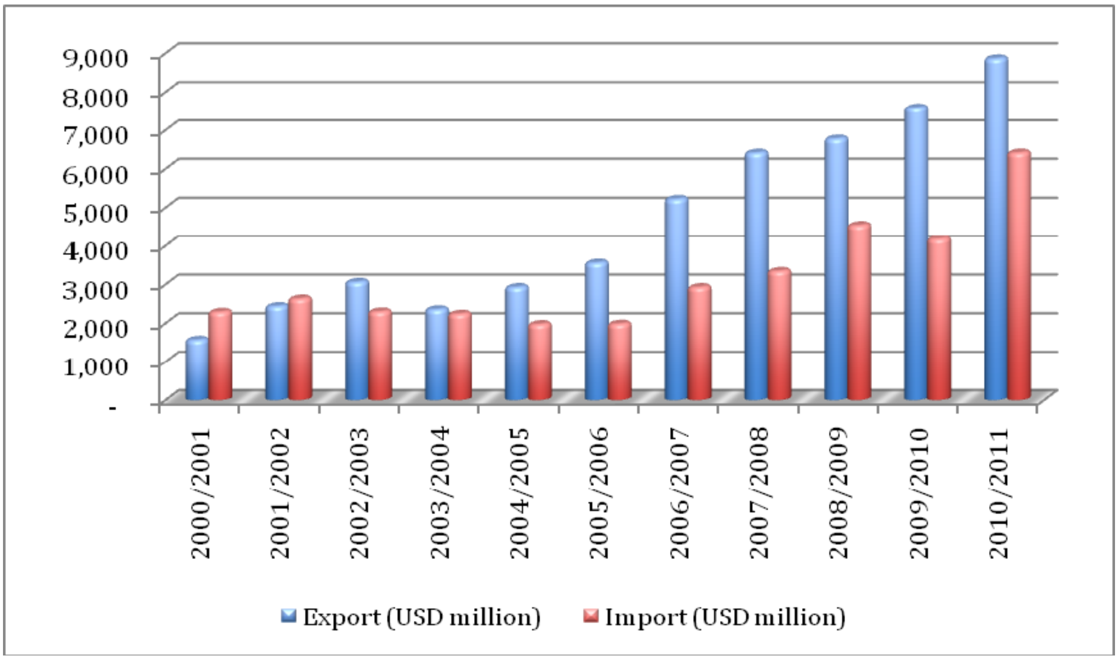
Sr. No.	Particulars	Permitted Enterprises No	Approved Amount	%
1	Power	4	14529.742	40.91
2	Oil and Gas	104	13815.375	38.90
3	Mining	62	2395.386	6.74
4	Manufacturing	157	1668.126	4.70
5	Hotel and Tourism	45	1064.811	3.00
6	Real Estate	19	1056.453	2.97
7	Livestock and Fisheries	25	324.358	0.91
8	Transport and Communication	16	313.272	0.88
9	Industrial Estate	3	193.113	0.54
10	Agriculture	5	96.351	0.27
11	Construction	2	37.767	0.11
12	Other Services	6	23.686	0.07
	Total	448	35518.440	100.00

Source: CSO, Selected Monthly Economic Indicators, April 2011

Regarding international trade, the private sector has been allowed to participate export and import business, which was previously monopolized by the state. Since Myanmar is eager to pursue the export-led growth policy like other leading economies, the government has encouraged export promotion by relaxing and liberalizing trade policy. To be in line with the changing economic system, border trade was regularized in order to develop and strengthen the bilateral trade relations with five neighboring countries. Though its economy was liberalized, trade strategies, very often, associated with free trade and government intervention under the names of export promotion and import substitution (Kudo, 2002). Ministry of Commerce has amended export and import policies and procedures with a view to developing external market and adopted trade strategies. Export policy is to export all exportable surpluses and to diversify foreign markets by using natural and human resources. Hence increasing and diversifying exports and improving the quality of products are among the main objectives of the export promotion policy. Import policy is designed to give priority to capital goods, industrial goods, industrial machines including raw materials and other essential items.

It is also deliberate to promote external trade not only of traditional exports but also of more-value added commodities. Trade value increased from about USD 0.40 billion in 1988/89 to USD 11.77 billion in 2009/10, which accounted as much as more than 25 times (Figure1).

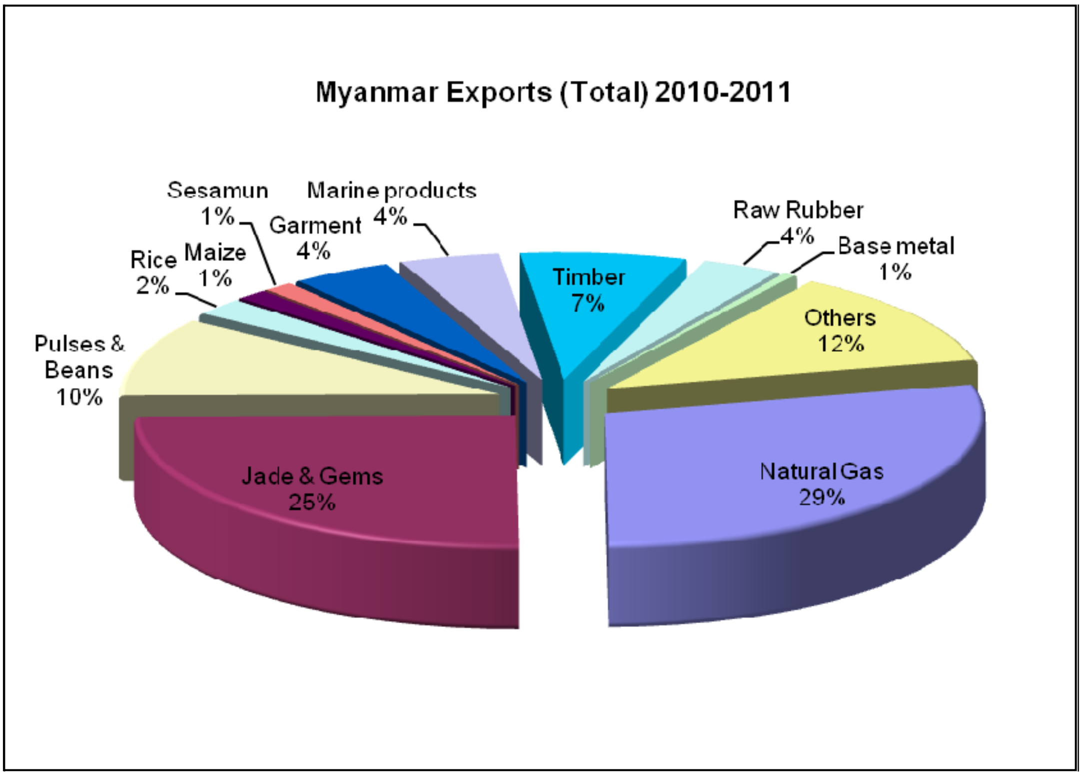
Figure 1: Export& Import of Myanmar, 2000-2011 (USD Million)



Source: Table 3

Major export items of Myanmar are mineral products such as natural gas, precious and semi-precious minerals; agricultural products including rice and rice products, pulses & bean and maize; forest products like raw rubber, teak and hard woods; and marine products (Figure 2).

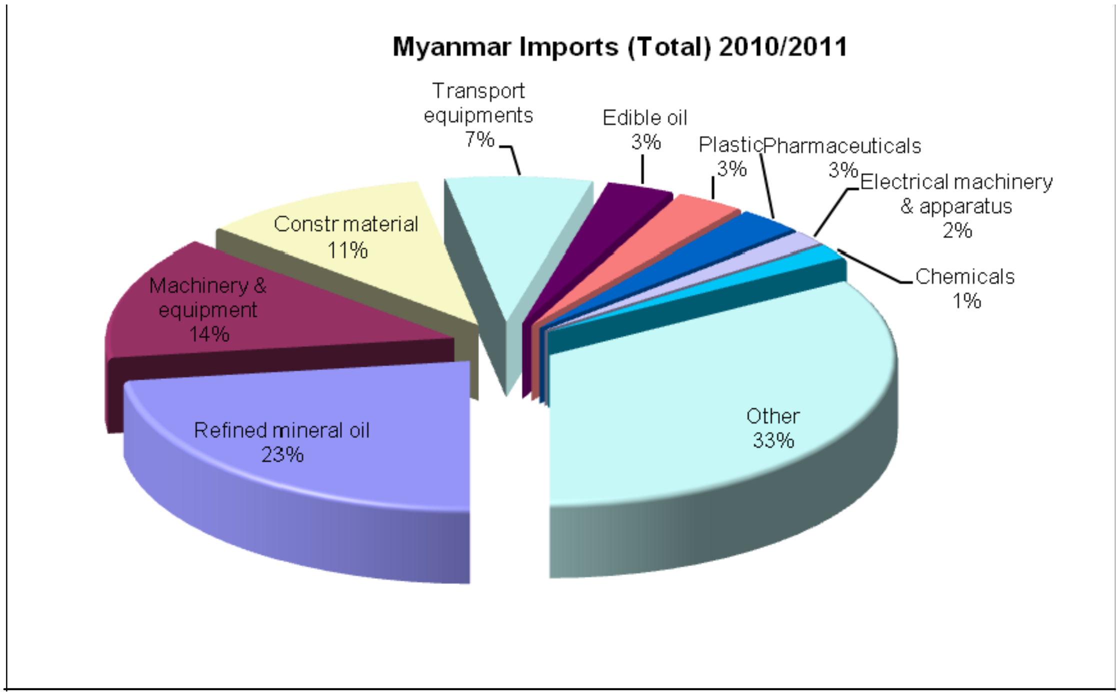
Figure 2: Export Commodities in 2010-11



Source: CSO, Selected Monthly Economic Indicators, April 2011

Under this circumstance, diversifying export products, increasing export volumes, and improving quality of the export products are among the main objectives of the export promotion policy. The import policy of Myanmar is to give priority to capital goods, industrial raw materials and spare parts and other essential items. The government has urged the public enterprises and private entrepreneurs to import commodities that will contribute to infrastructure development and production sectors. Two major import items accounted for more than half of total imports, viz., refined mineral oil (28% of total imports) and machinery, non-electric and transport equipments (26% of total imports) (Figure 3). These structures of export and import clearly identified that the country is net importer for manufactured and capital goods and net exporter of primary products.

Figure 3: Import Commodities in 2010-11



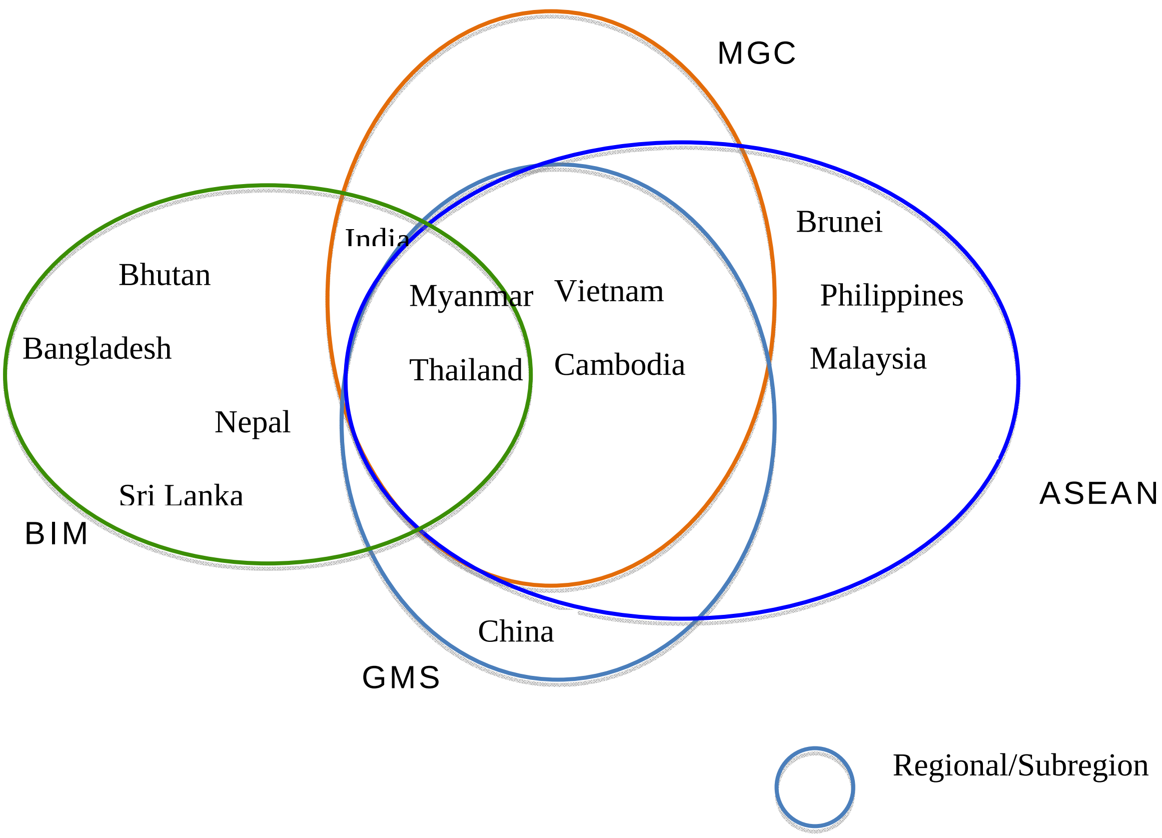
Source: CSO, Selected Monthly Economic Indicators, April 2011

4. Trade Relation within the Region

4-1. Myanmar-ASEAN Trade

Along with the economic success in Southeast Asia, the entire region has been increasingly opened to trade although there remain some constraints to economic integration. For example, in the case of border trade, tariffs are no longer significant barriers, but other border barriers such as quantitative restrictions, border administration, even closures, etc and behind-the-border constraints related to logistics, transport, infrastructure problems, weak institutions, etc are still significant barriers (ADB 2011). Asian regional integration have increased over the last decades, although this integration have primarily focused on sub-regional integration such as: Association of Southeast Asian Nations (ASEAN) formed in 1967, South Asian Association for Regional Cooperation (SAARC) formed in 1985, Greater Mekong Sub-region Economic Cooperation Programme (GMS) formed in 1992, Brunei, Indonesia, Malaysia, and the Philippines – East ASEAN Growth Area (BIMP-EAGA) formed in 1994, South Asia Sub-regional Economic Cooperation (SASEC) formed in 1997, Bay of Bengal Initiatives for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) formed in 1997 and Kunming Initiative among Bangladesh, the People Republic of China, India and Myanmar in South and Southeast Asia adopted in 1999. The purpose of these regional groupings were to provide economic and technological cooperation among the members in the areas of security, trade and investment, technology, energy, tourism, transport and communication (Cho 2008).

Diagram 1: Myanmar's Participation in Regional Economic Cooperation in Asia



Source: Cho ChoThein (2008), Regional Cooperation in Transport: Myanmar Perspective on BIMSTEC, Discussion Paper. 42, Centre for Studies in International Relations and Development, Kolkata, India, p. 12

Myanmar is a full member of such sub-regional cooperation as ASEAN, BIMSTEC, Ayeyarwaddy-Chao Phaya-Mekong Economic Cooperation Strategy (ACMECS), Asian Cooperation Dialogue (ACD), and Bangladesh-China-India-Myanmar Economic Forum (BCIM). The ASEAN was formed in 1967 and Myanmar became its membership in the fold on 23 July 1997. Since then, Myanmar apparently has shown its interests in close co-operation with the ASEAN member countries in all means via diplomatic, social, material, institutional co-operations. Myanmar also joined the ASEAN Free Trade Area (AFTA), which is a regional grouping of ASEAN to achieve a level playing ground without loss of the individual member state's sovereignty. Myanmar entered into ASEAN agreements on Customs and then, into the Ministerial Understanding for ASEAN Finance Sector Cooperation, the Protocol to amend the agreement on the Common Effective Preferential Tariff (CEPT) Scheme for the AFTA. Similarly in 2005, Myanmar agreed to modernize and standardize its procedures under the ASEAN Agreement on ASEAN Single Window and to complete the process by 2015 (Yin 2006). As a transitional economy, Myanmar has faced several challenges in the economic cooperation and regional integration process and called for tangible cooperation of the bilateral and multilateral institutions.

Myanmar is currently engaging international trade with over 80 countries and regions through normal trade practice. Myanmar's foreign trade partners are mainly Asian countries such as Singapore, China, India, Japan, Thailand and Malaysia. More than 70 percent of total export goes to the Asian region and about 90 percent of total import comes from these countries. Myanmar attaches great importance with Asian countries for further developing and strengthening. In fact, Southeast Asian countries are historically active trading partners of Myanmar. Because Myanmar has the highest share in agricultural output in relation to GDP (accounted for about 42% in 2008/09), not surprisingly, Myanmar is a major exporter of primary commodities and importer of manufactured produces in this context. In the past, Myanmar was a competitor of some of ASEAN members for certain primary exports. However, since the economic structure of these countries has been changed at accelerated pace, their trading items with Myanmar has become more complementary in nature (Myat 2004).

Table 3: Value of External Trade, Myanmar (1991-2010) (USD million)

	Total Trade			Border Trade		
Fiscal year	Export Value	Import Value	Trade Balance	Export Value	Import Value	Trade Balance
1991/1992	466	851	(385)	76	63	13
1992/1993	591	883	(292)	94	164	(69)
1993/1994	692	1,297	(605)	56	192	(137)
1994/1995	917	1,414	(497)	66	166	(100)
1995/1996	895	1,832	(937)	43	293	(250)
1996/1997	929	1,993	(1,064)	58	299	(240)
1997/1998	1,036	2,309	(1,273)	155	102	53
1998/1999	1,082	2,702	(1,620)	146	154	(8)
1999/2000	1,433	2,605	(1,172)	196	148	48
2000/2001	1,569	2,291	(695)	235	192	43
2001/2002	2,439	2,632	(193)	293	117	176
2002/2003	3,063	2,300	763	273	216	57
2003/2004	2,357	2,240	117	307	269	38
2004/2005	2,928	1,973	955	410	290	120
2005/2006	3,558	1,984	1,574	480	292	188
2006/2007	5,223	2,928	2,295	667	445	222
2007/2008	6,413	3,344	3,069	747	583	164
2008/2009	6,779	4,543	2,236	657	691	(34)
2009/2010	7,587	4,181	3,406	664	719	(55)
2010/2011	8,864	6,415	2,449	1,114	1,016	98

Source: Total Trade
1991/1992-1999/2000 Myanmar's Economic Development, MNPED, Ministry of Commerce
2000/2001-2009/2010 Planning Department, MNPED
Border Trade
1991/1992-1999/2000 Department of Border Trade, Ministry of commerce

Myanmar's export to ASEAN accounted for 44 percent of total exports in 2010/11. China including Hong Kong Special Administrative Region is the largest export destination for Myanmar accounting 35 percent followed by Thailand at 33 percent. ASEAN plus China are major destinations for Myanmar's exports and this amounted to about 80 percent of Myanmar's total exports. Myanmar's exports to the ASEAN increased by 28 percent within four years, from USD 2,836 million in 2006/07 to USD 3,931 million in 2010/11. The increase of trade with regional countries is partly because of becoming an active member of ASEAN and strengthening economic ties. Out of Myanmar's export to the ASEAN, 74 percent was absorbed by Thailand alone, whereas Singapore (12%) and Malaysia (11%).

Myanmar's imports from ASEAN equally portioned with its export accounted for 44 percent of total imports in 2010/11. China is the largest import source for Myanmar importing 34 percent in total import. Yet Myanmar's imports from India comprised only 3 percent. Total imports from ASEAN together with China and India accounted for slightly over 80 percent of Myanmar total imports.

4-2. Myanmar-India Trade

Trade between Myanmar and India has rapidly been growing in the recent years although trade volume (about 7% in 2010/11) in Myanmar's total trade is rather small. However, India is Myanmar's 4th largest trading partners after China, Thailand and Singapore. It is also the 3rd largest export market for Myanmar after China and Thailand, absorbing 10 per cent of Myanmar total exports in 2010/11, while only 3 per cent of Myanmar's import came from India. Myanmar's major export items to India are agricultural products like beans, pulses and maize and forest products such as teak and hardwoods. Its imports from India include chemical products, pharmaceuticals, electrical appliances and transport equipments (MOC 2011). With the aim to increase bilateral trade, India and Myanmar has signed the India-ASEAN Trade in Goods Agreement in August 2009. Myanmar is also a beneficiary country under India's Duty Free Tariff Preference Scheme for LDCs, which intends to provide tariff preferences by India on products originating in the notified Least Developed Countries.

Table 4: Myanmar Trade with India, 2004 to 2010

(USD million)

	Exports	Imports	Total
2004-2005	341.40	83.37	424.77
2005-2006	489.10	80.07	569.17
2006-2007	733.59	159.54	893.13
2007-2008	727.85	173.46	901.14
2008-2009	804.96	146.18	951.14
2009-2010	1010.56	194.03	1204.59

Source: Central Statistical Organization (CSO), Myanmar, 2010

The policy of the government is to further develop and strengthen the bilateral trade relations with the five neighboring countries- Bangladesh, China, Laos, India and Thailand - using border trade as a mechanism for trade expansion. There are 12 border trade posts at the cross border points between Myanmar and its neighboring countries. Border trade value increased from about USD 0.139 billions in 1991/92 to USD 2.130 billions in 2010/11 (Table 5). Increasing border trade activities not only contribute to bilateral trade relation but also bring together in regional economic blocs such as ASEAN, ACMECS, BIMSTEC and GMS-BF. On the other hand, it provides employment to the underperformed cities and towns and thus improves the people’s wellbeing in these regions.

Table 5: Myanmar Trade with China, India and Bangladesh

(USD million)

Sr No	Year	Myanmar-China			Myanmar-Thailand			Myanmar-India			Myanmar-Bangladesh		
		Normal	Border	Total	Normal	Border	Total	Normal	Border	Total	Normal	Border	Total
1	1997 - 1998	202.00	145.81	347.81	245.60	83.86	329.46	310.65	22.25	332.90	70.98	5.74	76.72
2	1998 - 1999	176.69	194.29	370.98	382.17	39.34	421.51	232.71	3.61	236.32	190.00	9.22	199.22
3	1999 - 2000	290.66	96.39	387.05	391.54	43.7	435.24	280.11	8.55	288.66	17.81	22.28	40.09
4	2000 - 2001	194.40	267.628	462.03	478.29	107.539	585.83	329.42	16.004	345.42	33.53	20.569	54.10
5	2001 - 2002	260.54	276.35	536.89	924.48	170.586	1095.07	408.05	19.37	427.42	32.87	31.125	63.99
6	2002 - 2003	500.76	331.797	832.56	1246.72	74.035	1320.75	418.36	11.798	430.16	51.38	26.718	78.10
7	2003 - 2004	307.37	387.116	694.49	892.94	78.568	971.51	460.32	10.279	470.60	55.13	25.186	80.32
8	2004 - 2005	288.85	496.711	785.56	1329.53	121.936	1451.47	412.24	15.195	427.43	44.86	22.759	67.62
9	2005 - 2006	352.27	481.36	833.63	1394.44	199.02	1593.46	553.84	15.41	569.25	40.10	20.87	60.97
10	2006 - 2007	552.10	749.76	1301.86	2411.63	300.23	2711.86	878.09	15.77	893.86	33.79	26.86	60.65
11	2007 - 2008	1384.845	977.429	2362.27	2888.35	304.74	3193.09	885.93	14.83	900.76	95.54	32.5	128.04
12	2008 - 2009	1384.438	986.598	2371.04	2698.67	327.35	3026.02	940.32	9.88	950.20	92.82	24.65	117.47
13	2009 - 2010	1774.640	1076.811	2851.45	3301.90	274.65	3576.55	1192.92	13.74	1206.66	62.31	18.47	80.78

Source: CSO, Selected Monthly Economic Indicators, April 2011

Apart from oversea trade, India is one of Myanmar's major trading partners for border trade. Since early 1990s, Myanmar has begun a new era of economic integration with countries across the globe. More significantly, economic ties between countries have grown quite strongly over the entire period. There were closer diplomatic, political and economic ties between Myanmar and India. Trade relations between the two countries existed for centuries and India has played as a supplier of consumer goods for Myanmar and importer of pulses & beans from Myanmar too. When the closer cross-border economic ties are being forged between Myanmar and India, border trade has come to be seen as a mean with a high potential in the context of emerging Asian regionalism. As noted above, trade activities across India-Myanmar border is perceived as not only a two-country affair but also an Asian regional cooperation.

Border Trade Agreement between the governments of India and Myanmar was signed in January 1994 with the goal of formalization of border trade practices and setting up such activities in a congenial model. The agreement specified that trade should be conducted through the designated customs posts i.e. (1) Moreh (Manipur state in India) and Tamu (Sagaing region in Myanmar), (2) Champhai (Mizoram state in India) and Rhi (Chin state in Myanmar), (3) Other places that may be notified by mutual agreement between the two countries (MOC 2010). The cross border point between Moreh and Tamu was opened, paving way for the opening of four check posts including Pangsau Pass, Paletwa, Lungwa- Yanyong, and Pangnyo between the two countries in 1995. In 2004, with the construction/upgrading of Rhi-Tidim and Rhi-Falam road sections in Myanmar, Zowkhathar-Rhi border points has been operationalized (Anushree 2008). Agreement has also been reached on setting up a third border trade point at Avakhung-Pansat/Somra[2].

After the border trade agreement, there was a spurt in formal trade across the Moreh-Tamu point during the period 1994/95 and 1997/98. However, the volume fell in the following years due to the restrictions imposed by Myanmar authorities. Consequently, the volume of informal trade exceeds that of formal trade by several times although it is difficult to definitely estimate the volume and composition of the trade flows. Since the importance of border trade has been recognized by authorities

2 http://meaindia.nic.in

from both sides of the countries, trade facilitation process has come to happen in better ways and the Moreh-Tamu trade-route, connecting Manipur with the commercial hub of Mandalay, has become an imperative part of Myanmar external trade scenario. However, the connectivity development does not rely only on the infrastructural and institutional development but also on the instability status in the respective regions and states. The insurgencies incurred in the Manipur state are frightening the development of regional connectivity through security. Most of rich businessmen from Moreh relocated into inner India and this relocation happened to reduce commercial transaction on the Moreh-Tamu route along the Asian Highway 1 and Trilateral Highway. As a consequence, Champhai-Rhi route has become more important in these days.

5. ASEAN-MYANMAR-INDIA CONNECTIVITY

Geographically, Myanmar is a gateway to south Asia and can be a central hub for exchange of goods, services and technology. Underdeveloped infrastructure and unfavorable institutional and business environment seriously limit participation of the economy into regional and global networks. The cross-border connectivity plays a very important role in this scenario. Establishing better connectivity in all means namely material, institutional and people-to-people connectivity will allow Myanmar, India and then, the other South East Asian countries to raise possibilities for collaboration between them and to expand economic synergies for development in the region. Moreover, regional interconnectivity through infrastructure development, trade facilitation and regulatory harmonization among the respective economies such as India, Myanmar and other ASEAN members can make each economy more dynamic and bring enormous benefits to the entire region.

Myanmar and India have historical, cultural and natural links. Since India shares a land boundary of 1,643 kilometers connecting Arunachal Pradesh, Manipur, Nagaland, and Mizoram with mainland South East Asia through Myanmar, the border states of Kachin in the north, Sagaing in the middle and Chin in the south of Myanmar are the ones directly linked to the borders of Northeast India and Bangladesh. Although the economies of these regions are relatively underperformed by several reasons including poor infrastructure, all three states enjoy considerable endowments for horticulture – vegetables and fruits, bamboo and medicinal plants. In addition, the states of Kachin and Sagaing are also rich in minerals. High potential horticulture and rich mining deposits should be able to finance infrastructure development. Tourism is another economic activity that can be promoted.

Myanmar government has endeavoured to develop the socio-economy of the borders by improving infrastructure. Border Area Development Plan was launched in 1989 to fulfill the basic needs of the nationalities, various ethnic groups residing in remote and border areas and social life of the nationals living in those areas. Priority has been given to the development of transport and communications, education, health, electric power, and agriculture. The government built many new miles of roads in Sagaing, Kachin and Chin regions, which are being mountainous and endowed with rivers and creeks. They had poor transport in the past. Earth roads have been upgraded into gravel ones, and the gravel roads to tarred facilities. Extension of motor road in Sagaing, Kachin and Chin regions increased from 2,581 miles in 1988 to 4,002 miles in 2010, while other modes of transportation also increased at relatively slower rates. Transportation in the border area has specially developed by the Government's Border Area and National Races Development Projects (GoM 2009).

Simultaneously, the government has targeted to upgrade economies of the Sagaing region, Kachin state and Chin state together with others. As efforts are being made for ensuring development of agriculture as the base and all round development of other sectors of the economy as well there have been good foundations for industrial development in these regions. With a view to bringing development to Kachin state and ensuring development of national races, the government has designated Kachin State Special Region-1 and Kachin State Special Region-2. There are also establishing industrial zones in Sagaing region (e.g., Monywa and Kalay). Similarly, the government is encouraging a particular crop, tea that grows well in Chin state and materializing the concept of 'one state-one product' in Chin state as a major tea growing region (GoM 2009).

On the India side, the North Eastern Regions faced challenges to become an attractive destination for private investment and regional trade due to its geographical remoteness, inherent deficiency in infrastructure and the bad publicity for recurrent ethnic strife and militant activities. Since closer cross-border economic ties have been forged around the world, cross-border trade and tourism have come to be seen as a mean for breaking out from being geographical isolation. While trade with Bangladesh and Bhutan has assumed important in the wake of attempts to forge greater South Asian regional cooperation, trade with Myanmar has acquired added significance in the context of India's proclaimed 'Look East' policy because of Myanmar's geographical proximity to the Southeast Asia and China (Phyo 2010).

These developments revealed that there are great possibilities and opportunities to improve economic cooperation with bordering regions/countries like India and Bangladesh, Thailand and China. Linking the states of Myanmar with bordering regions of India and Bangladesh will provide an outlet for their local produce and will stimulate economic activities, bringing in greater investment and prosperity to the border areas of all connecting nations.

On the other hand, Myanmar is the sole land bridge between ASEAN and India. The cross-border connectivity plays a very important role in this scenario. Establishing better connectivity in all means namely infrastructure, institutional and people-to-people connectivity will allow Myanmar and India to raise possibilities for collaboration between them and to expand economic synergies for development in the region. Moreover, regional interconnectivity through infrastructure development, trade facilitation and regulatory harmonization among the respective economies such as India, China, Bangladesh, Myanmar and other ASEAN members can make each economy more dynamic and bring enormous benefits to the entire region.

ASEAN and India together represent 1.7 billion people and a GDP of USD 2.4 trillion in 2009. Population within ASEAN is about half of India's population over one billion. However, ASEAN's per capita income at current USD 1,230 is nearly two and half times to India. The gap may narrow somewhat over time but is not likely to reverse in the foreseeable future (ADO 2010). The most populous country in ASEAN is Indonesia and it has about one-fifth of India's population. ASEAN is India's 4th largest trading partner after the EU, US and China. In the early 1990s, India-ASEAN trade constituted 7.6 percent of India's total trade and increased to 9.4 percent in 2007/08. In 2007/08, India-ASEAN trade held USD 38.37 billion in value and reached over USD 40 billion in 2008/09. By 2010 India and ASEAN plan to achieve an ambitious target of USD 50 billion.

ASEAN and India are natural partners and their policies, and business will expand economic opportunities and support increased trade and investment through wider and stronger connectivity. The potential of India’s connectivity with ASEAN is enormous and has become strategically imperative. Initially, land connectivity developments were aimed at improving connectivity between Northeast India and Western Myanmar and started with India-Myanmar friendship road project.

In 2004, both India and ASEAN became aware of the high potentialities of land connectivity. The first India-ASEAN Car Rally in 2004 clearly reflects the existence of land route connectivity that could facilitate and be a catalyst to free flow of trade, investment and tourism between ASEAN and India[3]. It could initially involve Cambodia, Laos, Myanmar, Viet Nam and Thailand, and the North-Eastern Region (NER) of India. This form of sub-regional cooperation could serve as building blocs for greater economic interaction and integration between ASEAN and India (ADB 2011). The Free Trade Area (FTA) that ASEAN and India are now working on could also further facilitate this approach. This regional integration will contribute towards not only economic cooperation but also enhancing regional security.

India and ASEAN should focus on building and enhancing transport network in the North Eastern Regions of India and its immediate neighborhood since transportation plays a vital role to open up geographical and mental space for greater economic integration. A vital element in sustaining the dynamics of this emerging economic relationship would be to develop trust and confidence each other and operationalize the framework agreement (Nagesh *et. al*. 2004).

India-Myanmar relationship have adequately developed in all dimensions in line with the Treaty of Friendship between two countries signed in 1951, which followed by a number of agreements enhancing bilateral cooperation. Mutual confidence between

[3] www.tata.com

the two countries, which is vital for effective regional cooperation and collaboration, has been a positive outcome of a series of high-level officials visits taken place from both sides since 2000. The commitment and ability of leaders of both countries have ensured to strengthen diplomatic relation, economic cooperation and regional integration since then. In October 2004, two Memorandums of Understanding (MoU) for Cooperation in the field of Non-Traditional Security Issues and Tamanthi Hydroelectric Project on Chindwin River in Myanmar were signed between the two countries. Both sides also expressed great interest in furthering cooperation in the field of infrastructure and energy. In April 2008, three agreements namely (i) Framework Agreement for Construction and Operation of a Multi-Modal Transit Transport Facility on Kaladan River, (ii) Intelligence Exchange Cooperation and (iii) Avoidance of Double Taxation were signed. In 2010, Treaty on Mutual Assistance in Criminal Matters, MoU regarding Indian Grant Assistance for Implementation of Small Developmental projects, MoU on Information Cooperation and Agreement on Cooperation in the fields of Science & Technology were signed between two countries.

Most of the economies in this region depend either on the investment flows from the Western economies or the market of those economies or both as the principle engines for rapid economic growth (Myat 2004). The ASEAN is aware of the need to further diversify its engines of growth from the traditional growth engines of the US, Japan and more recently, China, to India as well. Myanmar is the only land bridge between ASEAN and India and a strategic gateway to connecting ASEAN and India. The Southeast Asia is playing important role in the Asia-Pacific century because it is taking itself seriously and forging a growing regional identity and solidarity. It will reinforce the centrality of ASEAN in regional cooperation and integration (ASEAN Secretariat 2010). On the other hand, Indian Minister Mani Shanker Aiyar noted that the “Southeast Asia begins in Northeast India”. Linking the India with Southeast Asia will ensure an expanded market for the entire region. In this scenario, ASEAN, India and Myanmar become key players to realize a win-win solution to reflect the interest of all stakeholders. Notwithstanding that, connectivity development in Myanmar is not very much realized and left behind its peer countries in all respects (see Table 6).

Table 6: ASEAN Rankings on the Logistics Performance Index (LPI)

ASEAN Rank	Int'l LPI Rank	Country	LPI	Customs	Infra structure	International shipments	Logistics competence	Tracking & tracing	Time liness
1	2	Singapore	4.09	4.02	4.22	3.86	4.12	4.15	4.23
2	29	Malaysia	3.44	3.11	3.50	3.50	3.34	3.32	3.86
3	35	Thailand	3.29	3.02	3.16	3.27	3.16	3.41	3.73
4	44	Philippines	3.14	2.67	2.57	3.40	2.95	3.29	3.83
5	53	Vietnam	2.96	2.68	2.56	3.04	2.89	3.10	3.44
6	75	Indonesia	2.76	2.43	2.54	2.82	2.47	2.77	3.46
7	118	Lao PDR	2.46	2.17	1.95	2.70	2.14	2.45	3.23
8	119	Cambodia	2.37	2.28	2.12	2.19	2.29	2.50	2.84
9	133	Myanmar	2.33	1.94	1.92	2.37	2.01	2.36	3.29
n.a.	n.a.	Brunei	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: World Bank (2011)
Note: 1 is the lowest score and 5 is the highest score.

Table 6 indicates that in terms of connecting to compete (trade logistics) in the global economy, Myanmar is well below the average of regional performance and the ranking shows Myanmar is the lowest performance in ASEAN in terms of LPI, which is weighted average of six key indicators: (1) Efficiency of the clearance process (i.e. speed, simplicity and predictability of formalities) by border control agencies, including Customs; (2) Quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology); (3) Ease of arranging competitively priced shipments; (4) Competence and quality of logistics services (e.g., transport operators, customs brokers); (5) Ability to track and trace consignments; and (6) Timeliness of shipments in reaching destination within the scheduled or expected delivery time. This LPI ranking suggests that Myanmar is in serious need of not only physical connectivity but also soft infrastructure/institutional connectivity, which is also important to be developed simultaneously. The deepening and widening of connectivity would reinforce Myanmar's position as the hub of the Southeast, South and East Asian

Regions and it could be strengthened a broader connectivity in the longer term (ADB 2011). It will help provide access to an enlarged market, reduce transportation and trade costs, establish linkages with regional and global supply chains, and facilitate greater regional economic cooperation and integration (Rasiah 2009).

During the period 1988-2010, the government recognized to improve infrastructure of the country as a whole, which is relatively underdeveloped due to various kinds of natural and man-made barriers. The government implemented several projects in order to improve the network of roads and bridges to make all corners of the state easily reachable. Therefore, the country has built over 41,700 miles long roads in total in 2010, which increased from over 21,000 miles long roads in 1988. Similarly, over 39,400 miles of rural roads have been constructed in order to ensure the rural development. Employing parallel development plan, railroads are also being contrasted across the nation as a strong transport network. In retrospect, Myanmar constructed 1,924.75 miles long railroad from 1877 to 1948, 51.6 miles long facility from 1948 to 1988, 1,048.95 miles long from 1988 to 2011 April. At present, a total of 13 railroad projects totally 2,265 miles long were under planning/construction. Up to now, 474 miles long section has been already opened. The government has planned to build 250 miles railroads yearly. National railroad network is striving for upgrading the railroads, manufacturing coaches and wagons and extending new railroads for ensuring development of the region (MR 2011).

On the other hand, the government is implementing the highway projects in cooperation with regional countries. The Asian Highways[4] to link with the five neighbouring countries, the ASEAN highways[5] to improve within-ASEAN linkages, the GMS economic corridor highways[6], the BIMSTEC highway, the India-Myanmar-Thailand Trilateral Highway, the India-Myanmar Highways, the Paletwa border road,

4 There are 4 routes of Asian Highways in Myanmar. (1) AH 1 – Myawaddy –Tamu (1665 Km), (2)AH 2 – Tachilake-Kyaiton- taunggyi – Meikhtila (807 Km) and then link with AH 1. (3) AH 3 – Kyaiton – Mylar (93 Km), and (4) AH 4 – Mandaly – Muse (453 Km)

5 AH 1- Myawadi- Tamu (1665 Km),AH 2- Tachilake- Kyaington- Taunggyi-Meikhtilla- Tamu, AH 3- Kyaington-Mylar (93 km), Ah 14- Mandalay- Muse (453 Km), AH 111- Loinling-Thibaw (239 Km), AH 112- Thahtone-Kyaukthoung (239 Km), AH 123- Dewai- Minthame Valley in Thai-Myanmar Border (141 Km), AH 123- Laynyar Ywe – Khalonloin in Thai (60Km)

6 The routes of GMS Highways crossing the Myanmar territory are: R3- Tachilake – kyaiton-Mailar (257Km), R4 - Lasho – Muse (176 Km), R5 - Kyaiton – Loinlin –Thibaw- Lasho (666 Km)

the Kaladan River Project, the Kyautphyu and Dawei Deep Seaport Projects are the vital projects implementing in Myanmar to enhance stronger and deeper economic cooperation and regional integration (MOT, 2010).

In this respect, ASEAN is undertaking several connectivity projects under the Transport Action Agenda. ASEAN Plan of Action in Transport (1996-1998), undertook to explore various areas of transport infrastructure and facilities to enable free flow of goods, peoples, and ideas across the entire region, similarly to the EU. The transport links established within Greater Mekong Sub-region (GMS), for example, the North-South Corridor, and the 1,500 kilometers long East-West Corridor financed by the ADB, link different parts of Vietnam to Laos, Cambodia, Thailand and Myanmar (ADB 2010). ASEAN Highway Network (AHN) is a flagship land transport infrastructure project, which forms the major road (interstate highway) component of the overall trans-ASEAN transportation network.

Table 7: Designated Transit Transport Routes (TTRs) in ASEAN

Country	Total Length of TTRs (km)	Total Length of Below Class III TTRs (km)
Brunei Darussalam	168	0
Cambodia	1,338	0
Indonesia	4,143	0
Lao PDR	2,170	391
Malaysia	2,242	0
Myanmar	3,018	1,467
Philippines	3,037	211.5
Singapore	-*	-
Thailand	4,477	0
Vietnam	577	0
Total	21,206	2,069.5

Source: Thailand Report "The Updated Status of the AHN Project" presented to 29th Senior Transport Official Meeting in Brunei Darussalam (1-3 June 2010),, ASEAN Secretariat

Note: * Designated TTRs for Singapore to be submitted at the time of deposit of Instrument of Ratification for Protocol I of the ASEAN Framework on the Facilitation of Goods in Transit.

The current implementation status of the AHN still shows missing links and is 'below class III roads' within ASEAN's designated trade transit routes (TTRs). The completion of the missing links and upgrading designated TTRs appears to be a more achievable by 2015. The priority to the completion of the AHN by 2015 is stipulated in the ASEAN Leaders' Statement on ASEAN Connectivity as well as the AEC Blueprint (Master Plan).

5-1. Mekong-India economic corridor

The Greater Mekong Subregion (GMS) comprises Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam, and the provinces of Yunnan and Guangxi in China. It is a natural economic area bound together by the Mekong River, and a shared culture and history. The GMS has a total land area of about 2.6 million square kilometers – about the size of Western Europe and it has a population of 323 millions, a little larger than that of the United States. As a result of rapid economic growth, average per capita GDP at current market prices reached almost USD1500 in 2006.

GMS countries designed several types of economic corridors, such as North-South Economic Corridor, East-West Economic Corridor, and Southern Economic Corridor, which will be able to interlink among GMS countries: one North-South Economic Corridor links Myanmar –Thailand – Lao PDR- Vietnam, another North-South Economic Corridor connects China-Viet Nam, East-West Economic Corridor links Myanmar –Thailand – Lao PDR- Viet Nam, and Southern Economic Corridor ties Thailand – Cambodia – Vietnam. Western Economic Corridor and Southern Economic Corridor are the key bases to establish Mekong-India economic cooperation.

Myanmar is placed on the East-West Economic Corridor (EWEC), Northern Corridor, North-South Economic Corridor and South-West Corridor. Under the assistance of UNESCAP, ADB and Mekong River Commission, East-West Economic Corridor project is being implemented not only to improve freight transportation and to facilitate trade in the region but also for the development of transportation network across Mekong subregion, mainly in Cambodia, Lao PDR, Myanmar, and Vietnam (Cho 2008). The EWEC is designed to be the direct and continuous land route between the Indian Ocean and the South China. The highly efficient transport system will strengthen economic cooperation between Myanmar, Thailand, Laos and Vietnam by linking two port cities: Mawlamyine in Myanmar and Da Nang in Vietnam. Although the EWEC connects eastern ASEAN countries, the Western Corridor and Southern Economic Corridor are the key bases to establish Mekong-India Economic Corridor (MIEC) by extending the link to Dawei of Myanmar. The Mekong-India Economic Corridor is advantageous for Myanmar in order to perform direct trade, transit trade and to develop special economic or industrial zones along the corridors (e.g., Yangon, Mandalay, Monywa, Myingyan, Mawlamyine, Dawei, Kyautphyu, etc.) and develop trade posts at the border areas (e.g. Myawaddy, Tamu, Rhi, Muse, etc.). Development of economic corridors and transportation network will reduce not only transport costs but also growth differentials among the respective countries in the region.

Map 1: GMS Economic Corridors

Source: Asian Development Bank

5-2. India-Myanmar-Thailand trilateral highway project

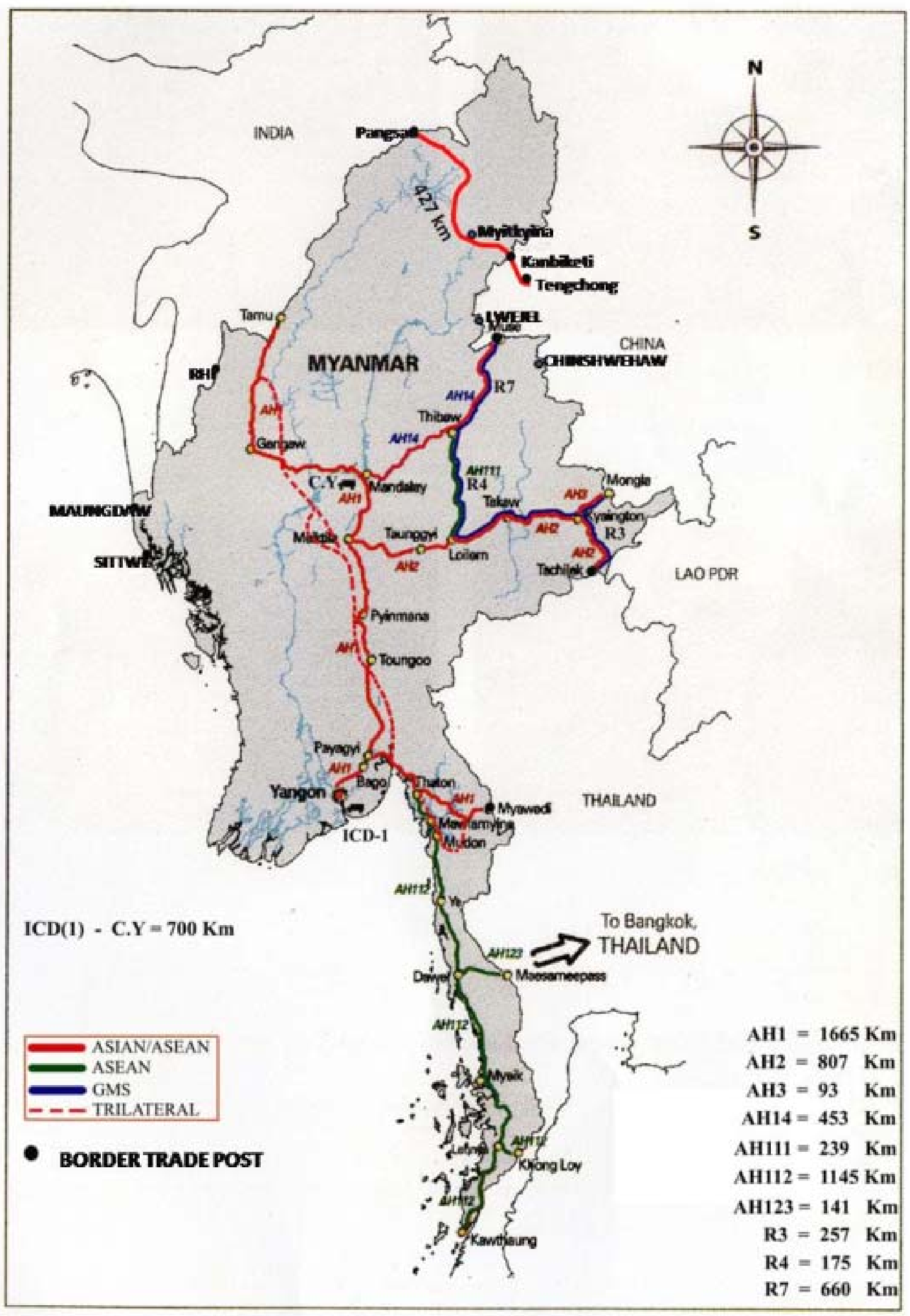
India-Myanmar-Thailand Trilateral Highway (TH) project under the Mekong-Ganga Cooperation Initiative, which was started in 2005, is a vital one to improve cross border connectivity between India and Myanmar (Master Plan on ASEAN Connectivity 2011[7]). The inspiration of India-Myanmar-Thailand Project has long ago come out to enhance connectivity, trade, investment and tourism by linking the three countries. Intended TH route is a 1,360 km long Moreh-Bagan-Mae Sot highway at the estimated cost of US$700 million. The intrinsic objective of the road was to fulfill the ambition of creating a 'link' between Northeast India and Southeast Asia. A deep-sea port at Dawei and the Dawei-Kachanaburi road link are also to be carried out in one package together with the trilateral highway project.

Even though the efforts are needed to upgrade existing road network and to construct small missing links, the development of TH has been very slow due to various constraints including human resources, technologies, advisory service and funding. Limitation of financial resources remains a contentious issue. India and Thailand have upgraded some of the link roads but due to financial scarcity in Myanmar, much work remains incomplete. Myanmar's demand for India and Thailand taking up the responsibility of bearing the costs of road construction in its territory also makes delay to accomplish.

The TH project of Myanmar-India-Thailand is an ambitious undertaking which was initially launched under the programme of the Mekong Ganga Cooperation (MGC) and later incorporated into the transport sector of BIMSTEC but it has not yet executed.

[7] ASEAN Secretariat (2011), Master Plan on ASEAN Connectivity, Jakarta, first published: December 2010.

Map 2: Asian Highways Routes and Trilateral Transport Linkages, Myanmar



International Road Links in Myanmar

Source: Myanmar Port Authority (2010)

Concerning the implementation of India-Myanmar-Thailand Trilateral Transport Linkages, apart from Kalay-Tamu road upgrading, there is no progress till now. The exact route for the TH within Myanmar has not yet become stable although some sections are approved. This impediment limits survey sites to be investigated, data availability and production of related maps. The TH route granted by Myanmar government passing through the country comprises various missing links: some are village-to-village tracks and some are totally untouched.

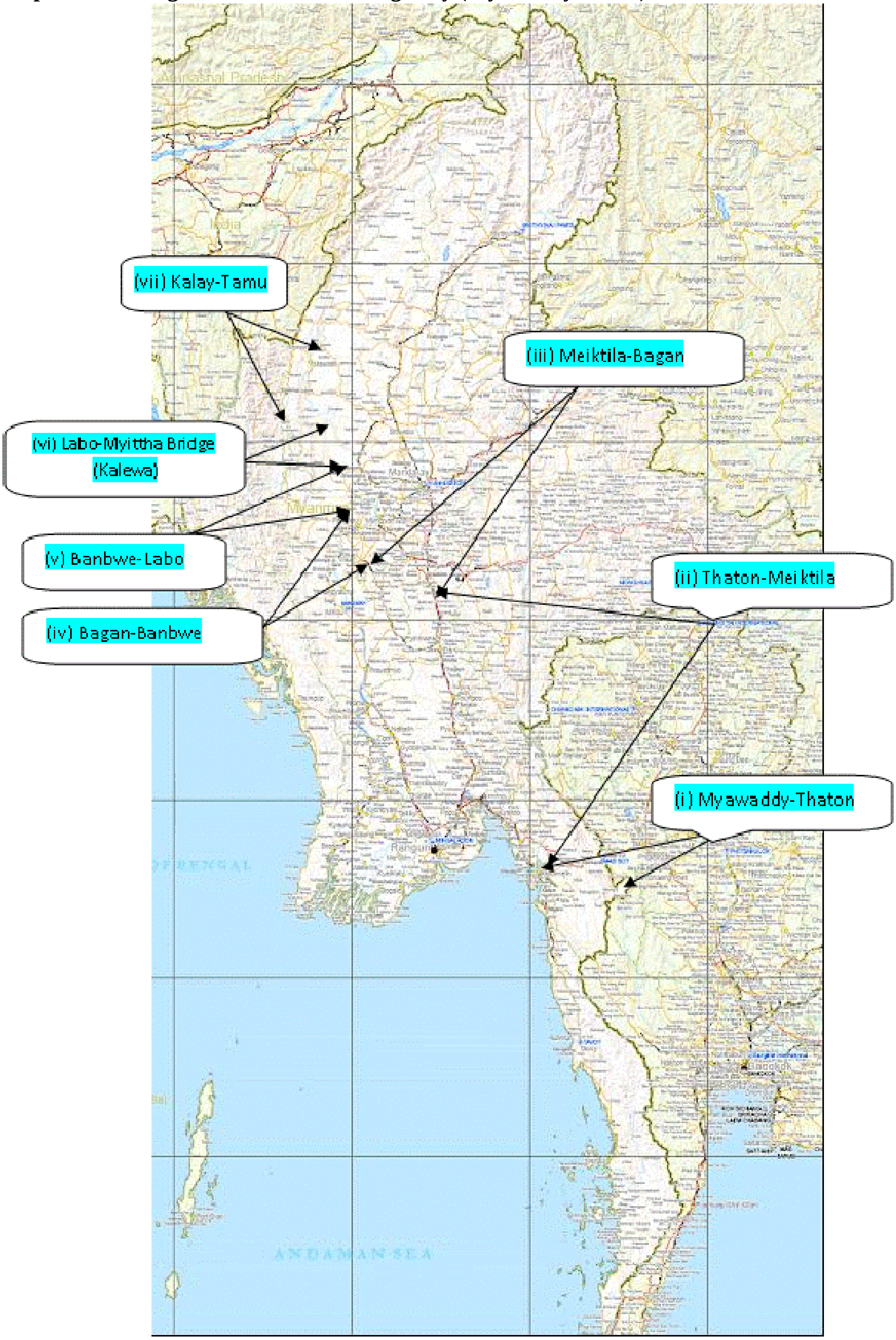
The TH from Mae Sot to Moreh is divided into twelve segments and these segments are conducted to identify road condition along the Highway. Map 3 displays seven sections combining shorter segments into one section in some cases in order to view clear depiction. For example, Myawaddy-Thingan Nyinaung, Thingan Nyinaung-Kawkareik, Kawkareik-Paan, and Paan-Thaton segments are collectively shown as Myawaddy-Thaton Section in the map. Thus, the map covers totally seven major sections in total in which distance, driving time (4-seater Toyota Van) in dry season and average speed are shown in Table 8.

Table 8: Road Conditions of Trilateral Highway in Myanmar by Segments between Myawaddy and Tamu (Distance, Time and Speed)

#		Route	Distance	Drive Time	Average Speed
(i)		**Myawaddy-Thaton**			
	(a)	Myawaddy-Thingan Nyinaung	18 km	15 minute	72 km/h
	(b)	Thingan Nyinaung-Kawkareik	44 km	120 minute	22 km/h
	(c)	Kawkareik-Paan	95 km	120 minute	47.5 km/h
	(d)	Paan-Thaton	38 km	50 minute	45.6 km/h
(ii)		**Thaton-Meiktila** : Thaton-Htantabin-Meiktila	Not yet constructed	-	-
(iii)		**Meiktila-Bagan** : Meiktila-Kyaukpadaung-Bagan	142 km	135 minute	63 km/h
(iv)		**Bagan-Banbwe** : Bagan-Pakoku-Yinmabin-Banbwe	Not yet constructed	-	-
(v)		**Banbwe-Labo**: Banbwe-Yagyi-Labo	80 km	150 minute	32 km/h
(vi)		**Labo-Myittha Bridge**			
	(a)	Labo-Kyaw-Marma	37 km	150 minute	14.8 km/h
	(b)	Marma-Myittha Bridge (Kalewa)	67 km	125 minute	32.2 km/h
	(c)	Myittha Bridge-Kyikone Junction	29 km	25 minute	69.6 km/h
(vii)		**Kalay-Tamu** : Kalay-Kyikone-Tamu	131 km	150 minute	52.4 km/h

Source: Field Survey

Map 3: Road Segments of Trilateral Highway (Myawaddy-Tamu)



Source: Author.

5-3. Other infrastructure development projects between Myanmar and India

5-3-1. India-Myanmar friendship road:

Among the several projects, completion of the 160km India-Myanmar Friendship road in 2001 on Myanmar territory, connecting Kalewa, Kalemyo and Tamu with Moreh was very imperative sub-regional integration between two countries. Tamu (Sagaing Division, Myanmar) is the border area on Myanmar side only 5 km from the Indian border point, Moreh (Manipur, India) (Myanmar Port Authority, 2011). With the grant-aid of the government of India, Kaly-Tamu road was completely upgraded and opened in Feburary 2001. Tamu-Kyigone-Kalemyo section of about 82 miles and 4 furlongs was also completed in September 2009. Kyigone-Kalewa section of about 17 miles and 4 furlongs has been still under maintenance by the India side. This friendship road became one of the major parts of the Trilateral Highway project linking India-Myanmar-Thailand under the Mekong-Ganga Cooperation Initiative, 2005.

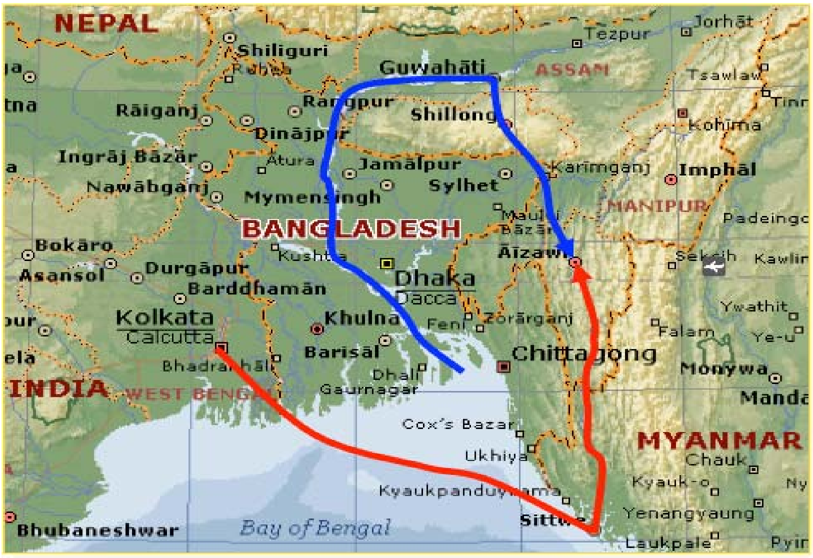
5-3-2. Tiddim-Rhi-Falam road

Engineers and surveyors from Border Road Organization of India and Public Works of Myanmar had prepared detailed Project Report (DPR) of upgrading Tiddim-Rhi-Falam road since 2006. A technical team from India also visited to consult with the Myanmar government with regards to the Tiddim-Rhi-Falam road upgrading project in 2008. Again, a delegation from two countries conducted a reconnaissance survey in 2009 and India allocated USD 60 million for the respective project. At present, the draft MOU for the project is underway to realize the upgrading project.

5-3-3. Kaladan Multimodal transport project

Similarly, another significant one is the Kaladan Multimodal Transport Project that was signed by the two ministers from Myanmar and India. Member countries of the ASEAN are naturally endowed with some 51,000 km of navigable inland waterways which can play an active role in transport development. However, the infrastructures related to this endowment are underutilized due to poor network, poor river ports and facilities, and poor intermodal connectivity (ADB 2011). There are urgent needs for developing inland water-transport connectivity to reap the large potential in reducing freight transport cost and time-lag in trade. Kaladan Multimodal Transport Project is in this direction utilizing Kaladan river transport and land transport for better connectivity. It is aimed at an optimal allotment of transport demands among various transport modes such as road, airport, seaport, and railway. A major purpose is to develop Sittwe port (Myanmar) by India Government for supporting the cargo flow from Kolkata to Aizawl (Mizoran State, India) through Kalandan River (Myanmar). The project involves a major upgradation of infrastructure at Sittwe, located about 250km from the Mizoram border on the north-western coast of Myanmar where the Kaladan river joins the Bay of Bengal (IPCS 2008). The project will connect Kolkata seaport, East India with the seaport in Sittwe (Arakan State) – a total distance of 539 km. It will then link Sittwe to the landlocked area of Mizoram in Northeastern India via river and road transport (see red line on the map below). It will promote bilateral relations between India and Myanmar and to increase trade with and continue multilateral initiatives, on a non-discriminatory basis, with Southeast Asian economies (Ministry of Commerce, Myanmar).

Map 4: Kaladan Multimodal Transport Project



Source: Myanmar Port Authority (2010)

Technical teams including Myanmar and Indian experts and engineers from the relevant departments are carrying out the preliminary surveys and engineering works for implementing the project.

5-3-4. The Stilwell road project

The Stilwell road is named after an American general, Joseph Stilwell, and was built during World War II to free China from Japanese occupation. The road linked Ledo, in India's northwestern Assam State, with Kunming. About 1033 km of the road, which traversed northern Kachin State via Myitkyina, is in Myanmar.

Trade between China and India has expanded rapidly in recent years and both countries would benefit from a road link. Indian Prime Minister Manmohan Singh has told AFP that his government is keen to further the country's "Look East Policy", which aims to strengthen trade and other ties with countries in Southeast Asia. Assam State Minister for Industry, Pradyut Bordoloi, said in August: "We are widening and developing Stilwell Road on the Indian side, which will be completed in four to six months. But the rest of the project depends on the three countries agreeing to reopen the road."

There are strong will for reopening the road in all countries concerned, namely India, China and Myanmar. The population living in India, China and the ASEAN countries is nearly three billion people, about half of the world population. India and China are eager to reopen this road; India wants to open its landlocked northeastern states to trade with China and the ASEAN nations, while China is willing to send its products through the same route. Myanmar would be able to reap benefit handsomely from this trade by charging transit fees and gaining spin-off benefits from tourism.

Myanmar could do the same as Singapore that has used its strategic location to profit from transit trade. The proposed Kyaukphyu deep-sea port and connecting highway projects will shorten the overall distance by thousands of kilometers and will save money and time for China by sending their products to the west and Middle East through Myanmar, instead of passing through the Malacca Strait. China and India have suggested to Myanmar's government that the 1726-kilometre-long Stilwell road, which could serve as an important road link between the world's two most populous nations, be reopened.

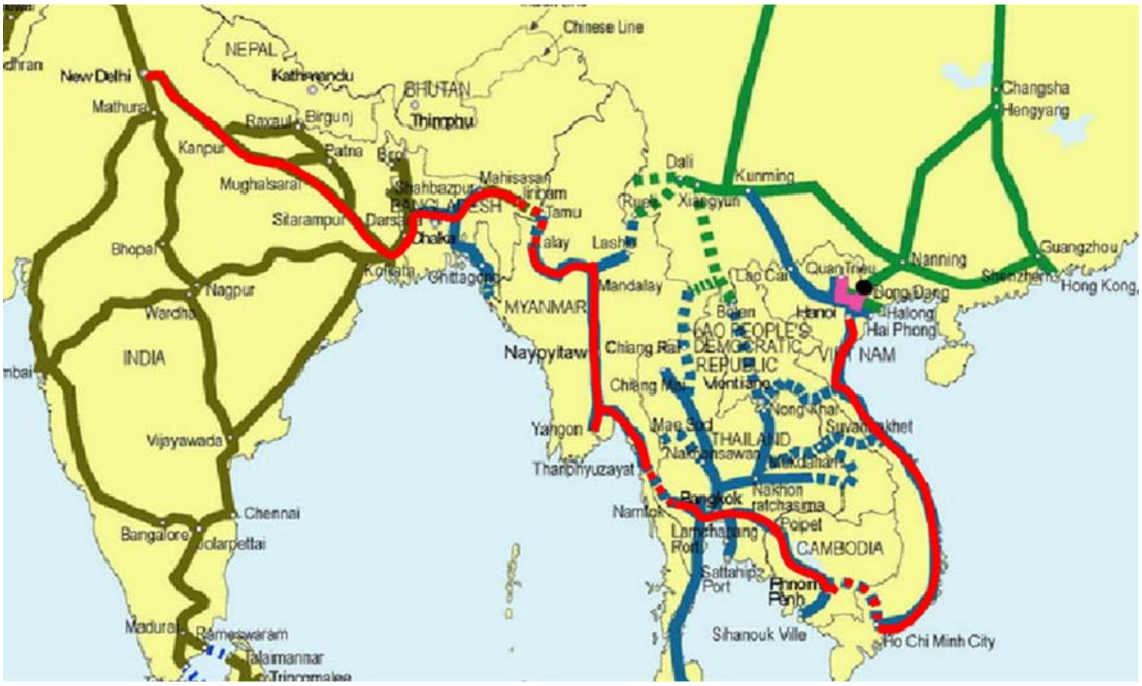
5-3-5. New Delhi - Hanoi Rail Link

There are also other rail link projects like the Jiribam-Imphal-Moreh line in the East Indian state of Manipur and the Tamu-Kalay-Segyi line in Myanmar, as well as rehabilitation of Myanmar's existing Segyi-Chaungu Myohaung line. According to the state-run company, Rail India Technical and Economic Services Ltd that conducted a feasibility study of the proposed freight corridor, the Jiribam-Imphal-Moreh rail link is estimated to cost USD 649 million, the Tamu-Kalay-Segyi link in Myanmar USD 296 million, and the cost of refurbishing the Segyi-Chungu-Myohaung line has been pegged at USD 62.5 million. All these rail links would ultimately add up to the New Delhi-Hanoi rail link proposed at the MGC ministerial meeting held in Phnom Penh in June 2003. The main tasks of developing New Delhi-Hanoi Rail Link are – (a) to link India's Manipur with India's main railway corridor, and (b) to re-establish and renovate railway networks in Myanmar.

India is planning New Delhi-Hanoi Rail Link with two possible routes. Both proposed railway routes will connect Hanoi through Myanmar with different rail links. Route-I will connect Hanoi via Myanmar, Thailand, and Cambodia. In Route-II, it is diverted to Bangkok via Ye and newly constructed portion of Ye and Dawei in Myanmar, then to Hanoi through Thailand and Laos. In both routes, the proposed link from Silchar (India) to Thanbyuzayat is common (Map 5 and 6).

Although a preliminary study was done by Indian consulting engineering company, RITES, in 2006, complete details of both routes are not available due to lack of data of railway systems in different countries. On completion of these projects there could be possible to promote regional cooperation, foster economic and social integration and increase trade and investment.

Map 5: New Delhi – Hanoi Rail Link Route-I



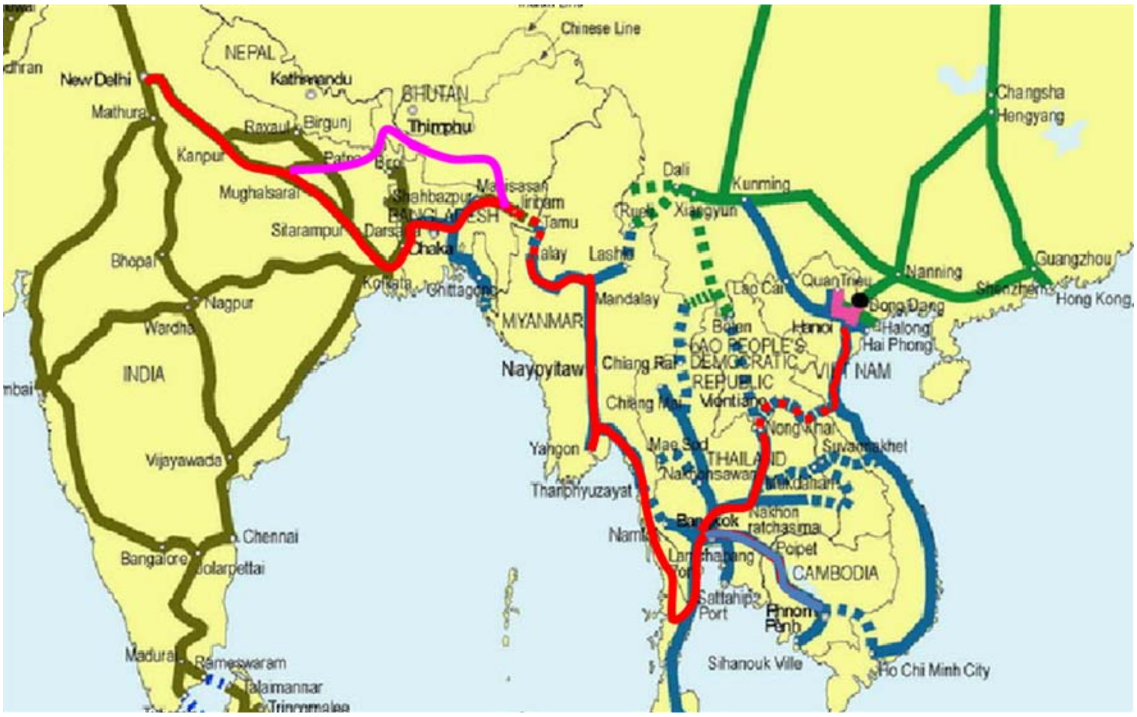
Source: Rail India Technical Economic Services (RITES)

Table 9: New Delhi-Hanoi Rail Link Route-I in Myanmar

Section	Route	Distance (in km)	Renovating/ Construction Cost (USD in million)
Tamu-Kalay	Missing	128	151*
Kalay-Mandalay	Existing	516	285*
Mandalay-Bago	Existing	541	
Bago-Thanbyuzayat	Existing	270	210**
Thanbyuzayat-Three Pagodas Pass	Missing	110	402**

Source: RITES Ltd, India
Notes: * – RITES Feasibility Study Report 2005 for connection unto Mandalay duly updated @10% per annum,
** – Concept Plan paper of MD/RITES – cost updated @10% per annum

Map 6: New Delhi – Hanoi Rail Link Route-II



Source: Rail India Technical Economic Services (RITES)

Table 10: New Delhi-Hanoi Rail Link Route-II in Myanmar

Section	Route	Distance (in km)	Renovating/ Construction Cost (USD in million)
Tamu-Kalay	Missing	128	151*
Kalay-Mandalay	Existing	516	285*
Mandalay-Bago	Existing	541	
Bago-Thanbyuzayat	Existing	270	210**
Thanbyuzayat-Ye-Dawei	Existing	235	
Dawei-Bang Bong Tee	Missing	110	309**

Source: RITES Ltd, India

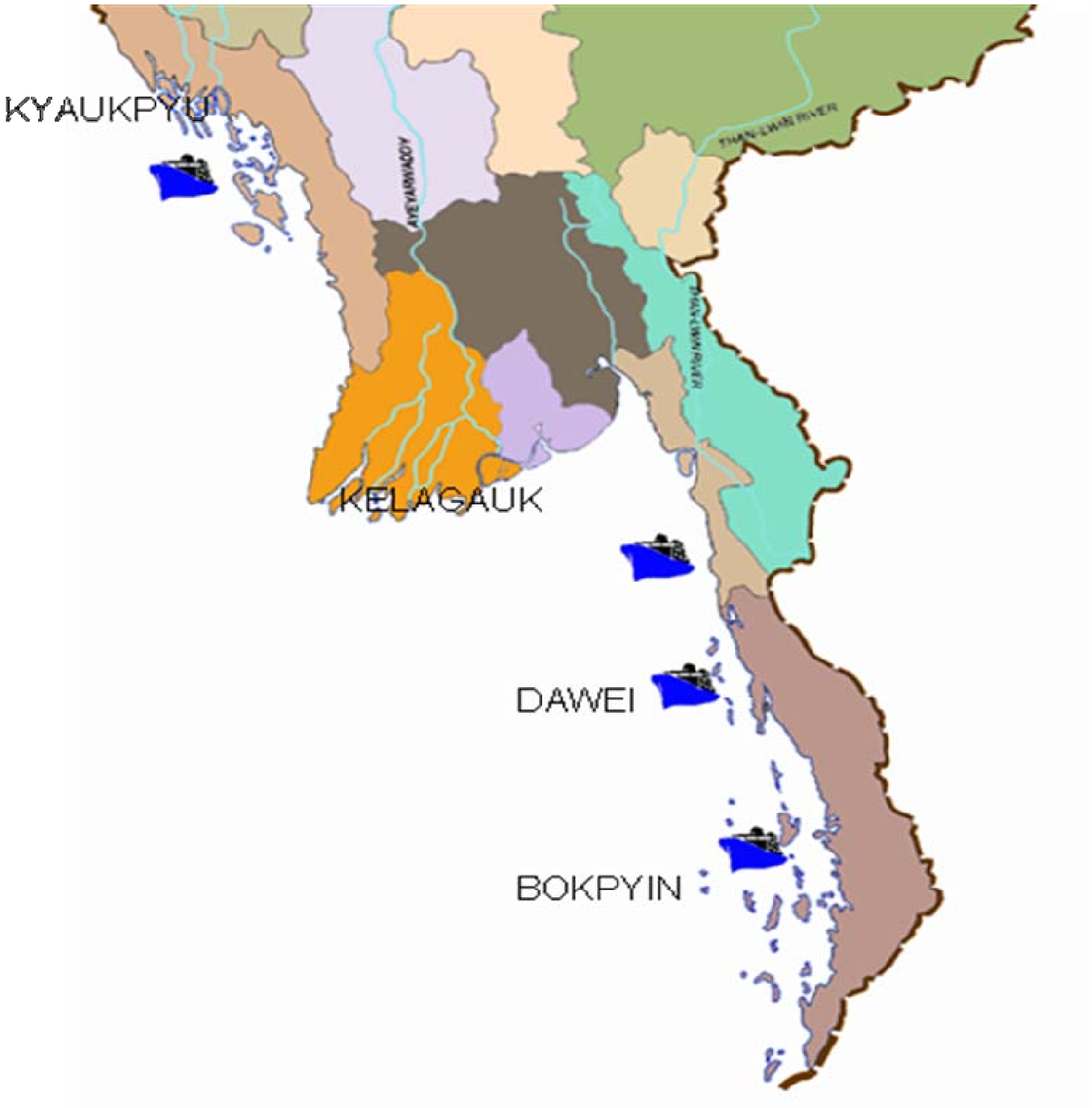
Notes: * – RITES Feasibility Study Report 2005 for connection unto Mandalay duly updated @10% per annum,

** – Concept Plan paper of MD/RITES – cost updated @10% per annum

5-4. Deep Seaport Projects in Myanmar

All existing ports of Myanmar including Yangon Port are river ports and not deep enough for large conventional vessels and container vessels. For long term requirement, if the economic situation of the country and the region demands traffic of larger vessels, then the development of Deep Sea Commercial Ports will have to be implemented at suitable sites along the coast of Myanmar such as Kyaukpyu at western coast and Kalegauk, Dawei and Bokpyin at eastern coast of Myanmar.

Map 7: Myanmar Deep Seaport Projects



Source: Myanmar Port Authority (2010)

5-4-1. Dawei deep seaport project:

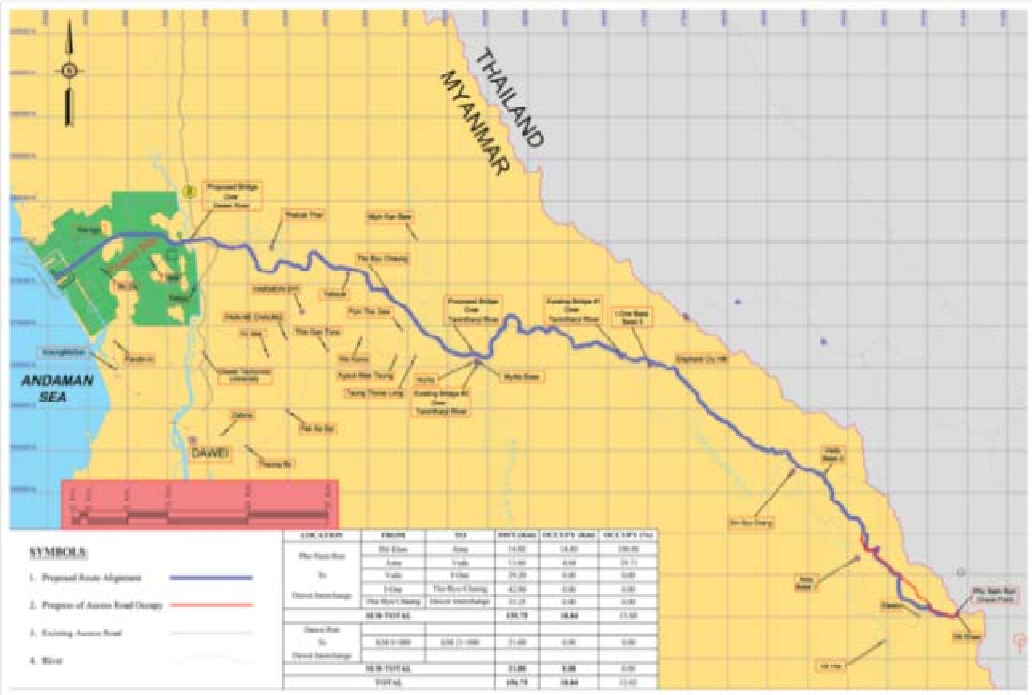
It is designed to lessen the growing problem with shipping traffic jams at the Strait of Malacca, which it uses for import and export of goods. When it is completed, the project would reduce logistical and labour costs for GMS members as well as create job opportunities for Myanmar. Framework Agreement has been signed between Myanmar Port Authority and Italian-Thai Development Public Co., Ltd on 2 November, 2010. The Dawei Project shall be developed on a build, operate and transfer (BOT) basis. It shall be valid for a period of 60 years commencing from the execution of said Agreement. The Dawei Project Development will cover an area of approximately 250 square kilometer (on shore) and consist of three major components comprising of Deep Sea Port, Industrial Estate (Heavy, Medium and Light Industries), Cross-border road, rail and pipeline link with connecting electrical transmission lines to the Myanmar/Thai border.

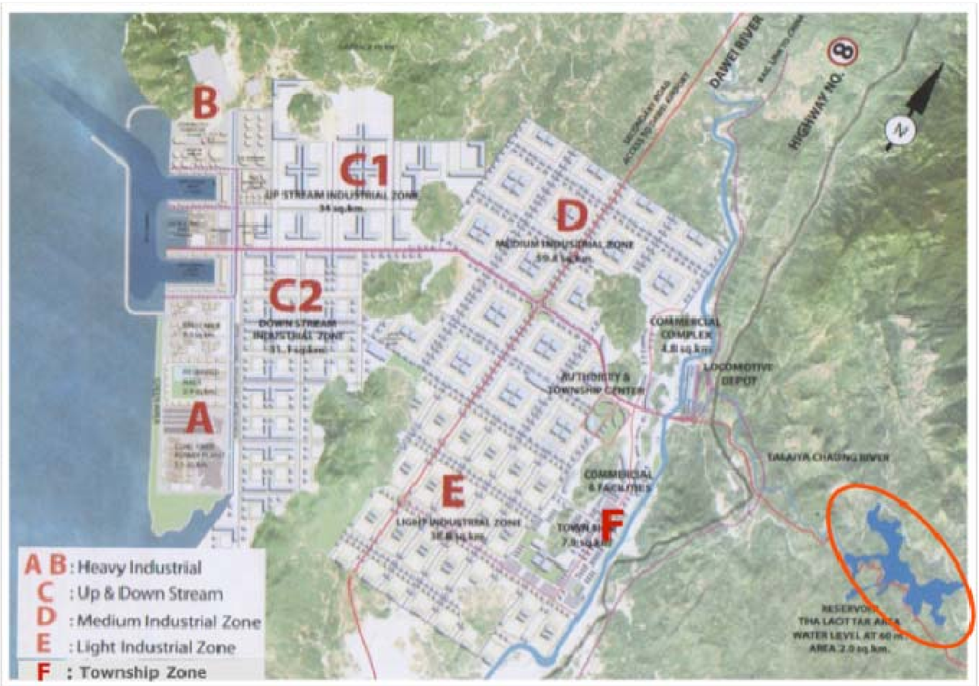
It was found in a research done by the Asian Development Bank in 2009 that high costs of Asian trade are not because of tax and tariff but because of poor transportation. The development of Dawei region will bring brilliant opportunities for not only Myanmar itself but also the region as a whole since Dawei port will serve as a new commercial gateway providing an alternative sea route to India, China, Middle East, Europe and Africa that will lessen the dependence on the congested Straits of Malacca reducing transportation time and logistic costs. For example, Thai cargo passing through Malacca Strait to India will take two/three weeks but it will be just hours from Bangkok to Dawei Seaport and less than one week to India. Additionally, it will offer gateway for land-lock eastern regions to trade with the west.

Rail links to Bangkok and to Kunming, via the proposed rail link from Dawei-Yangon-Mandalay-Muse, will enhance the strategic importance as a regional logistic and trading hub. An airport with a 3,200 m long runway has already been built near the Project (ITD 2009).

Dawei development project is one of the largest foreign investment projects and it has a different nature of investment compared to other mega projects such as oil and gas explorations and hydropower projects. These other mega projects could contribute to the national economy but produce less individual and social benefits of the entire people. While it is often concerned with natural resource degradation and environmental costs, it is able to create minimal employment opportunities and low technology transfers. On the contrary, Dawei project is expected not only to increase national economy as a whole but also to promote individual incomes and livelihood up to grassroots level.

Map 8: Conceptual Layout Plan for Industrial Estates and Proposed Highway Route in Dawei Project





Source: Myanmar Port Authority (2010)

5-4-2. Kyaukphyu deep seaport project

Myanmar Oil and Gas Enterprise (MOGE) and China National Petroleum Corp (CNPC) have been jointly implementing the tanker port on Made Island for Myanmar-China crude pipeline laying; this pipeline will likely be built along the proposed Kyaukphyu-Kunming highway. Tanker Port is 480 meter long and can be possible for the 300,000 DWT vessels. This would also provide easier access to the markets of Africa, the Middle East and Europe for Chinese manufacturers through Myanmar. Workboat Wharf and reinvent buildings construction are started in November 2009. The latest updates of the project's implementation are as follows.

Table 11: Work Plan of Workboat Wharf Construction

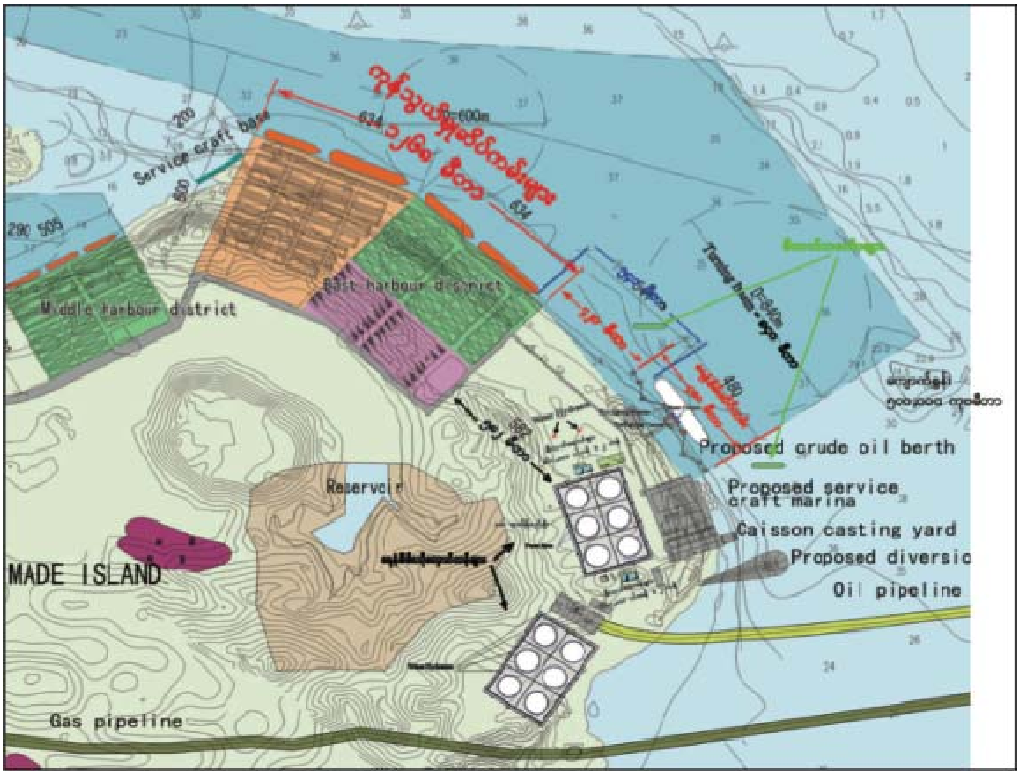
Items	Detail Items	Start time	End Time
Project preparation	Entering the construction area of the first set for personal, equipments and materials	30-9-2009	10-10-2009
	Entering the construction area of the second set personal, equipments and materials	11-10-2009	10-12-2009
Land territory construction	Ceremony for construction	31-10-2009	31-10-2009
	Mountain excavation and backfill for land territory	31-10-2009	21-2-2010
Revetment construction	Revetment construction	14-11-2009	20-4-2010
Cassion fabricating field construction	Cassion fabricating field construction	31-10-2009	4-5-2010
Cassion transportation wharf construction	Cassion transportation wharf construction	1-2-2010	29-6-2010
Workboat wharf construction	Workboat wharf construction	1-2-2010	24-8-2010
Completion	Project completion, check and accept	25-8-2010	31-8-2010

Source: Myanmar Port Authority (2010)

The project implementation has been delayed for several reasons. Though the projected was planned to complete at the end of August 2010, the date of completion has been postponed and expected to be finished in November 2012 as scheduled in Table 10.

On the other hand, HTOO Group of companies (Myanmar) cooperated with CITIC Group (China) in construction of the Development Zone, Deep Sea Port, connecting railway and other supporting facilities in Kyaukphyu. After signing the MOU, both governments attached great importance to this project.

Map 9: Kyaukphyu Deep Seaport Conceptual Plan



Source: Myanmar Port Authority (2010)

Map 10: Kuaukphyu Railways Conceptual Plan

–**Line**: Single track with consideration of expansion to double
–**Bridge and tunnel ratio**: 40%
–**Maximum speed**: 160km/h
–**Type of traction**: Diesel
–**Total length**: 997 kilometer
–**Total investment**: 10 billion USD (about 10 million USD/ kilometer)

Source: Myanmar Port Authority (2010)

6. EXPECTED IMPACTS ON MYANMAR ECONOMY

6-1. Advantages

6-1-1. International Trade

The improvements of ASEAN-India network of transportation infrastructure will deliver numerous benefits and will ensure all economies across the region having a competitive access to international markets through an efficient, reliable and thriving regional network. It will also integrate national markets to promote economic efficiency and private sector development. The grater connectivity through the Trilateral and Asian Highways, Economic corridors and Deep Seaports, which are planned to click one another, will enhance not only India-ASEAN trade but also international trade including both direct and indirect trade. Improvements in the modes and infrastructures in terms of their capacity will decrease transport costs. Decreasing transport costs does more than increasing trade, it also helps changing the location of economic activities (Myo 2004). Accordingly, trade between India and ASEAN is expected to reach about US$100 billion in the next five years.

6-1-2. Foreign Direct Investment

Most of the connectivity projects are associated with foreign funding or investment. Foreign institutions such as ADB basically fund Asian and ASEAN highway projects. Kaladan Multimodal Transport project will cost USD 120 million including construction of Sittwe deep seaport. As the projects, both Dawei and Kyaukphyu, are designed to develop the deep seaport with industrial zones and transportation links, it will enhance not only promote trade volume but also foreign direct investment in the region. The Dawei Project investment cost of infrastructure and supporting facilities will be an estimated as USD 8.6 billion, and the estimated investment from potential industrial investors in the industrial estate will be over USD 50 billion (MPA 2011).

6-1-3. Local Investment

With the completion of the projects, the development through foreign investment will also induce Myanmar manufacturers and entrepreneurs to invest and operate in the new institutional and business environment. Foreign firm moves first by making investment in the country. Then, local firm observes the investment and decides whether and when to enter the new market over the infinite time horizon. The foreign firm naturally dislikes competition but would accommodate small-scale or inoffensive entry. The local firms could start as sub-contracting firms or supporting firms through forward and backward linkages. The local firms also prefer delayed entry through imitation-by-doing at infancy stage.

6-1-4. Employment Opportunity

While implementing the projects, there are many job opportunities in the region. Together with Myanmar workers, Indian, Thai and Chinese workers have engaged in the projects and will continue for a couple of years. After completion of the projects, the industrial estate will create a new market for foreign investment and further promote regional trade, development and generate employment and enhance the livelihood of the Myanmar people. With inflows of FDI, there will be high employment opportunities for Myanmar workforce at all levels of skill. Consequently, new job creations will control outmigration of Myanmar workers and increase domestic knowledge accumulation by spillover effect, which is granted by the Dawei Special Economic Zone Law and the Myanmar Special Economic Zone Law, 2011.

6-1-5. Higher Wages

In the short run, of course, dispersion in the demand for labor can produce wage differentials, but they should disappear after some adjustment period. With the inflows of foreign firms, which are usually capital, technology and skill intensive will employ people with proper skills. At the initial stage, it will be difficult to achieve a qualified, competent and well-prepared domestic labor force, which will lead to employ skilled-labor from foreign countries. This will increase wage differentials between skilled and unskilled workers, foreign and local workers, and industrial and agricultural workers. By mobilizing labor across the regions and industries, and giving skill upgrading and human resource trainings to obtain 'higher skill', 'more skill' and 'multi skill' for the workforce, the wage differentials will be narrowed and real wages will be increased over time.

6-1-6. Narrowing Development Gaps

Enhanced physical connectivity can contribute to narrowing development gaps by expanding the frontiers of production/distribution networks. Strengthened connectivity facilitates cross-border movement of labor, capital, technology and idea that will cause narrowing the development gaps among the countries in the long term. In other words, the better transportation network will play a key role in promoting economic growth and regional development and increasing job-opportunities and real income, thereby reducing growth differentials and narrowing development gaps among people and regions.

6-1-7. Regional Stability

Policy makers have emphasized economic, political and social stability as the foundation of economic growth and scholars have thought of this stability and economic growth as a virtuous cycle (ADB 2011a). Economic cooperation will ensure stronger interdependences within the region and prevent vulnerabilities of external shocks. Moreover, collaboration in technological development, energy security, and disaster preparedness can yield significant synergies and positive spillovers. And, the skillful and cooperative management of regional commons will become increasingly important for Asia's long-term stability, peace and harmony (ADB 2011a). On the social frontier, traditional lifestyles and deep-rooted customs and beliefs have been altered among the countries, and this might cause some challenges for forthcoming grater regional integration in the short term. People-to-people connectivity will encourage social and cultural cooperation, mutual trust and capacity building through regional network and then, improve social security among the regions over time.

6-2. Challenges

However, there are a number of challenges which may affect on the implementation of various projects concerning regional connectivity and even the projects after completion stage. Moreover, some possible impacts and consequences are beyond the projects themselves and seem to extend to the national and regional level as a whole.

6-2-1. Project Funding

Limitation of financial resources remains a contentious issue as noted elsewhere. In the case of TH Project, India and Thailand have upgraded some of the link roads but due to financial scarcity in Myanmar, much work remains incomplete. Since 1998, Myanmar was included in "non-accrual status" list with the World Bank, meaning that there can be no new lending until all overdue payments are cleared. Indeed, there have been no World Bank loans to Myanmar since July 1987. The World Bank is keeping watch on the social and economic situation of the country. Likewise, no loans have been provided by the ADB to Myanmar since 1986 although it introduced in 2000 a Country Assistance Plan for the period of 2000 to 2002. Fund injection by the two neighboring countries has delayed and additional fund from regional/international organizations was also out of action. Likewise, some other projects are probably facing similar financial constraints in one way or another.

6-2-2. Environmental Degradation

It is questionable as to proper management in conservation of natural environment because of the nature and capacity of a developing country. Even environmental friendly practices such as proper waste management, low carbon emission technique and systematic treatment are to be set in the industries of special Economic Zone (SEZ), some extent of environmental degradation and pollution of soil, air and water are to be come about in this surrounding area.

6-2-3. Adverse Effects on Local Industries

Foreign investment is actually fine to be a source of fund for investment which cannot find qualified investor locally. Moreover, such investments spill over in technology and managerial skill to be adopted in local industries. However, crowding out effect can occur when foreign investors target the domestic market and/or attain outsized portion of local resources. Investment from outside world is surely to be brought in large scale and will adversely affect on local firms taking away from competitiveness. The most significant and recent example is tremendous rise of land price in Dawei area where small industries are unable to invest, attain and sustain. Moreover, labor cost has also a tendency to increase with possible higher demand from different projects and large firms. The high wages in foreign firms influence to be a similar trend in the local firms which may not be able to do so. It is true that competition offers efficiency for producers and lower cost for consumers, but high concentration of large firms devastate survival of small local industries on which majority of grassroots have to rely.

6-2-4. Political Influence of Major Investors

Every FDI recipient country is eligible to alter policy environment in order to assure international investors that their investment can prosper. Investment inflow from various sources positively supports proper alteration of investment policies and related issues. Conversely, large portion of investment contributed by single source (whatever multinational company or country) is predictable to manipulate its power for undue political influence over the policy makers. The pressures may go down upon national project planning, trade policy formulation, patent right enforcement leading to changes of economic policy. Intellectual property right, for instance, is appropriate for well developed countries to protect the profit of large corporations but not for underdeveloped ones. Developing economies including Myanmar have to rely on small and medium industries for which promulgation of intellectual property right law is quite harmful.

As is the case, the policy reforms principally focus on improving the operation of domestic financial market, strengthening the institutional base, enhancing regulatory and supervisory regimes.

7. CONCLUSION AND RECOMMENDATION

India-ASEAN Connectivity could be realized through enhanced physical infrastructure development, effective institutional arrangements and empowered people. However, building an enhanced regional connectivity requires not only the infrastructure development but also the development of new strategies and institutions, more effective implementation of existing and future initiatives (ADB 2011). The connectivity projects will enhance the strategic importance of Myanmar as a regional logistics and trading hub and will be definitely beneficial for Myanmar, India and ASEAN, and for the entire region, Asia. To realize the positive outcomes, Myanmar needs to respond to the opportunities offered by its geographical and natural advantages and to the competitive advantages brought about by regional and global market chain. The economic integration however not only depends on guidelines or policy frameworks but also depends on strong political desire and a common vision to integrate their economies themselves. Therefore, in order to achieve and maintain fruitful economic cooperation and successful regional integration, Myanmar and the entire Region should have strengthened the followings: (1) macroeconomic, social and political stability, (2) financial market development, (3) better Institutional and business environment, (4) consistent and standardized border crossing formalities and procedures, (5) low or no tariff and non-tariff barriers, (6) managing environment and natural resources to ensure sustainable development, and (7) political will/commitment and public-private partnership.

APPENDIX. ONGOING AND PROSPECTIVE INFRASTRUCTURE PROJECTS FOR ASEAN-INDIA CONNECTIVITY: MYANMAR

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US$ mil)	Status
2	PPP	Logistics	Port, Rail, Road	Dawei deep sea port	8,600.0	Ongoing
2	PPP	Logistics	Road/Bridge	Dawei-Magul-Lenya-Kawthaung	-	Ongoing
2	PPP	Logistics	Port, Rail, Road	Kyaukphyu deep sea port	10,000.0	Ongoing
2	PPP	Logistics	Road/Bridge	Dawei-Maesamee Pass	-	Prospective
3	PPP	Logistics	Road	Kaladan Multimodal Project (Setpyitpyin to India border)	49.1	Ongoing
3	PPP	Logistics	Port / Maritime	Kaladan Multimodal Project (Sittwe Port, Kaladan River development)	68.2	Ongoing
3	Public	Logistics	Road/Bridge	Upgrading below Class III road (Chaung U-Kalay)	-	Ongoing
3	Public	Logistics	Road/Bridge	Upgrading below Class III road (Kengtong-Taunggyi)	-	Ongoing
3	PPP	Logistics	Railway	Lasio-Muse railway	479.5	Prospective
3	PPP	Logistics	Road/Bridge	Muse-Kyaukphyu	-	Prospective
3	PPP	Logistics	Railway	Rehabilitation of Kalay-Mandalay rail line	162.0	Prospective
3	PPP	Logistics	Railway	Tamu-Kalay railway	97.7	Prospective
3	PPP	Logistics	Road/Bridge	Tanine-Pansauk Road	-	Prospective
3	PPP	Logistics	Railway	Thanbyuzayet-Three Pagoda Pass railway	246.2	Prospective
3	PPP	Logistics	Road/Bridge	Thingannyinaung- Kawkareik	-	Prospective

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CHAPTER 5.

ASEAN-INDIA CONNECTIVITY: A THAILAND PERSPECTIVE

RUTH BANOMYONG

PAITOON VARADEJSATITWONG

NUANNALIN PHANJAN

Abstract

Thailand places strong importance on its relationship with India. As observed, trade and investment between the two countries is on the increase even though the Thai-India Free Trade Area is not working properly. This growth is coupled with the increase in the number of visitors from both countries. The purpose of this chapter is to provide an understanding of the role that can be played by Thailand in enhancing ASEAN-India connectivity. However, this understanding will be based on a Thai perspective which may or may not fit within the overall ASEAN strategic direction. This chapter will first explain how Thailand looks at connectivity. The role of the Thai Ministry of Transport is then examined more closely to better understand its development strategy. A strength weakness opportunity and threat (SWOT) analysis is then further conducted followed by a discussion on Thai-India specific policies. The last section of the chapter will focus on a proposed connectivity framework and the findings derived.

Thailand has a clearly defined strategy to enhance its connectivity with India even though infrastructure links are still limited. Thailand is currently at the crossroads as from a Thai perspective the "official" priority is on the development of Pak Bara port on the Andaman Sea while a Thai private company has obtained a concession to develop Dawei port in Myanmar to act as a gateway with India, the Middle East and Europe. From a national security perspective, it is preferable for Thailand to focus its infrastructure development on Pak Bara as the location is in the country and not subject to external factors. However, if a regional perspective is taken, the option to develop Dawei port seems to be more interesting as it offers a shorter access route to the Andaman Sea for industries located in Thailand Eastern seaboard.

1. INTRODUCTION

In the year 2015, the Association of South East Asian Nations or ASEAN[1] is expected to become the ASEAN Economic Community (AEC) by creating a single market. This enhanced level of economic integration will foster sustainable economic growth and hopefully reduce development gaps among ASEAN member countries.

However, enhanced internal economic integration within ASEAN is not sufficient for the region to sustain its growth. ASEAN requires closer co-operation with its main trading partners such as China, Japan, South Korea, the European Union, the United States, and so on. This co-operation on trade related issues and investment schemes will not only further accelerate the economic growth of the region but will also be beneficial to trading partners in terms of market and investment destination.

It is recognised that India is an important trading partner to ASEAN albeit on a lesser scale compared to the existing main partners. The emergence of India as a newly industrialised country has provided the impetus for increasing trade and investment with ASEAN, but the question still remains whether the existing connectivity links between ASEAN and India can be improved as current links are considered to be quite weak thus hindering the development of increased trade and investment flows. In terms of growth area for ASEAN, India has the potential to become a key partner but this can only be done with improved connectivity links.

India is considered to be an important and influential actor in Asia as well as on a global basis. India was welcomed as an ASEAN sectoral dialogue partner in 1993, and the status was later upgraded to a full dialogue partner in 1995. Subsequently, India joined the ASEAN Regional Forum (ARF)in 1996.

Thailand as a founding member of ASEAN will surely gain from ASEAN's enhanced relationship with India. Thailand as a country has also been looking "East" and exploring the potential of increased trade and investment with India. Thailand and India have strong cooperative relationship in the East Asia Summit (EAS), the Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC), the Mekong-Ganga Cooperation (MGC) and the Asia Cooperation Dialogue (ACD).

[1] The ASEAN member countries are: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

The purpose of this chapter is to provide an understanding of the role that can be played by Thailand in enhancing ASEAN-India connectivity. However, this understanding will be based on a Thai perspective which may or may not fit within the overall ASEAN strategic direction.

This chapter will first explain how Thailand looks at connectivity issues. Thailand does not have specific connectivity policy, but the connectivity paradigm is firmly entrenched in Thailand's logistics policy development plan. The role of the Thai Ministry of Transport is then examined more closely to better understand its development strategy. A strength weakness opportunity and threat (SWOT) analysis is further conducted followed by a discussion on Thai-India specific policies.

The last section of the chapter will focus on a proposed connectivity framework and the findings derived. The connectivity framework is composed of 4 key dimensions which are: infrastructure; institution; people; trade, business and investment.

2. THAILAND POLICY REVIEW RELATED TO CONNECTIVITY

2-1. Thailand's Logistics Development Strategy (2006-2011)

In Thailand, there is no Government connectivity policy per se, but connectivity issues are highlighted in the country's national logistics development plan. This national logistics development plan was developed with a vision to establish a world-class logistics system in the country to support Thailand as Indochina's trade and investment centre.

The objectives of the plan are to enhance trade facilitation with the aim of increasing cost efficiency, customer responsiveness and reliability, and security, and to create added value for logistics and other supporting industries. In order to achieve these objectives a goal was implemented. The country had to lower down its logistics costs as a proportion of the Gross Domestic Product (GDP) from 19% in 2005 to 16% in 2011. The estimated numbers for 2010 is around 18 to 19% of GDP which fall short from the stated objective.

A total of five strategic agenda are proposed that should enable Thailand to achieve its logistics vision, objectives and goals:

- Business Logistics Improvement
- New Trade Lanes and Logistics Network Optimization
- Logistics Service Internationalisation
- Trade Facilitation Enhancement
- Capacity Building

The new trade lanes and logistics network optimization agenda is the one that is the most related to physical connectivity while logistics service internationalisation focuses on service connectivity. Trade facilitation enhancement provides a framework that facilitates trade connectivity.

The goal of the new trade lanes and logistics network optimisation agenda is to set up an integrated logistics management system that will support Thailand's status as Indochina's logistics hub in terms of gathering, transferring and distributing merchandise, both regionally and internationally. The lead agency for this agenda is the Thai Ministry of Transport.

The Thai Ministry of Transport has taken the lead in the development of an integrated logistics network, both locally and internationally, in such a way that the country is linked with overseas markets through the development of, among other things, feeder systems, motorways, logistics centres/distribution centres and container yards at strategic locations throughout the country.

Such centres include Thailand's business gateways or regional manufacturing and trading centres, and Suvarnabhumi Airport City, where local and international investors collaborate in joint ventures that enhances connectivity.

The development of such an integrated logistics network will be combined with the establishment of new trade lanes to the Middle East, Africa and Europe via Thailand's Andaman Sea. This will support the expanding trade activities of Thailand's neighbouring countries by developing deep seaports in the west coast of the country as well as providing an economic corridor approach linking ports within the country's and the region's major transportation networks.

Industrial development will be enhanced through the development of other supporting industries in a cluster-like manner in purpose-built industrial parks. In concrete terms this means that Andaman deep seaports will be developed, ready to provide appropriate services and that a railway system linking ports on the western coast with regional transport routes, major trading centres and the major trading cities will be operational by 2011. Sadly, this development plan has not progressed much.

The logistics development plan also proposes to upgrade Thai logistics service providers (LSPs) in such a way that they remain competitive and that their services remain in the high value-added category. The Thai Ministry of Commerce is the lead agency for this strategic agenda.

The Thai Ministry of Commerce has been assigned with the task of promoting investment in LSPs' business in both industrial groups/parks and individual businesses. The Ministry also has to support joint ventures and strategic alliances between Thai LSPs and foreign small or medium sized service providers by supporting the formation of partnerships and alliances within the private sector through business matching activities, in order to increase opportunities for information exchange and cost sharing about such aspects as trucking and warehousing while developing integrated logistics services.

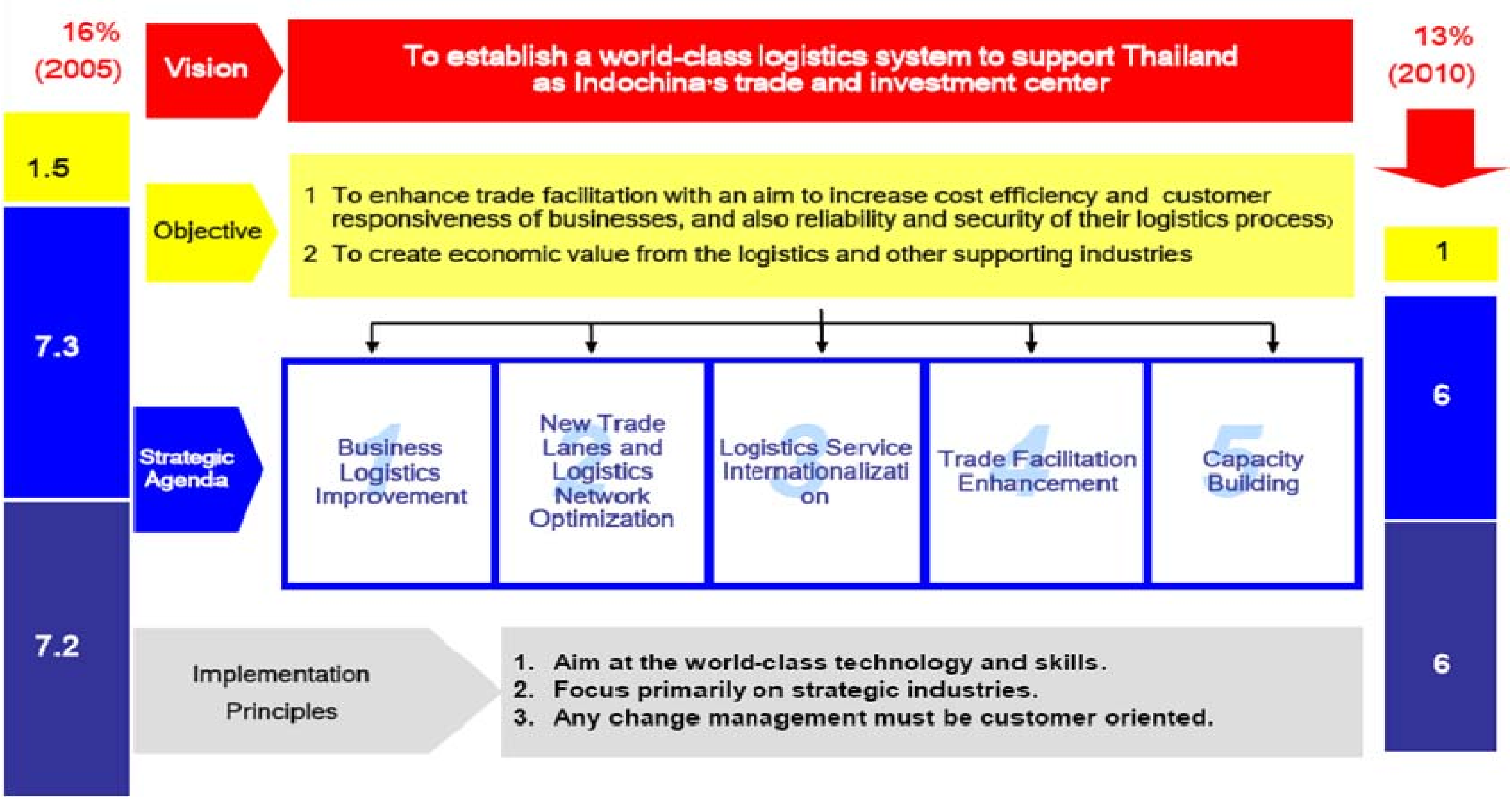
The Ministry of Finance and in particular the Thai Customs Department has been assigned the task of reducing operators' import and export handling cost. This is based on the development of E-Logistics and Single Window Entry into a central system in order to provide import/export and logistics services; while linking information in a G2G, G2B and B2B basis.

Not only should handling cost be reduced but the Ministry of Finance will also have to reform taxation system and customs clearance procedures related to import and export transportation and shipping businesses with the aim of facilitating the import/export process. This objective is expected to be achieved based on:

- Reduced time for transporting import and export goods or transferring goods between ships.
- Reduced costs for transporting import and export goods and for transferring merchandise between ships.

The Thai trade facilitation agenda also highlight the need to promote the setting up of distribution and logistics centres in priority markets such as India in order to increase Thai business competitiveness in foreign markets.

Figure 1: Thailand Logistics Development Strategy (2006-2010)



Source: Office of the National Economic and Social Development Board.

2-2. Thailand's New Trade Lane Development and the Establishment of a Regional Hub

The aim of Thailand's strategic planning for the development of transport network linkages to support the expansion of economic, trade, and investment corridors is focused on making Thailand a regional logistics and economic hub. The new trade lanes that Thailand are exploring concentrate mainly on the routes linking to China and India, the new economic areas of the world with rapid economic growth.

Such routes are the main supporting factors that can offer Thailand with the opportunity for increasing production and the expansion of economic activities, trade, and investment. In the development of such new efficient trade lanes, consideration has been given to changes derived from economic globalization and the comparative advantages of the location of Thailand based on two dimensions as follows:

(1) Globalization has made, at present and in the future, the Asian Region as the main area for trading and economic growth that is derived from the driving force coming from countries such as China and India. Increased consumers' demand in both countries is the driving force for the regional economic growth.

(2) Thailand is a country with natural geographic comparative advantage and is strategically positioned between India and China. Thailand also offers other alternatives in terms of new trade lane development as illustrated in Table 1.

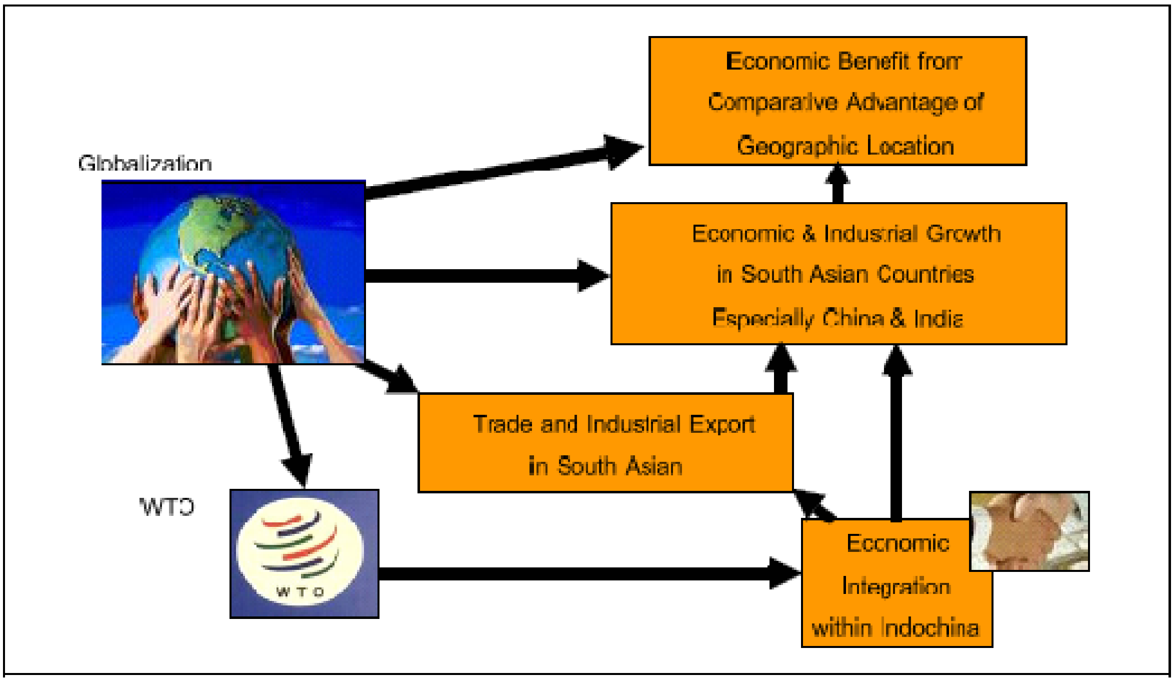
Table 1: Potential for New Trade Lane Country Linkage

Country	BIMSTEC	ASEAN/AFTA	GMS	ACMECS
Thailand	✓	✓	✓	✓
India	✓	✕	✕	✕
Myanmar	✓	✓	✓	✓
Laos	✕	✓	✓	✓
Vietnam	✕	✓	✓	✓
China	✕	✕	✓	✕

Source: Department of Foreign Trade, Ministry of Commerce, Thailand

The geographical location of Thailand enables the country to be the connectivity hub for economic and trade linkages to new markets such as China and India. The characteristics of the country's location between the Indian Ocean and the Pacific Ocean also places it on the main crude oil transport routes between the producing countries in the Middle East and the important consuming countries such as China, Japan and South Korea. Therefore, the western seashore (Andaman) has high potential for being the new economic route between the main global energy source and the major energy consumers.

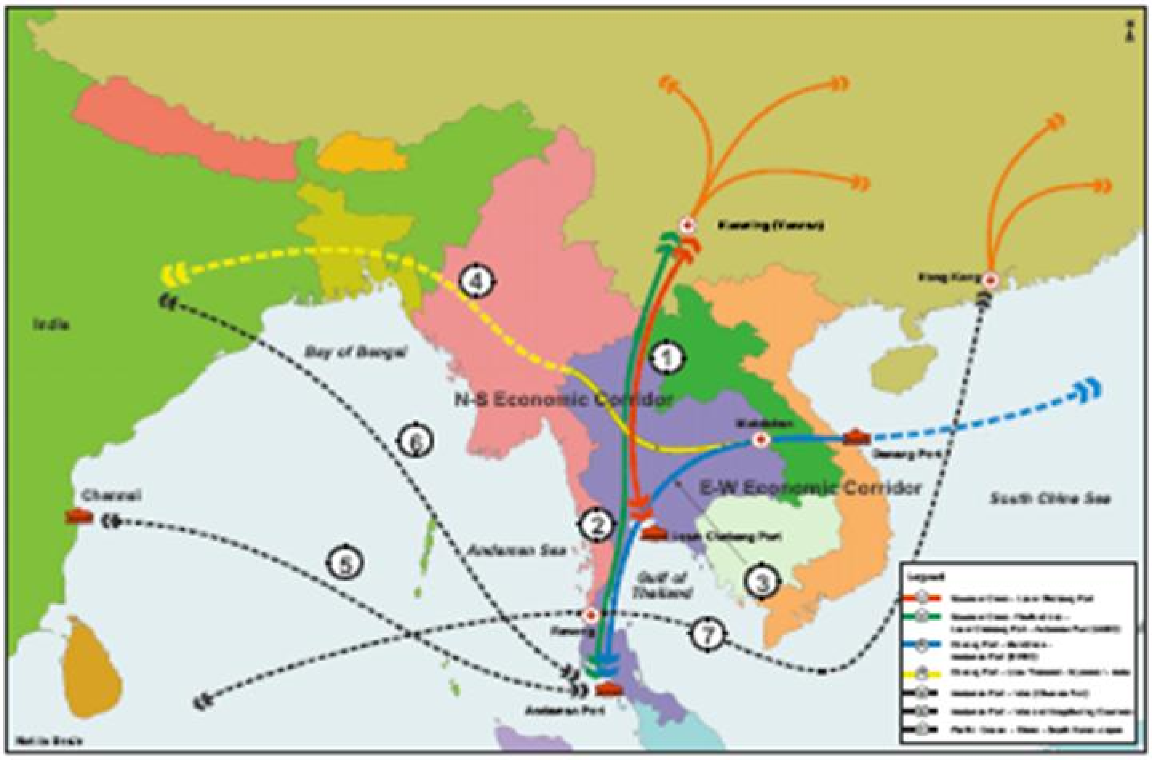
Figure 2: New Trade Lane and Economic Benefit for Thailand



Source: Thai Ministry of Commerce.

Freight transport networks and international trading routes especially between China and India and the major markets of the world that passes through Thailand can save transport cost and time for both countries. These new freight transport network are highlighted in Figure 3.

Figure 3: New Freight Network



Source: Thai Ministry of Commerce.

The proposed freight routes are:

(1) Routes linking Southern China to Northern Thailand by land passing through Lao PDR to Laem Chabang Port and coastal harbours on the Andaman Sea via the North-South Economic Corridor (No. 1 & 2).

(2) Routes link from Danang Port passing through Lao PDR to Mukdahan and to deep sea ports on the Andaman coast (No.3) on the East-West Economic Corridor. The routes in (1) and (2) provide links from Southern China to the Middle East and Europe. The assumption is that there will be savings as freight can bypass the Malacca Straits.

(3) Routes link from Danang Port via Lao PDR through the North-eastern to North-western parts of the Thailand to Myanmar and to India (No.4). This route will link India to the countries in continental Southeast Asia. It is also assumed trade will be more efficient due to savings in cost and time since freight will bypass the Malacca Straits.

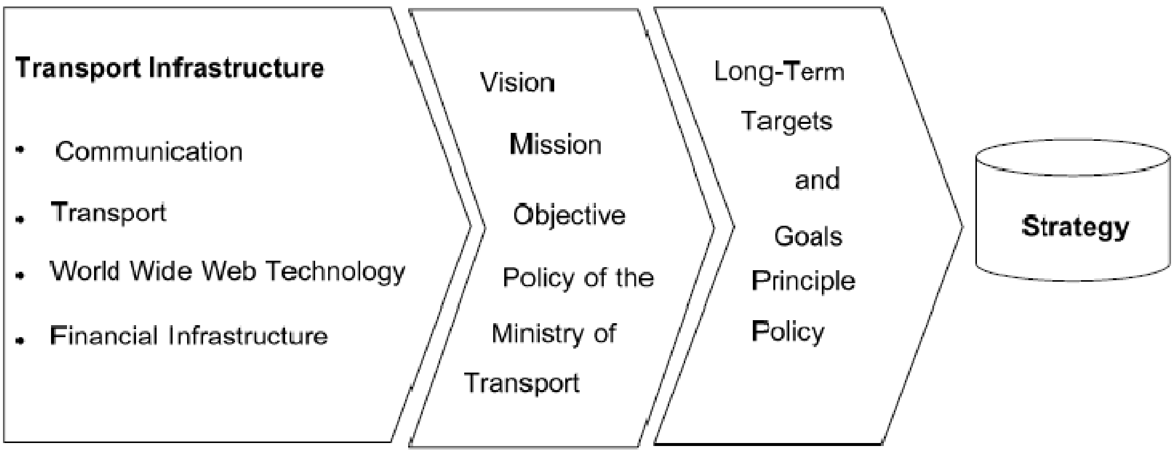
(4) Routes link by sea between ports on the Thai Andaman coast and India as well as neighbouring countries (No.5 and 6). The routes assumed that Thailand can increase its trade efficiency of trade since freight can bypass Laem Chabang Port and the Malacca Straits.

(5) Energy lane (crude oil) with the industrial countries on the Pacific coast such as China, South Korea, and Japan, through the Southern seaboard of Thailand (No.7).

3. THE ROLE OF THE THAI MINISTRY OF TRANSPORT IN THE DEVELOPMENT OF INFRASTRUCTURE

The role of the Thai Ministry of Transport in defining the development of infrastructure has to be adapted to suit the designed strategy. The targeted infrastructure includes transport, information communication technology as well as financial infrastructure as illustrated in Figure 4.

Figure 4: Strategy for the Development of Transport Infrastructure



Source: Thai Ministry of Transport.

The role of the government in the development of economic infrastructure has started to be more complex as all forms of infrastructure must be coordinated to deliver economic development.

The major strategy of the Thai Ministry of Transport is to enhance efficiency in the freight transport process and to reduce the cost for the operators and users in order to increase Thailand's potential in becoming a logistics hub for ASEAN.

Laem Chabang Port on the Eastern Seaboard has been designated as the main gateway of the country. In the future, if Laem Chabang Port is used to its full capacity and the volume of goods is high enough for increased export to the West of country then there will be a need to develop ports on the Andaman Seacoast to help cater for the expected increase in freight. These ports on the Andaman side of the country, could then become gateways to the European Union, BIMSTEC countries, and countries in the Middle East.

Laem Chabang Port can still continue to be the gateway to the U.S.A., East Asia, and Australia. Thailand can therefore use its extended port network to promote value added services through the collection and distribution mechanism of goods and raw materials from China and India, including linkages to industrial estates for processing products for export.

The proposed main Thai port on the Andaman side is Pak Bara. Pak Bara is located on the Andaman Sea in the Satun province in Thailand's South. The Marine Department of the Thai Ministry of Transport has undertaken a detailed feasibility study to assess the technical, economic and financial feasibility of the proposed development of a deep sea container port. The initial port development includes the construction of:

- Port and container yard on land reclamation area of 450x700 metres, with navigational depth of 14 meters, capable of docking two 70,000 Dead Weight Tons (DWT) vessels, or two 30,000 DWT plus one 70,000 DWT vessels.
- 50x90 meters quay for fishing boat with loading area, capable of docking three 25-meters boats.
- 50x90 meters quay for tourist boats with passenger terminal, capable of docking three 25-meters passenger boats.
- Port facilities area comprising container freight station, administration building, custom building, parking, and access road to fishing boat quay and tourist passenger quay.

- 2-lane elevated bridge linking the port area to Highway Number 4052 with a new bridge supporting railway linkages.

The approximate cost of the development is US$ 325 million, excluding land acquisition cost for the first phase only. The development is contemplated in four stages as follows:

- Stage I (2008 – 2011) to handle 500,000 TEU,
- Stage II (2012 – 2013) to handle 825,000 TEU,
- Stage III (2016 – 2018) to handle 1,375,000 TEU, and
- Stage IV (2021 – 2024) to handle 2,475,000 TEU

Dubai Port has expressed an interest in developing the port on joint-venture basis with 49.9% equity stake for 30 years concession period, extendable 3 times. However the project has not yet been approved by the Environmental Impact Assessment Committee.

Pak Bara port has a geographically competitive advantage over other ports on Andaman coastline, as it is located near to the existing main line carrier route, which passes the Malacca straits.

The development of Pak Bara port and the second Songkhla Port on the Gulf of Thailand together with other transport network will enable transport of goods and passengers from the East Coast (LaemChabang) to the Andaman Coast via the second Songkhla Port which can be further linked to Pak Bara Port by road and rail land-bridges.

Figure 5 graphically illustrates the potential linkages in the south of Thailand between the Andaman Sea and the Gulf of Thailand.

Figure 5: Connecting the Andaman Sea with the Gulf of Thailand

Source: Thai Ministry of Transport.

This Pak Bara port development project is expected to become a major gateway for import and export between Thailand and India, the Middle East or Europe. It will be a gateway not only for products from the South of the country, and thus will encourage further investment in the area. Currently, the State Railway of Thailand (SRT) is interested in extending train service to link with the Pak Bara port site.

The Ministry of Transport has an important mission in bringing out the strength of the country by using its comparative advantage in terms of geographic location to support the country into achieving logistic hub status. The economic growth of China and India provide strong opportunities for Thailand to establish new trade lanes to the two markets. Coordination of strength and opportunity will offer a strong potential for Thailand in developing transport connectivity with the two countries. Thailand in its transport strategy has focused on expanding the role of Laem Chabang as a gateway to the East while Pak Bara has been earmarked as a gateway to the West.

4. THAILAND LOGISTICS: A SWOT ANALYSIS

It can be observed that Thailand only has a moderate level of readiness in terms of logistics development based on the 2010 World Bank's logistics performance index. However, if a SWOT analysis is conducted, then a clearer picture of the Thai logistics situation can be presented as described in the table hereunder.

Table 2: Thailand Logistics SWOT Analysis

Strengths	**Weaknesses**
- Readiness and capacity of Thailand logistics infrastructure, i.e., road, sea and air, both domestic and international connectivity - Strong network of local and international LSPs - High investment and interest in information technology for trade facilitation - Continuous monitoring and assessment of country's logistics plan	- Rail transportation infrastructure and capacity limited - Insufficient facilities for multimodal transportation - Late implementation of missing link such as Thai-Lao friendship bridge or with Myanmar - Late response from the Government in term of preparation and investment/promotion direction resulting in difficult business planning
Opportunities	**Threats**
- Location of Thailand as a centre of ASEAN - Regional collaboration in infrastructure development and institutional framework - Regional supply chain development	- Political issues in Thailand - Migration of labour intensive production

Source: Authors.

Thailand is ready for enhanced network linkagesbased on the SWOT analysis. Infrastructure wide, the capacity and coverage of infrastructure is decent. Quality of road, seaports, and airports is acceptable. There are still some missing links but it is expected that by 2015 most of the links will be connected. LSPs and traders themselves are also moving up the value chain.

Even though multi-national firms play a significant role in Thailand's logistics system, Thai firms are developing continuously. The institutional framework remains the main obstacle in the development of connectivity but there are signs of improvement. International and regional collaboration is increasing, and the national logistics development framework is also becoming more responsive.

Since 2003, Thailand has realised the importance of logistics development, to support economic growth, enhance development capabilities, and sustain competitiveness. However, the country's shortcomings need to be highlighted in order to help raise these critical issues. This will enable Thailand to provide an environment that is conducive towards improved connectivity with key markets.

4-1. Infrastructure Issues

- Rail transport cannot effectively serve demand, as transport infrastructure policies has mostly concentrated on road network development. The train network, rail infrastructure, station and operations are too weak to satisfy the need of passengers and freight.
- Water transport especially inland waterways are limited in their development of facilities that support passengers and freight.
- The majority of passenger and freight transport are by road. The proportion of road transportation is more than 90% of total transportation while air, train, and water only have a 10% share of total transportation.
- Intermodal facilities are lacking thus hindering the development of multimodal transport network.

4-2. Institutional Issues

- The Thai Government administration system suffers from numerous document procedures which have become non-value added costs to enterprises in doing business.
- Facilitating agreements at the bilateral, regional or international level have been signed but not ratified nor implemented due to internal complications.
- The national single window system is not working and importers/exporters are still subject to cumbersome regulations. Even though measures have been taken to facilitate trading processes, their impacts are still limited.

4-3. Trade and Business Issues

- There is a lack of human resource capacity in logistics both at the operational and managerial level.
- Lack of cooperation among firms to enhance bargaining power. Cluster like collaboration is also limited within the Thai business sector.
- Lack of supply chain cooperation between Thai and foreign enterprises to enhance value-adding capabilities.

4-4. Logistics Service Providers (LSPs) Issues

- The majority of Thai LSPs are composed of small and medium enterprises (SMEs) with low level of logistics competence, capability and value-added offerings.
- The main logistics services offered are based on transport, warehouse, and customs brokerage activities.
- Liberalisation of logistics services within ASEAN will surely impact the Thai logistics market with local.
- Limited usage of advanced information technology for logistics services.
- Limited number of logistics personnel with the necessary skills.

5. THAILAND'S INDIA RELATED POLICY

5-1. The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)

On February 8, 2004, in Phuket, Thailand, the ministers of economics and trade of the member countries of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) jointly signed a Framework Agreement to establish a free trade area by 2012, leading to liberalization of trade in goods, services, and investment, as well as to undertake economic cooperation.

The BIMSTEC group currently comprises 7 countries: Bangladesh, Bhutan, India, Nepal, Myanmar, Sri Lanka, and Thailand. A BIMSTEC Trade Negotiating Committee was formed, with Thailand serving as Chair during the year 2004-2005, to negotiate agreements for trade in goods, services, and investment under the BIMSTEC Free Trade Agreement.

5-1-1. Significant Aspects of the Framework Agreement

(1) Trade in Goods

Trade negotiations substantially cover all trade in goods, in the form of reduction and elimination of tariffs, with more flexibility granted to the less developed countries (LDCs). Tariff reduction/elimination will be divided into 2 tracks: Fast Track and Normal Track. Other than that, some of the products will be listed in the Negative List, to which no tariff reduction will be granted at this point. The number of products under the Negative List will be subject to a maximum ceiling to be mutually agreed among member countries. LDCs will be accorded flexibility to seek derogation in one form or another, taking into account products of export interest of respective countries.

(2) Trade in Services

With a view to expedite the expansion of trade in services, the BIMSTEC member countries agreed to discuss progressive liberalization of trade in services with substantial sectoral coverage based on a positive list approach.

(3) Investment

To promote investment and to create a facilitative, transparent, and competitive investment environment, the BIMSTEC member countries agreed to provide for promotion and protection of investments, strengthen cooperation in investment and enter into negotiation to progressively liberalize the investment regime through a positive list approach.

(4) Other Sectors of Cooperation:

Negotiations have involved discussions to bring about further progress in various sectors of economic cooperation within the BIMSTEC framework, such as technology, transports and communications, energy, tourism, and fisheries, as well as facilitation of trade through establishment of Mutual Recognition Agreements and cooperation in customs matters.

5-1-2. Current Status

The BIMSTEC Trade Negotiating Committee (BIMSTEC TNC) and the working groups on related matters held several meetings during September 2004 and March 2008.

(1) Tariff Liberalization

Members are currently deliberating on the number of items to be placed in the Negative List under the BIMSTEC FTA. For goods under Fast Track, member countries have exchanged their lists of items to be liberalized under the Fast Track schedule, comprising 10% of tariff lines using the 6 digit HS level.

For goods under Normal Track, tariff reduction/elimination under Normal Track will be divided into 2 categories: Normal Track Elimination (NTE) and Normal Track Reduction (NTR). Member countries are now negotiating the number of products to be included in these groups.

(2) Rules of Origin

Members are currently deliberating on the general rules as well as Product Specific Rule (PSR) to determine criteria for country of origins of goods to be applied under FTA.

(3) Trade in Services and Investment:

Negotiations for agreements on trade in services and on investment are currently in progress. It is anticipated that negotiations can be concluded expeditiously if members can agree on the number of goods to be placed under the Negative List, Normal Track, and Rules of Origins of Products under the BIMSTEC FTA.

The deadline of 2012 is fast approaching with no significant progress albeit encouraging statements from the BIMSTEC TNC and related working group meetings. The establishment of the BIMSTEC FTA will strongly contribute to Thailand's look West policy and enhanced connectivity links with not only India but also the rest of the Subcontinent.

5-2. Thai-India Free Trade Area

India and Thailand share age-old bonds of cultural affinity, commercial interests and common perceptions on various issues. These geographically proximate neighbours need to take advantages of the context that is provided by the history and geography between them for mutually beneficial economic cooperation. Whether it is the economics of neighbourhood or the importance of cooperation in the competitive global environment, the economic logic suggests that both the countries must strengthen their economic ties in the realms of trade, investment, technology and human resources. The complementarities on these different dimensions need to be exploited so as to jointly take advantage of the globalisation process in a more effective and WTO consistent manner.

In an effort to promote trade and investment cooperation between the two countries, a Joint Working Group (JWG) was set up at the behest of the Prime Ministers of both the countries for getting a Feasibility Study conducted on India-Thailand Free Trade Area (FTA). The First JWG Meeting was held in New Delhi, India during April

2002. At this meeting, the JWG adopted its Terms of Reference and finalized the broad structure of the feasibility study.

The meeting also agreed on a work programme and the description hereunder is the outcome of this process, which has been deliberated upon extensively in subsequent three JWG meetings, including the fourth and final one held in Bangkok on 22-24 December 2002.

India and Thailand are developing economies with both commonalties and differences in their economic progress. The economic policy strategies adopted by them have made them amenable to take advantage of global integration. In this context, possibilities of bilateral economic cooperation especially in the form of an FTA are immense.

It has also been noticed that albeit the bilateral trade and investment linkages between the two countries are quite low their dynamism in recent years is noteworthy. The relative importance of each other in the trading space has been observed to be relatively limited which is indicative of the fact that the potentials for greater trade linkages are yet to be tapped.

In terms of trade composition, significant scope for diversification in the bilateral trade basket is noticed and it is in this context that the FTA appears desirable, the feasibility of which is assessed subsequently.

In terms of the barriers to trade, it is observed that countries face both tariffs as well as non-tariff barriers on their bilateral trade. In the area of investment too, the bilateral linkages need strengthening and their sectoral composition need to be broadened. In this regard, bridging information gap, removing procedural bottlenecks and overcoming infrastructural constraints has to be addressed.

5-2-1. Current Status

(1) Trade in Goods

Thailand and India have reached an accord on Trade in Goods that incorporates tariff reduction and/or elimination under the Normal Track and Sensitive Track. Other than that, some of the products will be listed in the Exclusion List, to which no tariff reduction will be granted for a period of three years, and will be reviewed thereafter.

(2) Rules of Origins:

The two countries have agreed upon 'Change in Tariff Sub-Heading (CTSH) plus Local Content of 35%' as the general rule for consideration of origins of products. They also agreed on the Product Specific Rules (PSR) for another 200 items.

(3) Trade in Services and Investment:

Negotiations for agreements on trade in services and on investment were expected to be concluded within 2008 but things have not moved much.

(4) Dispute Settlement Mechanisms:

Consensus has been reached on an agreement to establish mechanisms for the settlement of disputes, which will be prepared as a separate document to cover all agreements deriving from the Thailand - India FTA Agreement.

India and Thailand are likely to restart talks on a full-fledged free trade agreement including goods, services and investments. Talks on an FTA were suspended after the two sides implemented a limited agreement involving just 82 items in 2004. Both countries want to double bilateral trade to $12 billion by 2012 from the present level of $5-6 billion.

India and Thailand signed an early harvest programme (EHP) in 2004 under which the two sides agreed to eliminate duties on 82 items like television tubes, refrigerators, mangoes, apples grapes and some metals. The EHP led to protests from the Indian industry which complained that Thailand had gained much more than India and the domestic market was flooded with products like television picture tubes.

Thailand is also a member of ASEAN that has signed an FTA with India. A separate FTA between India and Thailand would give both countries the option of offering more than what has been agreed under the India-ASEAN FTA.

Table 3: Trade between Thailand and India

	Value (million USD)		% change
	Jan-10	Jan-11	Jan-11
Export	406.59	400.96	-1.39
Import	194.7	238.5	22.5
Trade Balance	211.89	162.45	-
Total	**601.29**	**639.46**	**6.35**

Source: Information Technology and Communication Centre, Office of the Permanent SecretaryMinistry of Commerce.

5-3. Barriers to Bilateral Investment Flows

Investment flows between both countries are often restricted due to various barriers, of which some are in the domain of policy and others relate to the level of development itself. Some of these barriers are mentioned below.

5-3-1. Perspectives from India

One major constraint coming in the way of Indian investors in Thailand is in terms of information gap regarding policy guidelines, potential sectors, prospective collaborators, etc. Indian investors find it difficult to locate a reliable counterpart. Procedural bottlenecks also act as barriers. Recruitment of staff in Thailand has reportedly also not been smooth. It is believed that some of the trade liberalisation measures and rules of origin could provide a boost to Indian investments in Thailand.

Similarly, despite the fact that Indian investment climate has become more liberal of late, procedural hurdles have acted as major barriers. Information gap acts as a constraint for Thailand’s investments in India too. However, it is worth mentioning that infrastructural bottlenecks have proved to be the main constraint in India in terms of attracting FDI from Thailand. Therefore, steps need be taken to facilitate Thai investment in the infrastructure sector itself.

5-3-2. Perspectives from Thailand

There are investment barriers in India that need to be eliminated to facilitate foreign direct investments from Thailand:

- Lack of standardised procedures: Due to lack of standardised procedures, on certain occasions, different interpretations of rules and procedures occur. This gives rise to procedural delays.
- Lack of intra-and inter-state harmonisation of rules: India is divided into different States and each state has its own authority to introduce investment promotion regimes. Such a situation often results in possibilities of double taxation.
- Difficulty in loan approval for foreign projects: Procedural complexities and lack of standardised banking norms hinder approval of loans for foreign projects.
- Paucity of adequate information exchange: The Office of the Board of Investment of Thailand has launched a joint venture program, which focuses on facilitating foreign investments seeking Thai joint venture partners. Through this programme, not even a single joint venture between Thailand and India has been reported till now.

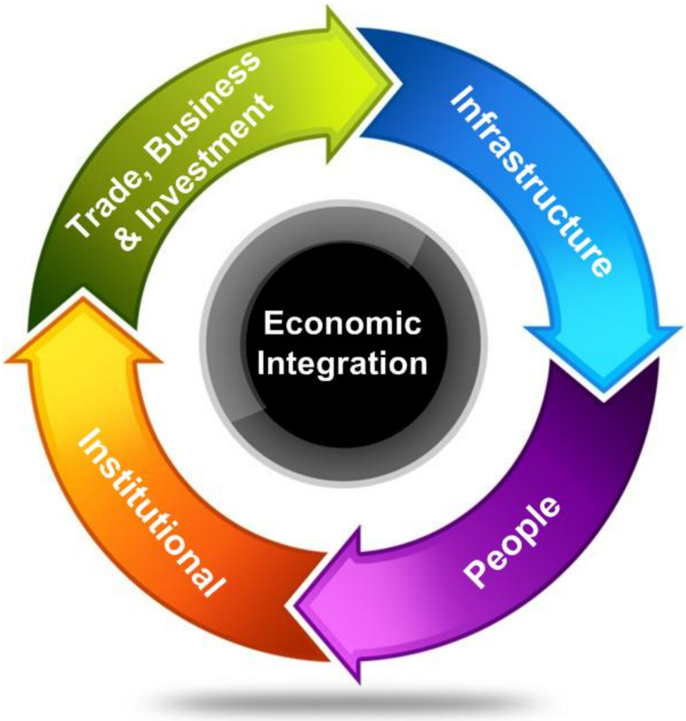
6. ANALYTICAL FRAMEWORK

In order to better understand the connectivity level between Thailand and India, it is therefore important to propose a connectivity assessment framework that will enable rapid identification of connectivity level between the 2 countries. This connectivity framework is derived from the macro-logistics model developed by Banomyong in 2008.

A connectivity framework is composed of (1) infrastructure connectivity; (2); institution connectivity; (3) people connectivity and (4) trade & investment connectivity.

Figure 6 shows how these four components combine to determine the connectivity between each part of the framework. The higher the level of connectivity, the higher the level of economic integration as the sum of these 4 dimensions determines overall integration.

Figure 6: Connectivity Framework



Source: The authors.

7. THAI-INDIA CONNECTIVITY

7-1.Background

It is only natural that two countries that have long history and rich cultural heritages would have established linkages dating back centuries ago; this is certainly the case with India and Thailand. More importantly, the two countries have not only maintained these age-old links but also translated them into a strong and prolific partnership on the global stage across a wide variety of policy matters.

The links between India and Thailand can be traced back to almost 2,000 years, when under the orders of King Asoka of India, Buddhist pilgrims travelled to Suvarnabhumi, the golden land, of which Thailand was a part, to disseminate the teachings of the Buddha. Since then Thailand and India have developed a deep and abiding connection, which reflects, even after all these years, in their cultural, religious and linguistic similarities.

One of the strongest links between the two countries is that forged by Buddhism. Nearly 95% of Thailand's population aligns itself with the teachings of Theravada Buddhism. Even though the number of Buddhists in India is significantly lower, as the land where he achieved enlightenment, India leaves an indelible impression on Thailand and its people. Since the language associated with Theravada Buddhism is Pali, a Middle Indo-Aryan language, derived from dialects of Vedic Sanskrit, also known as Prakrit. By tradition, this is the language of religion in Thailand. Scriptures are recorded in Pali, and despite the fact that most Thai's do not understand Pali; it is also used in religious liturgy. Justifiably, over the years, aspects of 'high' Pali have trickled down into the vernacular, and today a number of words in Thai can be identified as having a Sanskrit or Pali root, thereby creating linguistic links between Thailand and two great cultures.

During the past twenty years or so, India and Thailand have seen their relationship blossom. The interactions between the two countries have expanded from a cultural and economic relationship to significant interactions on security, defence as well as the establishment of a free trade area.

The 1990s can be seen as the 'golden age' of intensified India-Thai relations. In 1996 Thailand initiated the 'Look West' Policy aimed at exploring new markets, energy source and new investments flows. Given Thailand's central location in Southeast Asia and its position as a regional hub, this policy serves to strengthen the region's partnership with South Asia and beyond. Thailand's 'Look West' policy is the perfect complement to India's 'Look East' policy which has been instrumental in promoting bilateral relations between the two countries as well as in strengthening India's relationship with the region in general.

One of the most recent visits was in August 2009, when Mr. Anand Sharma, Indian Union Commerce and Industry Minister was in Bangkok to sign the Free Trade Agreement (FTA) between India and ASEAN, thus opening new doors for the continued cooperation between the two countries.

7-2. Institutional Connectivity

The key idea behind the current India-Thailand relationship is that of an enhanced partnership. The core policies governing Thailand relations remain Thailand's 'Look

West' policy complementing India's 'Look East' policy. An important factor of Thailand 'Look West' policy is, among other things, India's vast market of 1.1 billion. Thailand also recognised India's geo-political and economic weight in the region, as well as the extension of that weight in global affairs. The phenomenal rise of India has to be embraced and factored in the conduct of Thailand foreign policy towards India.

Thailand's bilateral diplomatic relations, cultivated over more than half a century, signify the efforts from both sides to maintain friendly relations and to enhance Thailand cooperation in the context of globalisation and a rapidly changing world. Cooperation between the two countries is multifaceted, taking into account the common interests and common challenges India and Thailand have. The long standing friendship and history of cooperation between the two countries is of great value to Thailand as stated by the Thai Ministry of Foreign Affairs.

Both countries are important regional partners linking South and Southeast Asia. They cooperate closely in the ASEAN, East Asia Summit (EAS) and BIMSTEC groupings as well as the Mekong Ganga Cooperation (MGC) and Asia Cooperation Dialogue (ACD). The implementation of the India-ASEAN Agreement on Trade in Goods from January 2010 is an important milestone of this partnership.

In working together to enhance security bilaterally and regionally, the two countries conduct annual dialogues to find ways and means to cope with security challenges, money laundering, international economic crimes, cyber-crimes, military, narcotics, terrorism, arms smuggling and illegal migratory flows. The annual dialogue enables both countries to achieve tangible progress, as is exemplified in the joint patrol of the Andaman Sea undertaken twice annually.

Furthermore, combined exercises between Thailand two armies and air forces are also carried out on a regular basis. Exchange of intelligence also greatly contributes to the strengthening of security cooperation in the region.

7-3. Trade, Business and Investment Connectivity

Economic and commercial linkages form an important aspect of India's partnership with Thailand. The past few years have seen a rapid growth in this area. Bilateral trade has multiplied six times since 2000 to cross US$ 6.6 billion in 2010. The global financial and economic crisis impacted the bilateral trade during 2009. The trade figure for 2009 was US$ 4.9 billion declining by 17% (Indian exports were US$ 1.7 billion, down by 34%, while Thai exports were US$ 3.2 billion a decline of 3.6%). However, trade data for Jan-Dec 2010 shows bilateral trade at US$ 6.64 billion, an increase of 34 % over the corresponding figure of last year.

Table 4: India's Trade with ASEAN Countries
(%share in India's export and import basket)

Countries	Export					
	1996-97	1997-98	2001-02	2006-07	2007-08	2008-09
Brunei	0.018	0.0065	0.0084	0.0066	0.0064	0.0095
Cambodia	0.0047	0.0085	0.0258	0.0413	0.0328	0.0256
Indonesia	1.7683	1.2571	1.2178	1.605	1.3254	1.3771
Lao PDR	0.0011	0.0009	0.0072	0.0019	0.0024	0.0053
Malaysia	1.5869	1.4085	1.7653	1.0322	1.5761	1.8769
Myanmar	0.135	0.1418	0.1389	0.1108	0.1138	0.1211
Philippines	0.5487	0.6863	0.5654	0.461	0.3798	0.4019
Singapore	2.9204	2.2266	2.2185	4.8028	4.5226	4.4908
Thailand	1.3358	0.9858	1.4446	1.143	1.1098	1.0376
Vietnam	0.3528	0.364	0.4978	0.7776	0.9836	0.9455
Total	**8.6717**	**7.086**	**7.8897**	**9.9822**	**10.0527**	**10.2913**
Countries	Import					
	1996-97	1997-98	2001-02	2006-07	2007-08	2008-09
Brunei	0.0001	0	0.0007	0.1536	0.0898	0.1369
Cambodia	0	0.0037	0.0022	0.0009	0.0011	0.0009
Indonesia	1.5257	1.7636	2.0166	2.2445	1.9184	2.2374
Lao PDR	0	0	0.0001	0.0002	0	0.0002
Malaysia	2.8194	2.8418	2.2048	2.8505	2.3882	2.3713
Myanmar	0.4528	0.54	0.7283	0.4213	0.322	0.3085
Philippines	0.042	0.0556	0.1845	0.0901	0.0814	0.0848
Singapore	2.1494	2.4154	2.5365	2.9554	3.2285	2.5146
Thailand	0.5462	0.5462	0.8229	0.9398	0.9151	0.8987
Vietnam	0.0211	0.0211	0.0368	0.0903	0.069	0.1355
Total	**8.1874**	**8.1874**	**8.5334**	**9.7466**	**9.0135**	**8.6888**

Source: Thai Ministry of Commerce.

Investment by Indian and Thai companies in each other's countries is growing. Indian FDI into Thailand is estimated to be around US$ 1.5 billion since the 1970s.

Indian investment in Thailand was around US$ 287 million in 2008 and US$ 214 million in 2007 according to the Board of Investment of Thailand. Thailand has invested over US$ 65 million in India (*April 2000-Dec 2009*) according to Department of Investment Policy Promotion of the Government of India. Thai Sources quote a higher figure of US$ 800 million. The Board of Investment, Thailand received Indian investment proposals worth US$ 50.82 million of which investments worth US$ 46 million have been approved for January-October 2010.

The major Indian groups doing business in Thailand include: Tata group (automobiles, steel, software), Aditya Birla group (chemicals, textiles), Indo Rama group (chemicals), Ranbaxy, Dabur, Lupin (pharmaceuticals), BhartiAirtel, NIIT etc., reflecting the diverse sectors of interest.

Leading Thai companies in the fields of agro-processing, infrastructure, automotive, engineering, banking, housing and hospitality have active and growing business presence in India. Major Thai companies active in India are: C P Aquaculture (India) Ltd., Italian Thai Development Pcl., Krung Thai Bank Pcl., Charoen Pokphand (India) Private Limited, Stanley Electric Engineering India Pvt. Ltd., Thai Summit Neel Auto Pvt. Ltd., Thai Airways International Pcl., Precious Shipping (PSL) of Thailand, Preuksa Real Estate, Dusit and Amari group of hotels.

Table 5: Doing Business 2010 Economy Rankings

No.	Economy	Ease of Doing Business Rank		Starting a Business	Protecting Investors	Paying Taxes	Trading Across Borders	Enforcing Contracts	Closing a Business
		2010	2009						
1	Singapore	1	1	4	2	5	1	13	2
2	Hong Kong, China	3	4	18	3	3	2	3	13
3	Thailand	12	13	55	12	88	12	24	48
4	Malaysia	23	20	88	4	24	35	59	57
5	Taiwan, China	46	61	29	73	92	33	90	11
6	China	89	83	151	93	130	44	18	65
7	Vietnam	93	92	116	172	147	74	32	127
8	Brunei	96	88	153	119	22	48	160	37
9	Indonesia	122	129	161	41	126	45	146	142
10	India	133	122	169	41	169	94	182	138
11	Philippines	144	140	162	132	135	68	118	153
12	Cambodia	145	135	173	73	58	127	141	183

Source: World Bank's Ease of Doing Business Survey, Doing Business 2010 Report.

The ASEAN-India Agreement on Trade in Goods was signed in Bangkok on 13 August 2009. Negotiations are continuing on concluding its Investments and Services sector components, as well as for a BIMSTEC FTA and an India-Thailand FTA.

An Early Harvest Scheme under the proposed India-Thailand FTA has been in place since September 2004 covering a total of 82 products. Another significant recent element has been the active promotion of trade and investment linkages between the north eastern states of India and Thailand.

7-4. People Connectivity

Based upon the already strong cultural ties between the two countries, a bilateral cultural agreement was signed in 1997 between the 2 countries. A cultural exchange programme was also initiated in 2007 to 2009, increasing the existing frequent cultural exchanges. Indian music and dance based upon the Ramayana are popular in Thailand. Bollywood serves as an incredible force of cultural association, as it has increased its presence in Thailand over the last few years.

Thailand is a favourite destination for the filming of Bollywood movies. New Delhi and Kolkata played host to a month long Festival of Thailand in 1997. Bangkok, in turn, is home to an Indian cultural centre since September 2009.

Currently, there are approximately 200,000 people of Indian origin residing in Thailand with 80% holding Thai citizenship. Most of them have made Thailand their home for many generations. They constitute a dynamic factor in broadening the friendship and deepening the understanding between the two countries. Indian businessmen also play an active role in promoting trade and investment activities in Thailand.

Thailand is an extremely popular holiday destination for Indian tourism. India is one of Thailand’s fastest growing markets and the biggest source market for visitors from South Asia. In 2010, Indian visitor arrivals were upwards of 790,000 up 29% over 2009.

Thailand has a huge market for tourism and views Indian tourists as the fastest growing segment, and there are more than 140 flights to Thailand from various Indian cities. India is also looking to attract tourists from Thailand and is keen in developing Buddhist centres. The Thai tourists visit India mainly for spiritual tourism.

Table 6: Number of tourism visiting

Year	No. of visitors from India arriving in Thailand	No. of visitors from Thailand arriving in India
2007	506,237	51,562
2008	536,973	56,718
2009	614,566	67,305
2010	790,000	74,053

Source: Tourism Authority of Thailand and Ministry of Tourism and Sports.

7-5. Infrastructure Connectivity

Thai infrastructure companies have been working on various infrastructure projects in India like the Kolkata airport and parts of Delhi metro. India and Thailand share maritime boundaries and both sides face common challenges of piracy, terrorism and smuggling. The two nations are already conducting joint and coordinated patrols on the north of Bay of Bengal up to Straits of Malacca.

The India – Myanmar – Thailand trilateral highway under the Mekong Ganga Cooperation (MGC) is another important link initiated in 2005. The 1,360 km Trilateral Highway with the cost of US$ 700 million runs from Moreh in India to Maw Sot in Thailand through Bagan in Myanmar. On the other hand, the Diphu – Karong – Imphal – Moreh railway track in India is an example of the Indian initiatives to develop internal transport infrastructure. There are other projects on the pipeline including construction / up gradation of Rhi – Tidim and Rhi –Falam road sections in Myanmar. A deep seaport at Dawei, in Myanmar's southern tip, and the Dawei - Kanchanaburi road that will branch off from the highway would be part of the trilateral highway project (IBEF, 2004). Schemes such as project specific credit lines for the upgrade of Yangon – Mandalay Trunk line, India-sponsored optical fibre link between Moreh and Mandalay are on the way (MEA, GOI, 2004).

India's infrastructural initiatives with ASEAN neighbours actually provide a strong development impetus to the land-locked northeast region of India. The chicken's neck or the Siliguri corridor is a narrow stretch of land, which connects mainland to the northeast of India. This distance is over 1,600 km which is not just long but infested with geological perils and security threats. The development deficit in the Northeast India can be reduced by integrating the Northeast with ASEAN to reduce development gaps and support the enhanced prosperity of the entire region (Aiyar, 2007). Over the years, there has been deliberate effort by the Indian Government's to project the Northeast region as the bridge to Southeast Asia (Karthykeyan, 2009). India's infrastructure ties with ASEAN through the northeast can be drawn parallel with China's attempt to link Xinjiang province to the neighbouring Central Asia (Clarke, 2008). Similar is the case of Yunnan province, where China has turned the once impoverished landlocked region, into a gateway to the Greater Mekong Sub-region (Nanfan Daily, 2010).

7-6. The Future of Thai-India Connectivity: The Case of Dawei

The strong partnership between Thailand and India has made remarkable progress in the past decades and has continued to flourish in all areas and at all levels. Thailand is committed to maintaining the momentum in terms of strengthening and deepening cooperation with India, especially as regards security and economic affairs. At the same time, both partners should make the most out of the full potential of Thailand-India partnership, in particular with regard to trade and investment. With the signing of the FTA, bilateral trade will increase significantly, and new infrastructure will be needed to facilitate connectivity linkages between the 2 countries. The case of Dawei port in Myanmar is an example in the development of a critical node that will accelerate connectivity between the 2 countries.

The Dawei Deep Sea Port and Special Economic Zone is an ambitious proposed project for the development of a major sea port and a major industrial zone including coal-fired power station on a 250-square-kilometre site near the city of Dawei in Myanmar. In May 2008, a Memorandum of Understanding was signed between the government of Thailand and Myanmar for the development of the Dawei deep seaport and road link to Bangkok (Thai Ministry of Transport, 2008) but the development was slow from an institutional perspective.

Nevertheless, in November 2010 Italian-Thai Development (ITD) announced that on November 2, it had signed a framework agreement with the Myanmar Port Authority, Ministry of Transport of the Union of Myanmar to develop the Dawei Deep Sea Port, Industrial Estate and Road Link to Thailand. In a one-page summary translation of the agreement Italian-Thai Development stated that ITD was granted a

Build Operate and Transfer (BOT) concession to develop the following projects in Dawei, in the Union of Myanmar:

1) A deep seaport.
2) An industrial estate and heavy industries such as a steel mill, fertilizer plant, power plant and other utility services.
3) A cross-border road, rail and pipeline link from the Designated Area in Dawei District to Thailand at Pu Nam Ron, Kanchanaburi Province.
4) Township for residential and commercial development and a tourism, resort and recreation complex.

ITD is authorised to invite suitable potential partners to invest in each activity accordingly. The company further disclosed that the agreement was for 60 years plus an extension period as agreed upon development phases in the project subject to each detailed project development plan. To implement the project successfully and without delay, ITD has to first construct a cross-border road from Dawei District, the Union of Myanmar, to Thailand at Pu Nam Ron, Kanchanaburi Province, and will then invite suitable partners for the development of the deep sea port. The cross-border road link development and deep sea port will be in phases, with the full phase investment to cost of approximately USD 2 Billion (ITD, 2011).

If successful, this development project will become a logistic and trading hub for the region. It will link the trading routes and international logistics between the countries in Southeast Asia and South China Sea, via the Andaman Sea, to the Indian Ocean. This new gateway will be able to service sea transport of goods to and from countries in the Middle East, Europe and Africa; thus saving tremendous transportation cost and time. This Project will undoubtedly increase trade, investment and economic growth of Thailand, the Union of Myanmar and the entire region as a whole.

The Dawei Deep Seaport and Industrial Estate project and the road/rail links to Thailand will be the first-ever special economic zone in Myanmar. The Dawei Deep Seaport and Industrial Estate is expected to cover an area of 250 square kilometres or 61,775 acres. The project will require spacious land to avert industrial congestion and environmental problems. It will also need to cater for future expansion (Zaw and Kudo, 2011).

The details of the development project areas follow:

Phase 1: January 1, 2011-December 31, 2015

- Deep Seaport Phase#1 (South port) with full scale of facilities;
- One stop service and township;
- Main Road Network in complex;
- Standard Public Utility in Industrial Estate. (reservoir, coal-fired power plant, drainage system, water supply system and wastewater treatment system) ;
- 4 lanes road from Dawei to Thailand's border.

Phase 2: January 1, 2013-December 31, 2018

- Extended 4 to 8 lanes road from Dawei to Thailand's border;
- Additional Public Utility;
- Shopping Centre and Government Complex.

Phase 3: January 1, 2016-December 31, 2020

- Deep Seaport Phase#2 (North port) with full scale of facilities;
- Full scale of Road Network in complex;
- Standard Gauge Railway from the project to Thailand, which will be connected with the high-speed freight train in Thailand (China's budget) ;
- High Voltage Line System from the power plant in Industrial Estate to Thailand;
- Petroleum and Gas Transmission Pipeline from the Project Site to Thailand.

Dawei deep seaport is expected to help support Thai policy in building a new deep-sea port in the western region to enhance the country's logistic competitiveness. The Dawei development project is situated in Burma and includes a land route linking Kanchanaburi and Dawei to facilitate cross-border transportation. If the Dawei development project is completed, it could become an effective link within the ASEAN countries according to the Master Plan on ASEAN Connectivity to help increase linkages to many destinations located in the west of Thailand, such as India and countries in South Asia, Europe and the Middle East, due to lower time and shorter distance needed for sea freight. In addition, Dawei port will help enhance opportunities for investment in Thailand’s western region and help boost economic growth which will generate higher income for both individual and business in that region and the vicinity.

However, there are risks toward the Dawei development project that should be monitored, such as sources of capital and the fact that it is a long-term project that may be vulnerable to future economic and political instability. Aside from its ability to attract more users over existing ports, other factors that should be considered are the development of infrastructure, water transport systems in Myanmar and cross-border transportation between Thailand and Myanmar that is now subject to limitations.

Other concerns toward this project include political risks there, especially the political situation in Myanmar and Thailand, as well as the overall diplomatic and trade relationship between Burma and other countries. The attitude of other nations toward those who will invest in Dawei development project as this could affect their business and the acceptance on their exports, particularly if their exports are not in line with trade regulations of Thai’s trade partners. The opinions of foreign investors toward the project may have an influence on its progress.

Last but not the least the Dawei development project is expected to affect progress on other industrial development projects on the Andaman side of Thailand and the Thai logistic network in the future. As a result, all relevant parties should consider all positive and negative factors as well as short-term and long-term impacts carefully (Kasikorn Research Centre, 2010).

8. SUMMARY

Thailand places strong importance on its relationship with India. As observed, trade and investment between the two countries are on the increase even though the Thai-India FTA is not working properly. This is coupled with the increase in the number of visitors from both countries.

Thailand has a clearly defined strategy to enhance its connectivity with India even though infrastructure links are still limited. Thailand is currently at the crossroads as from a Thai perspective the "official" priority is on the development of Pak Bara port on the Andaman Sea while a Thai private company has obtained a concession to develop Dawei port in Myanmar to act as a gateway with India, the Middle East and Europe.

From a national security perspective, it is preferable for Thailand to focus its infrastructure development on Pak Bara as the location is in the country and not subject to external factors. However, if a regional perspective is taken, the option to develop Dawei port seems to be more interesting as it offers a shorter access route to the Andaman Sea for businesses located in Thailand Eastern seaboard.

Since the development of Dawei is subject to private investment, it is possible to have both ports developed. Potential port competition on the Andaman may provide the impetus for enhanced logistics services that will support trade and investment connectivity along the Mekong-India Economic Corridor.

However, it remains to be seen if the Thai concessionaire will be able to raise enough funds to pursue the very ambitious Dawei port development project. Infrastructure connectivity within Thailand and up to the border with Myanmar is not an issue. The challenge is more in the infrastructure connectivity from the border to Dawei.

APPENDIX. ONGOING AND PROSPECTIVE INFRASTRUCTURE PROJECTS FOR ASEAN-INDIA CONNECTIVITY: THAILAND

Tier	Type	Sector	Sub-Sector	Project Name	Cost (US$ mil)	Status
1	Public	Logistics	Railway	Bridge enhancement	406.7	Ongoing
1	Public	Logistics	Port / Maritime	Container yard construction at Laem Chabang Port	67.2	Ongoing
1	Public	Logistics	Airport	Development of 2nd Suwannabhumi Airport	2,089.0	Ongoing
1	Public	Logistics	Railway	Development of colour traffic light	379.6	Ongoing
1	Public	Logistics	Railway	Development of Kaengkhoi locomotive depot	33.4	Ongoing
1	Public	Logistics	Port / Maritime	Development of Laem Chabang Port, A0	59.5	Ongoing
1	Public	Logistics	Railway	Development of Sriracha and LadKrabang locomotive depot	12.0	Ongoing
1	Public	Logistics	Airport	Development on Phuket Airport	192.6	Ongoing
1	Public	Logistics	Railway	Double-track construction (Jira-Khon Kaen)	434.8	Ongoing
1	Public	Logistics	Railway	Double-track construction (Lopburi-Pak Numpo)	262.7	Ongoing
1	Public	Logistics	Railway	Double-track construction (Mab Kabao-Jira)	437.1	Ongoing
1	Public	Logistics	Railway	Double-track construction (Nakonprathom-Nong Pladuk-Hua Hin)	554.8	Ongoing
1	Public	Logistics	Railway	Double-track construction (Prachubkirikhan-Chumporn)	568.2	Ongoing
1	Public	Logistics	Railway	Double-track construction on east coast (Chachoengsao-Klong 19-Kaengkhoi)	379.3	Ongoing
1	Public	Logistics	Railway	Double-track construction on east coast (Chachoengsao-Sriracha-Leam Chabang)	9.8	Ongoing
1	Public	Logistics	Port / Maritime	Dredging groove (coastal area)	91.9	Ongoing
1	Public	Logistics	Port / Maritime	Dredging groove (inland waterway)	50.9	Ongoing
1	Public	Logistics	Railway	Inland container depot, phase 2	202.7	Ongoing
1	Public	Logistics	Energy / Power	Management of 13 electric locomotive	71.7	Ongoing
1	Public	Logistics	Energy / Power	Management of 50 old GE Diesel Locomotive with Electric Locomotive	220.1	Ongoing
1	Public	Logistics	Railway	Railway enhancement, phase 5	284.3	Ongoing
1	Public	Logistics	Railway	Railway enhancement, phase 6	226.5	Ongoing
1	Public	Logistics	Energy / Power	Refurbish 56 diesel locomotive	112.3	Ongoing
1	Public	Logistics	Telecommunication	Telecommunication network installation	73.5	Ongoing
1	Public	Logistics	Port / Maritime	Development of Chumporn Port	77.5	Prospective
1	Public	Logistics	Railway	Development of container yard	6.7	Prospective
1	Public	Logistics	Port / Maritime	Development of Kantan Port, Trang	22.3	Prospective
1	Public	Logistics	Port / Maritime	Development of Laem Chabang Port, Basin3	1,002.7	Prospective
1	Public	Logistics	Port / Maritime	Development of Thai Gulf-Andaman landbridge	1,671.1	Prospective
1	Public	Logistics	Railway	Double-track construction, phase 2 (Chumporn-Surattani)	568.2	Prospective
1	Public	Logistics	Railway	Double-track construction, phase 2 (Hua Hin-Chumporn)	304.1	Prospective
1	Public	Logistics	Railway	Double-track construction, phase 2 (Kaengkhoi-BuaYai)	962.6	Prospective

Tier	Type	Sector	Sub−Sector	Project Name	Cost (US$ mil)	Status
1	Public	Logistics	Railway	Double-track construction, phase 2 (Pak Numpo-Tapanhin)	250.7	Prospective
1	Public	Logistics	Port / Maritime	Port Transport Management Center in 2nd Chaingsan Port	4.9	Prospective
2	Public	Logistics	Road / Bridge	Development for 4-lane highway, phase 2	3,096.9	Ongoing
2	Public	Logistics	Port / Maritime	Development of 2nd Chaingsan Port, Chaingrai	26.9	Ongoing
2	Public	Logistics	Port / Maritime	Development of Ayutthaya waterway depot	7.4	Ongoing
2	Public	Logistics	Port / Maritime	Development of Klong Yai Port, Trat	43.3	Ongoing
2	Public	Logistics	Airport	Enhancement of runway strip and runway end safety area in Surattani Airport	6.0	Ongoing
2	Public	Logistics	Airport	Enhancement of runway strip in Naratiwas Airport	7.1	Ongoing
2	Public	Logistics	Road / Bridge	Highway development	91.5	Ongoing
2	Public	Logistics	Road / Bridge	Highway development for supporting multi-modal transportation	168.4	Ongoing
2	Public	Logistics	Road / Bridge	Highway enhancement	75.8	Ongoing
2	Public	Logistics	Road / Bridge	Inter-city motorway	10,588.2	Ongoing
2	Public	Logistics	Airport	Krabi Airport Terminal enhancement (1)	3.5	Ongoing
2	Public	Logistics	Airport	Krabi Airport Terminal enhancement (2)	2.6	Ongoing
2	Public	Logistics	Road / Bridge	Mekong landbridge in Nakorn Panom	38.3	Ongoing
2	Public	Logistics	Road / Bridge	Mekong River bridge in Chaingkong, Chaingrai	22.6	Ongoing
2	Public	Logistics	Airport	Nakonsrithammarat Airport Terminal enhancement	6.0	Ongoing
2	Public	Logistics	Road / Bridge	Road standard enhancement	1,319.4	Ongoing
2	Public	Logistics	Road / Bridge	Rural higway network for transport linkage	1,443.9	Ongoing
2	Public	Logistics	Port / Maritime	Development of 2nd Songkhla Port, phase 1	192.4	Prospective
2	Public	Logistics	Port / Maritime	Development of Angthong waterway depot	8.5	Prospective
2	Public	Logistics	Port / Maritime	Development of Pakbara Port, Satul	415.6	Prospective
2	Public	Logistics	Road / Bridge	Truck terminal at transportation hub province and border province Phase 1 (Chaingmai, Songkhla, Nongkai, Ubonrachatani, Chaingrai, Tak)	105.8	Prospective
2	Public	Logistics	Road / Bridge	Truck terminal at transportation hub province and border province Phase 2 (Mukdahan, Sakeaw, Surattani, Nakornrachasima, Khonkaen, Nakonsawan)	116.3	Prospective

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CHAPTER 6.

ECONOMIC IMPACTS OF ENHANCED ASEAN-INDIA CONNECTIVITY: SIMULATION RESULTS FROM IDE/ERIA-GSM

SATORU KUMAGAI

IKUMO ISONO

Abstract

We have been developing the IDE/ERIA Geographical Simulation Model (IDE/ERIA-GSM) since 2007, and now the model has reached the 5th version (Kumagai et al. 2012). By using IDE/ERIA-GSM, we conduct several simulations to estimate the economic impacts of various trade and transport measures (TTFMs) concerning ASEAN-India Connectivity[1]

[1] General explanation of IDE/ERIA-GSM 5, including model, parameters and data, is provided in Appendix.

1. INTRODUCTION

Infrastructure development as well as logistics enhancement is one of the most important key drivers for economic development. We still have huge gaps both in economic development and in logistics infrastructures in East Asia. To pursue higher economic development and to narrow the economic gaps, it goes without saying that we need much effort in the region.

This chapter provides some policy implications for better ASEAN-India Connectivity by using IDE/ERIA Geographical Simulation Model (IDE/ERIA-GSM). IDE/ERIA-GSM is a simulation model based on spatial economics, also known as new economic geography. It can be used as a tool for policy makers to judge about what kinds of trade and transport measures (TTFMs) are needed, how to prioritize them and how to mingle them. The model has an original economic model with general equilibrium setting, original simulation programs running on JAVA, huge dataset consists of 1,715 regions, 4,266 nodes and 7,044 routes, and several parameters obtained by econometric techniques. It covers 18 countries/economies in Asia in addition to two economies of the U.S. and European Union (EU); Bangladesh, Brunei Darussalam, Cambodia, China, Hong Kong, India, Indonesia, Japan, Korea, Lao PDR, Macao, Myanmar, Malaysia, the Philippines, Singapore, Chinese Taipei, Thailand, and Vietnam. The model makes it possible to estimate the economic impacts of various TTFMs, e.g. economic impacts on each Indian state of a road improvement in Myanmar, and is well accorded with the cluster approach and economic corridor approach.

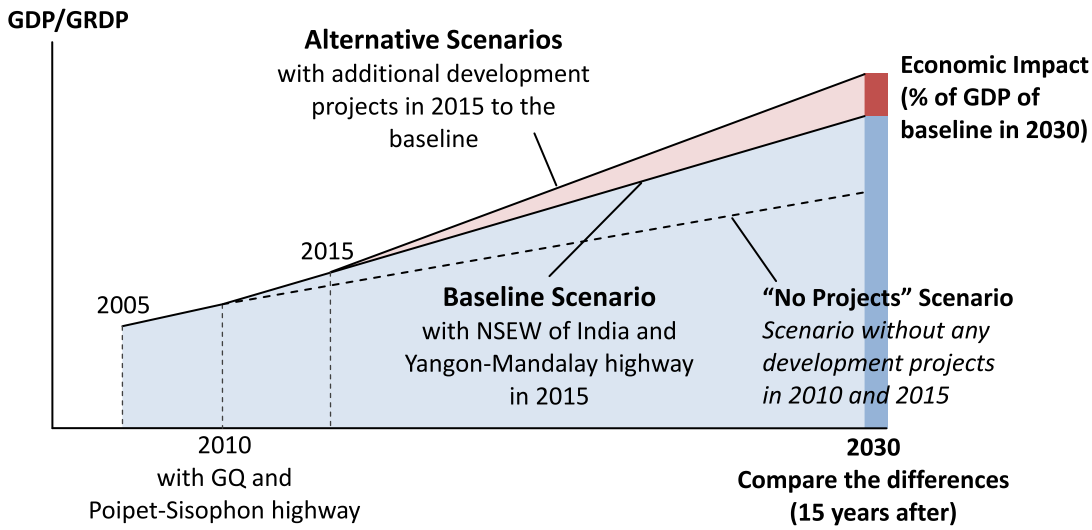
This chapter is structured as follows: Section 2 constructs the baseline scenario and explains its assumptions. Section 3 gives additional alternative scenarios concerning ASEAN-India connectivity. Section 4 concludes with some policy implications.

2. INFRASTRUCTURE DEVELOPMENT IN INDIA AND THE BASELINE SCENARIO

In this section, we explain the baseline scenario in this chapter. We have the baseline scenario, other alternative scenarios and a scenario *without any development* *projects* as in Figure 1. We call the last one "no projects" scenario. In all scenarios, the simulation starts from 2005. In 2010, we have some TTFMs in the baseline and other alternative scenarios, representing already completed projects by 2010, such as the Golden Quadrilateral (GQ) of India. Also, we have other TTFMs in 2015 in both baseline and alternative scenarios, presuming some TTFMs such as the improvements of North-South and East-West Corridor (NSEW) of India will be implemented by 2015. On the other hand, in the "no projects" scenario we don't have any TTFMs after 2005.

We incorporate not only already completed projects but also some on-going projects in the baseline scenario. It is because our objective is to estimate the net benefit of additional projects planned in ASEAN-India connectivity. It also helps to identify which areas these projects contribute for, and which areas we should focused on further.

Figure 1: Difference between Baseline Scenario and other Alternative Scenarios



Source: Authors.

The following macro parameters are maintained across scenarios:

- There is no immigration between the region covered in the simulation and the rest of the world.
- The national population of each country is assumed to increase at the rate forecasted by the United Nations Population Division until year 2030, as specified in Table A16 in Appendix.

2-1. Specification for the Baseline Scenario

In principle, the basic speed of land traffic is set to 38.5 km/h and fixed for all years. However, because of the better road conditions compared to transport demand for them, we assume that the speed of highways in Thailand (excluding surrounding area of Bangkok), between Bukit Kayu Hitam and Singapore via Kuala Lumpur, and between Sisophon and Bavet is 60km/h and the speed passing through mountainous areas is set to half of the basic at—19.25 km/h. As for sea traffic, the average speed is set to 29.4 km/h for international-class routes, and at half of that among other routes. For air traffic, the average speed is set to 800 km/h between the primary airports[2] of each country and at 400 km/h among other routes. As for railway traffic, the average speed is set at 19.1 km/h.

In the "no projects" scenario and the baseline scenario, we prohibit transit transport through Myanmar and Bangladesh. Therefore, in this case trade between China and India is mainly done by ocean routes passing through Malacca Straits, or by air routes. Also, firms in Thailand and Laos usually use Laem Chabang port to export to India or EU.

In baseline scenarios as well as other alternative scenarios, we have improved GQ of India and the road between Poipet and Sisophon in 2010, by raising the speed of them to 60km/h. Figure 2 shows the economic impacts of GQ on India. Note that this figure compares two economies in 2030 as follows:

- GQ Scenario: An economy where we have improved GQ in 2010 but no other projects after 2005.
- No projects Scenario: The other artificial economy where we hadn't had any infrastructure development projects after 2005.

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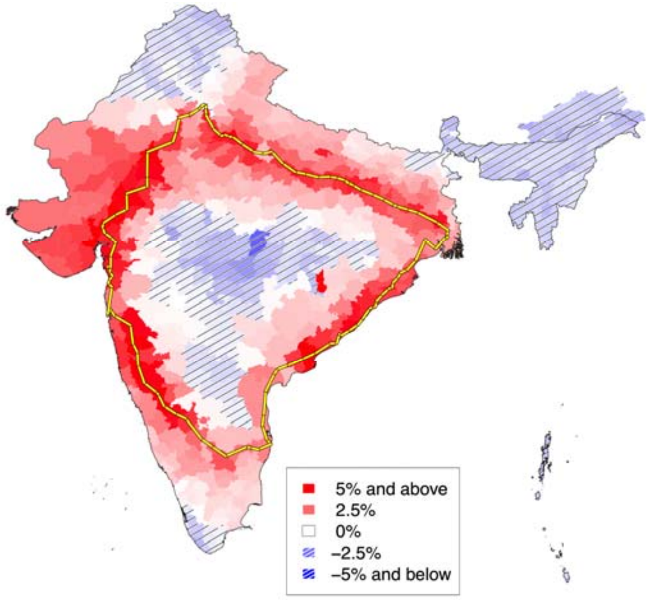
[2] In this simulation, we designated the following airports as primary airports: Brunei Intl Airport,Changi Intl Airport, Hong Kong Intl Airport, Kuala Lumpur Intl Airport, Ninoy Aquino Intl Airport, SoekarnoHatta Intl Airport, Suvarnabhumi Intl Airport, Phnom Penh Intl Airport, Yangon Intl Airport, Wattay Intl Airport, Tansonnhat Intl Airport, Chennai Intl Airport, Noibai Intl Airport

Figure 2: Economic Impacts of Golden Quadrilateral (GQ) of India (2030, compared with the *"No projects" Scenario without any Development Projects in 2010 and 2015*)[3]



Note: NA for Jammu and Kashmir due to data availability.
Source: IDE/ERIA-GSM 5.

After having the better highway, firms in the model along GQ get the benefit in selling and buying products in better price, thanks to the lowered transport costs. This stimulates economic activities and thus raises GRDP of the regions along GQ in 2030. Moreover, some firms in Middle and North-East India move to regions along GQ to seek higher profits, and some people also move to the regions to get better incomes. These behaviors push up the GRDP of the regions along GQ further, while Middle and North-East India may suffer losing GRDP, even if we weigh the GQ scenario against the scenario with no infrastructure developments.

In the baseline scenario, we also assume that we will have better highways along with NSEW in India and highway between Yangon and Mandalay in 2015, because these projects are on-going now and no doubt we will complete these projects by 2015. Figure 3 depicts the economic impacts of NSEW of India, comparing the "No Projects"

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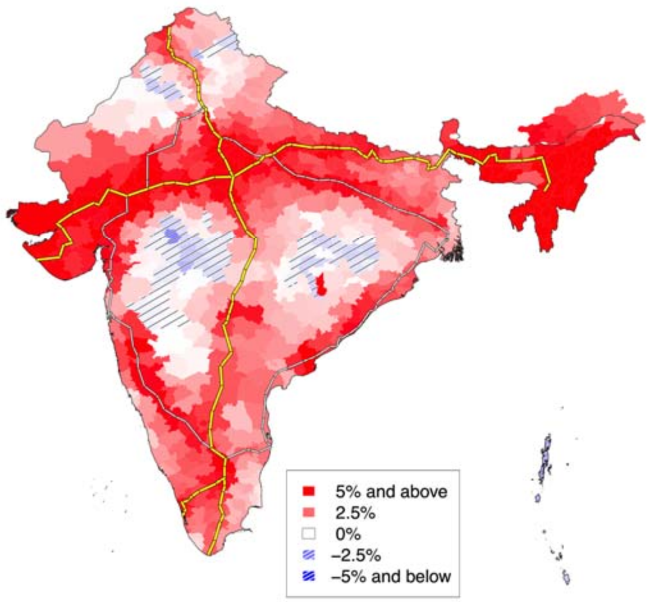
[3] We couldn't obtain the results for Jammu and Kashmir because the geo-mapping data based on the Global Administrative Unit Layers(GAUL) dataset by FAO doesn't meet our socio-economic dataset for the region.

scenario.

Thanks to the development of NSEW, economic activities along these economic corridors are revitalized, leading to the higher GRDP. Some of regions along GQ may suffer slightly compared with GQ scenario, because *relative* attractiveness of these regions to firms and people will slightly decline. However, Figure 3 tells us that these regions still have obvious positive impacts compared to the scenario without any development projects.

Figure 3: Economic Impacts of GQ and NSEW of India (2030, compared with the *"No projects" Scenario without any Development Projects in 2010 and 2015*)



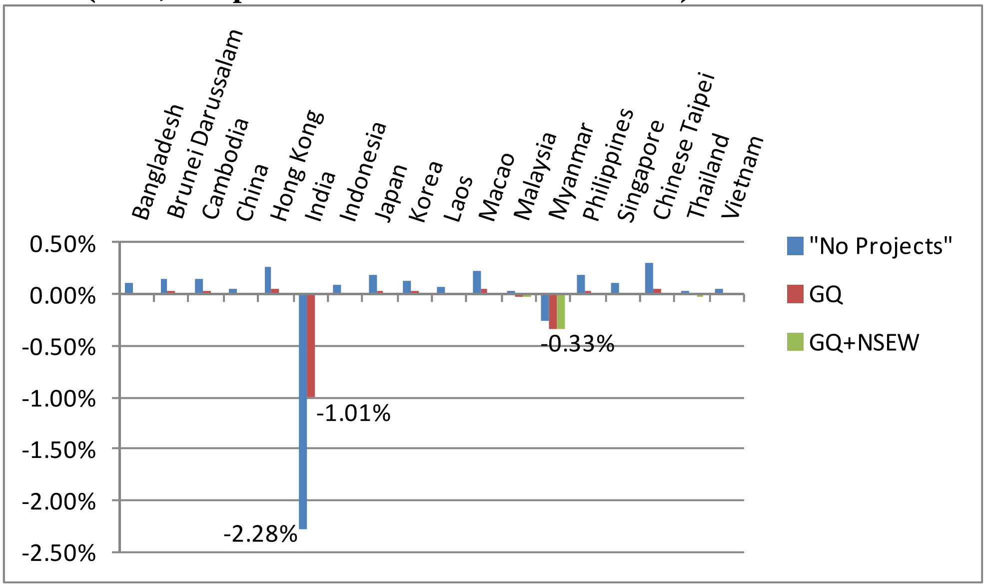
Source: IDE/ERIA-GSM 5.

2-2. Simulations on Basic Infrastructure Developments in India and Myanmar up to 2015 compared with the Baseline Scenario

In the last subsection, two simulations were conducted comparing the economies in 2030 between GQ development in 2010 with no developments, and between GQ in 2010 and NSEW of India in 2015 with no developments.

To understand the baseline scenario more clearly, let us illustrate the simulation results of no projects scenario, GQ scenario, GQ+NSEW of India scenario, comparing with the baseline scenario. Figure 4 shows the economic impacts in 2030 of these scenarios. Because in the baseline scenario we already have GQ and NSEW of India as well as highways between Poipet and Sisophon and between Yangon and Mandalay, each scenario shows negative impacts for India and Myanmar. For India, economic impact of "not having" all GQ, NSEW and other roads in 2030 is -2.28% of the baseline scenario. GQ development in 2010 will relieve the negative impact to -1.01%, and the developments of NSEW will alleviate the negative impact further to 0.00%. Meanwhile, the developments such as highway between Yangon and Mandalay have almost no impacts on India. For Myanmar, economic impact of "not having" all GQ, NSEW and other roads in 2030 is -1.11%. GQ development in India has slightly negative impact on Myanmar, compared with "No Projects" scenario. Obviously, the development of the highway between Yangon and Mandalay has bigger impact in Myanmar. It increases Myanmar's GDP in 2030 by 0.33-percentage point, or we can say that if we don't have the highway development, Myanmar's GDP in 2030 will decrease 0.33% compared with the scenario having the development.

Figure 4: Economic Impacts of "not having" GQ, EWEC and NSEC (2030, compared with the Baseline Scenario)



Source: IDE/ERIA-GSM 5.

3. ADDITIONAL ALTERNATIVE SCENARIOS

This section introduces additional alternative scenarios and compares with the baseline scenario. We have several scenarios on ASEAN-India Connectivity as follows:

a. Comparison between Dawei deep seaport and Pak Bara deep seaport.
b. Mekong-India Economic Corridor (MIEC).
c. Kyaukphyu deep seaport.
d. Trilateral Highway (TH).
e. “South Route” connecting Mae Sot to Siliguri with better highways.
f. “South Route+x”, adding the routes between Dhaka and Kolkata and between Kanchanaburi and Thaton to South Route.
g. “North Route” connecting Mae Sai to Moreh (or Silchar) with better highways.
h. “North Route+x”, adding the routes between Silchar to Dhaka and between Guwahati to Dhaka.
i. All Developments.
j. All Developments with reduction of Policy and Cultural Barriers (PCBs).

3-1. Two Deep Seaport Projects and MIEC

We consider two deep seaport projects in Andaman seaside, that is, Dawei deep seaport project in Myanmar and Pak Bara deep seaport project in Thailand.

We set five different scenarios as follows:

Dawei (No Transit)

- Development of Dawei Port and highway between Kanchanaburi and Dawei in 2015.
- Customs facilitation at the Kanchanaburi-Dawei border.
- Connecting Dawei to Kolkata, Chennai, and Rotterdam by international equivalent sea routes.
- Fixed PCBs.

Dawei

- In addition to the Dawei (No Transit) scenario, the transit transport through Myanmar only when firms use both Dawei port and the Kanchanaburi-Dawei border to be allowed.
- Special customs facilitation that products of Thailand, Laos, Cambodia and other countries to be exported to India or EU can go through Kanchanaburi to Dawei very smoothly, at 15 minutes and free-of-charge, and vice versa.

Pak Bara

- Development of Pak Bara Port and highway connecting to national highway.
- Connecting Pak Bara to Kolkata, Chennai, and Rotterdam by international equivalent sea routes.
- Fixed PCBs.

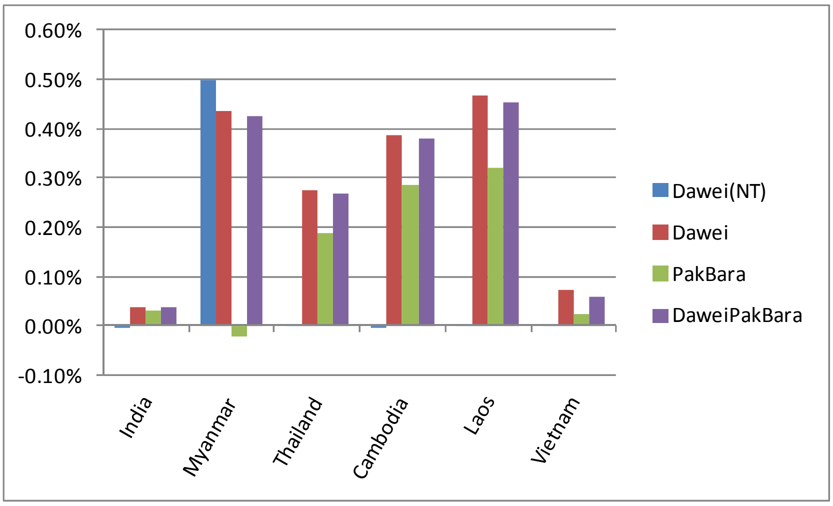
Dawei+Pak Bara

- Development of both Dawei and Pak Bara, including all related measures mentioned above.
- Fixed PCBs.

Figure 5 shows the economic impacts of the five different scenarios in 2030, compared with the baseline scenario. In Dawei (No Transit) scenario, only Myanmar has a positive impact while the others have almost no impacts. It this sense, allowing the transit transport in Myanmar is critical for other countries, especially for Thailand.

Dawei project has larger impact than Pak Bara project for Thailand even though Pak Bara is a project in Thailand and Dawei is in Myanmar. Furthermore, there is almost no additional impact when we compare Dawei project only and both Dawei and Pak Bara projects.

Figure 5: Economic Impacts of Four Different Scenarios (2030, compared with the baseline scenario)



Source: IDE/ERIA-GSM 5.

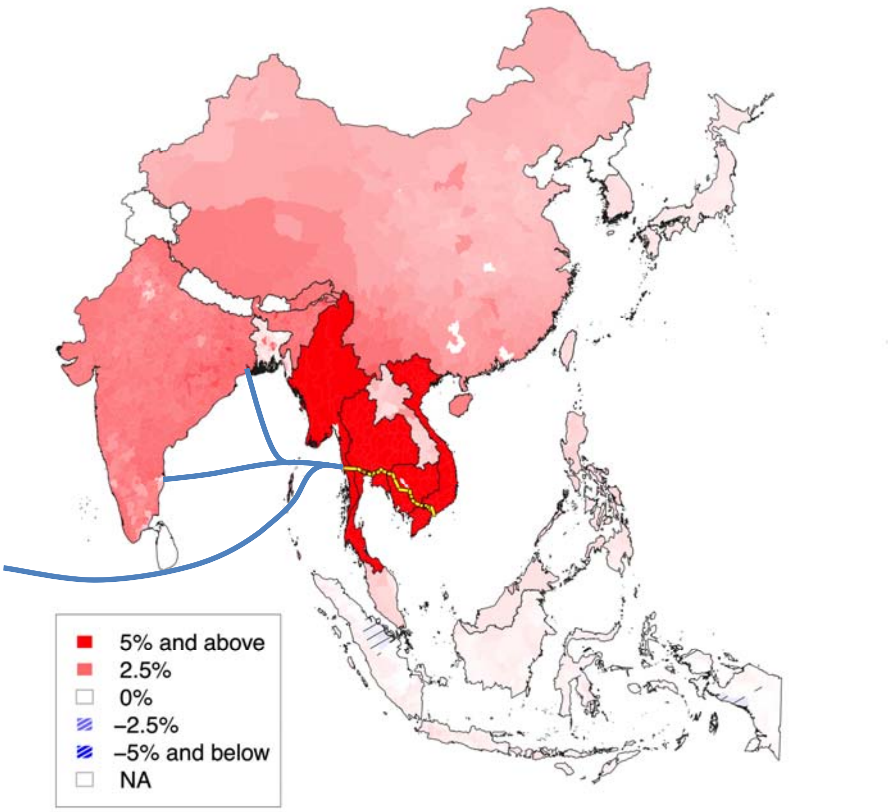
In addition to the Dawei scenario, we consider the enhanced connectivity along MIEC as follows:

MIEC

- Infrastructure Development of the Bridge at Neak Loueng, new highway between Kanchanaburi and Dawei, and Dawei Port in 2015, leading to the speed-up to 60km/h along the road.
- Customs facilitation, meaning that time and costs at the 3 border points at Kanchanaburi-Dawei, Poipet-Sisophon and Bavet-Moc Bai are halved.
- Special customs facilitation that products of Thailand, Laos, Cambodia and other countries to be exported to India or EU can go through Kanchanaburi to Dawei very smoothly, at 15 minutes and free-of-charge, and vice versa.
- Connecting Dawei and Chennai, and Dawei and Rotterdam by international equivalent sea routes.
- Reducing PCBs 2% per year in Vietnam, Cambodia, Thailand, Myanmar and India.

Figure 6 presents the economic impact of MIEC. Taninthayi, where the capital city is Dawei, has the largest impact. Enhancement of physical and institutional connectivity brings large economic impacts on related countries.

Figure 6: Economic Impacts of MIEC with Soft Infrastructure Improvement (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

3-2. Kyaukphyu Deep Seaport

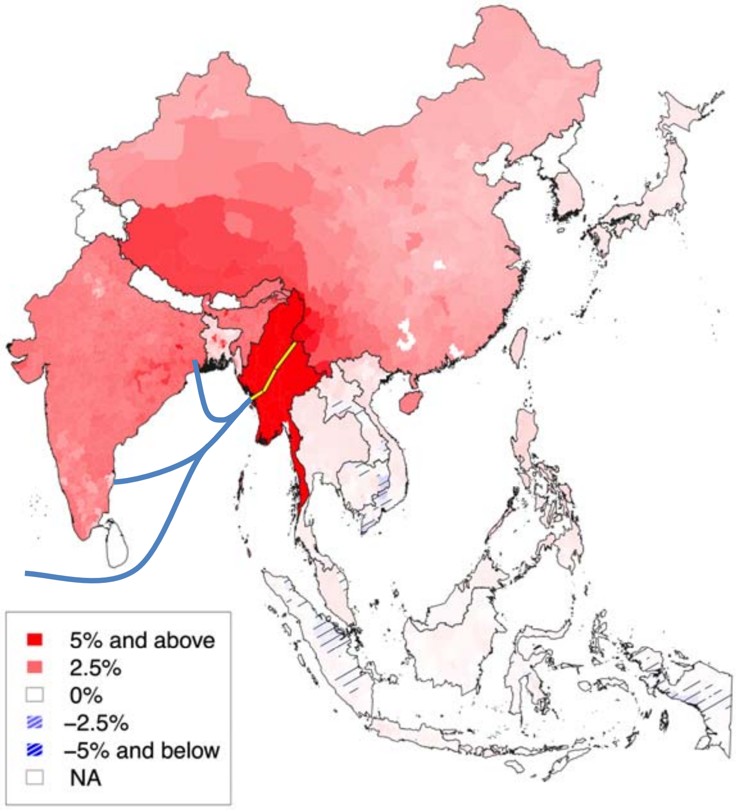
In Kyaukphyu deep seaport project, we assume as follows:

- Development of Kyaukphyu Port and highway between Muse and Kyaukphyu in 2015.
- Customs facilitation at the Muse-Ruili border.
- Connecting Kyaukphyu to Kolkata, Chennai, and Rotterdam by international equivalent sea routes.
- The transit transport through Mynmar only when firms use both Kyaukphyu port and the Muse-Ruili border to be allowed.
- Special customs facilitation that products of China and other countries to be exported to India or EU can go through Ruili to Muse very smoothly, at 15 minutes and free-of-charge, and vice versa.

- Reducing PCBs 2% per year in China, Myanmar and India.

Figure 7 illustrates the economic impact of Kyaukphyu project. Myanmar and China will have large positive impacts. Particularly, the transit transport using Kyaukphyu port and the Muse-Ruili border makes it possible for the firms and people in Western China to trade with India and EU without passing Malacca Straits.

Figure 7: Economic Impacts of Kyaukphyu Deep Seaport with Soft Infrastructure Improvement (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

3-3. Trilateral Highway

In Trilateral Highway project, we set two scenarios as follows:

Trilateral Highway (TH)

- Development of New highway running.
  Silchar-Moreh/Tamu-Pale-Bagan-Theinzayat-Mawlamyine-Kawkareik-Myawaddy/

Mae Sot.

- Customs facilitation at the Moreh/Tamu and Myawaddy/Mae Sot borders.
- Allowing the transit transport in Myanmar only when firms use the road.
- Fixed PCBs.

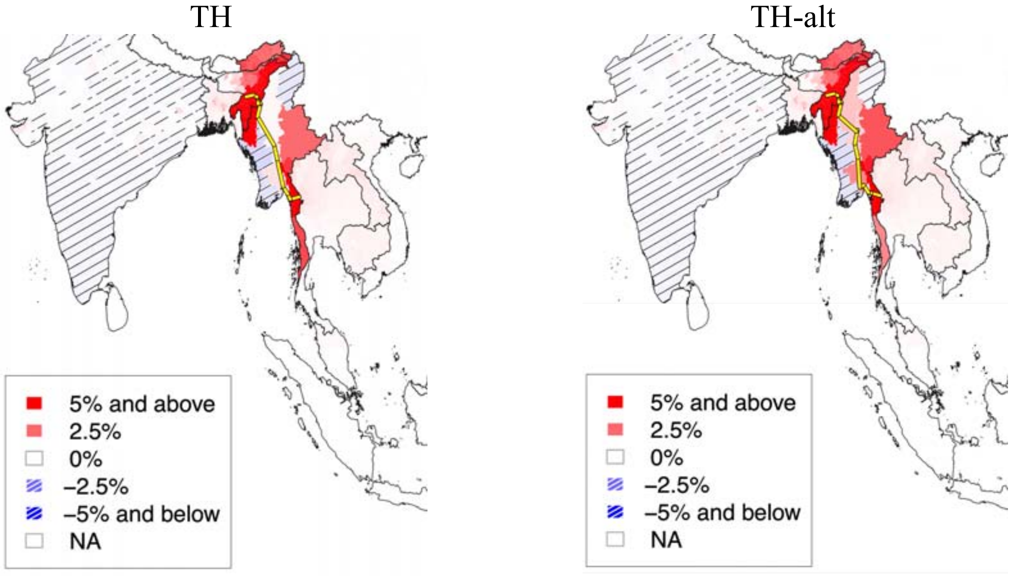
Trilateral Highway (TH-alternative)

- Development of highways between the Moreh/Tamu border and Mandalay and between Payagyi and Myawaddy/Mae Sot via Hpa An.
- Customs facilitation at the Moreh/Tamu and Myawaddy/Mae Sot borders.
- Allowing the transit transport in Myanmar only when firms use the road.
- Fixed PCBs.

TH scenario describes the new highway project proposed by Myanmar Government. Having an additional bypass through Myanmar in addition to the Mandalay-Yangon Highway will make extra positive impacts. TH-alt means highway project along with Asian Highway No. 1. Connecting the border areas and large cities such as Mandalay, Bago and Yangon will make additional benefit.

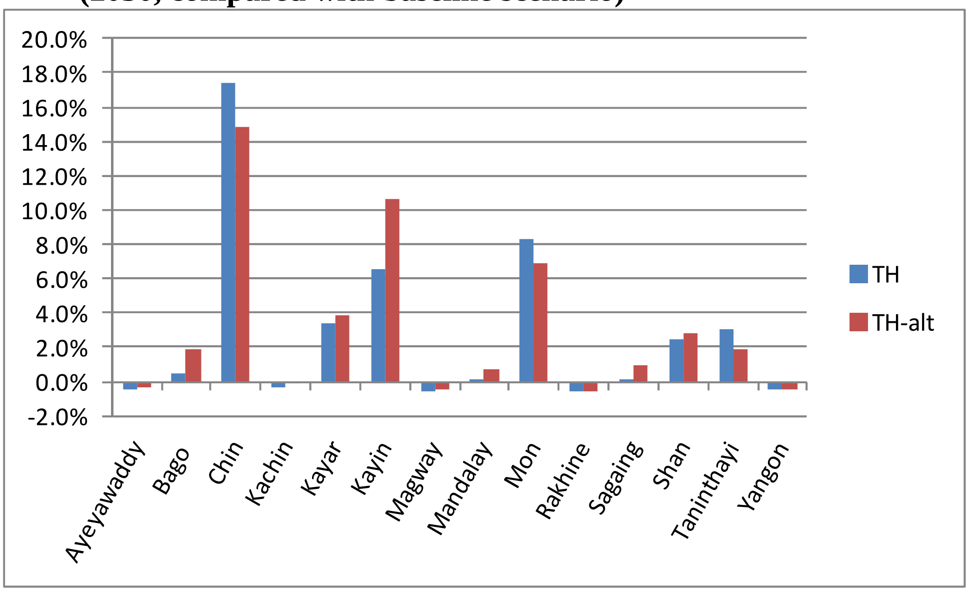
Figure 8 shows the comparison of two Trilateral Highway scenarios. In this case, TH-alt has larger impact which means having better connection between border areas and large cities will benefit more. Figure 9 compares the impacts on each Myanmar state/region. Chin, Kayin and Mon states will get larger positive impacts.

Figure 8: Economic Impacts of Trilateral Highway (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

Figure 9: Economic Impacts of Trilateral Highway on Myanmar (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

3-4. Kaladan River Project

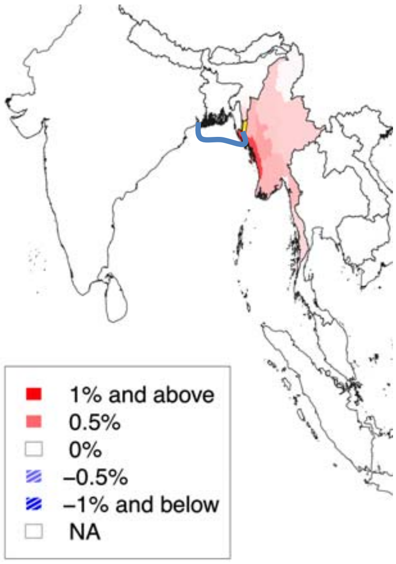
The scenario for Kaladan River project is set as follows:

- Connecting Kolkata port to Sittwe port.
- Develop new Inland waterway between Sittwe and Paletwa.

- Develop new road between Paletwa and Saiha, India.
- Allowing the transit transport in Myanmar only when firms use the way between Sittwe and Indian border via Paletwa.
- Fixed PCBs.

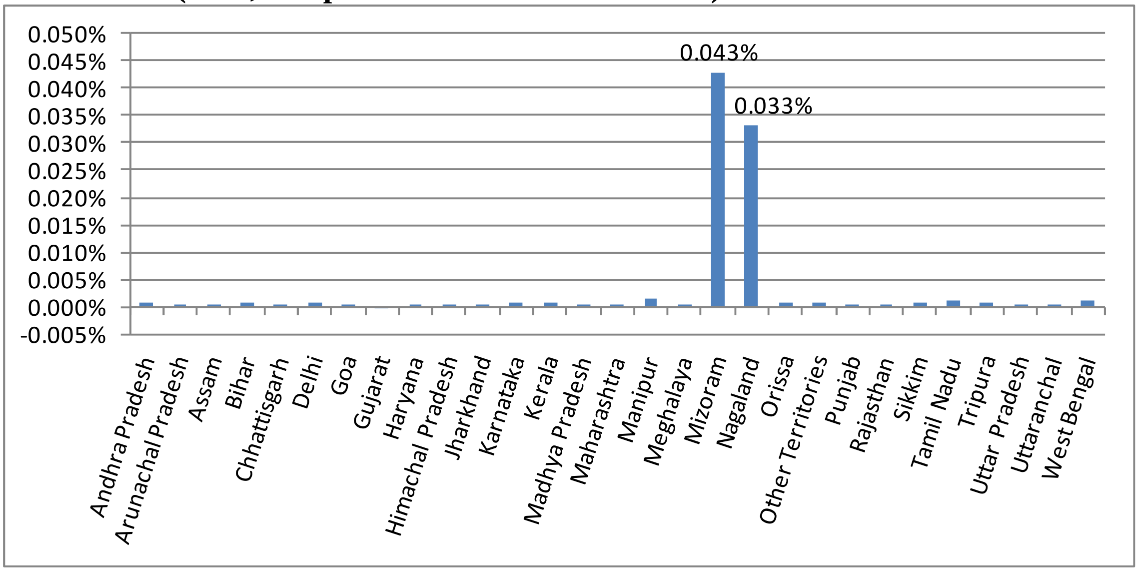
As Figures 10 and 11 show, the impacts of Kaladan River project are relatively small. Connecting Kolkata to Sittwe will benefit Myanmar, while the impacts on India are tiny.

Figure 10: Economic Impacts of Kaladan River Project (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

Figure 11: Economic Impacts of Kaladan River Project on India (2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

3-5. "South" and "North" Routes

In the South and North Route scenarios, we set four scenarios as follows:

South Route Scenario

- Better highway between Mae Sot and Siliguri, via Thaton, Bago, Pyay, Chittagong, and Dhaka leading to the speed-up to 60km/h along the road.
- Customs facilitation at the borders along the highway.
- Allowing the transit transport along the road.
- Fixed PCBs.

South Route+x Scenario

- Additional better highways between Dhaka and Kolkata and between Kanchanaburi and Thaton to South Route Scenario, to connect the large cities.
- Allowing the transit transport along the road.
- Fixed PCBs.

North Route Scenario

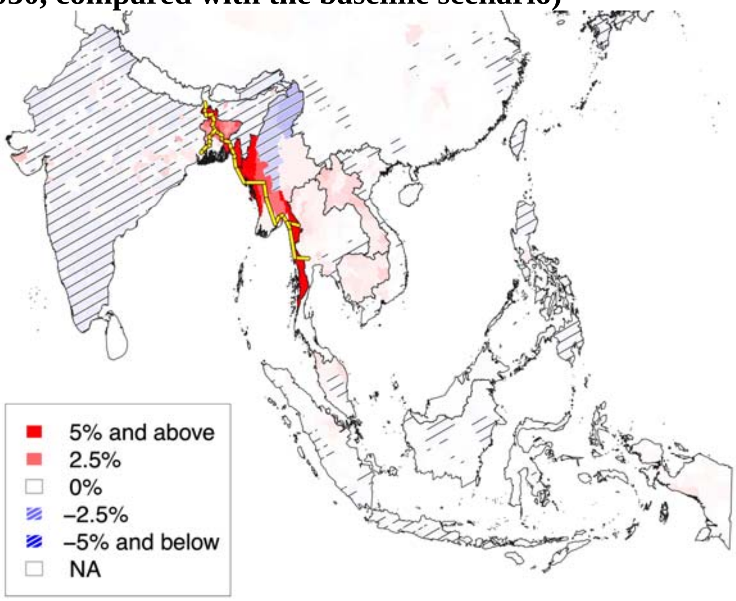
- Better highway between Mae Sai and Silchar, via Mandalay leading to the speed-up to 60km/h along the road.
- Customs facilitation at the borders along the highway.
- Allowing the transit transport along the road.
- Fixed PCBs.

North Route+x Scenario

- Additional better highways between Silchar to Dhaka and between Guwahati to Dhaka to North Route Scenario.
- Allowing the transit transport along the road.
- Fixed PCBs.

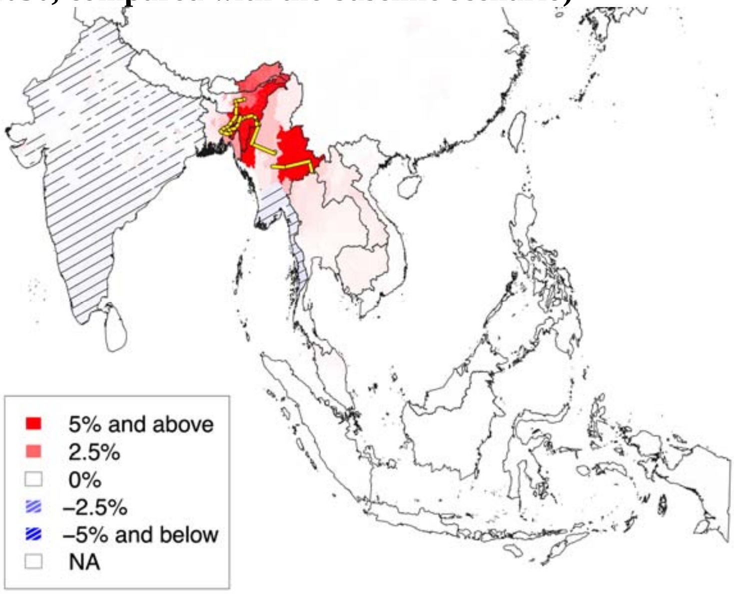
Figure 12 depicts the economic impacts of South Route+x Scenario. Figure 13 shows the impacts of North Route+x Scenario.

Figure 12: Economic Impacts of South Route+x Scenario (2030, compared with the baseline scenario)



Source: IDE/ERIA-GSM 5.

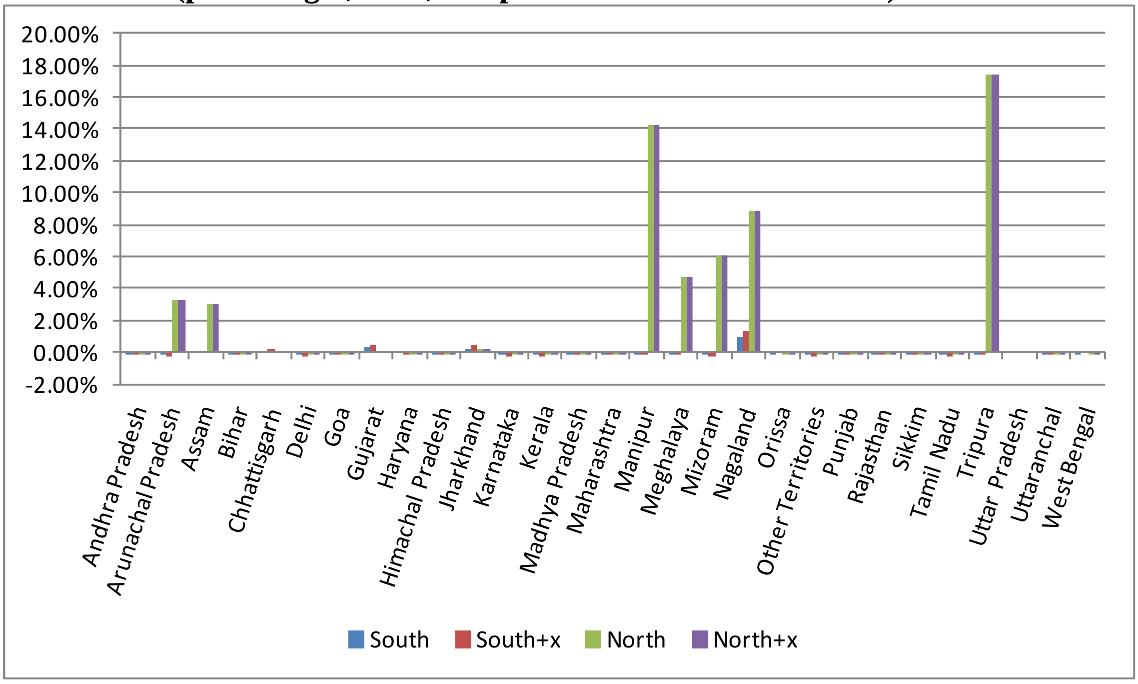
Figure 13: Economic Impacts of North Route+x Scenario (2030, compared with the baseline scenario)



Source: IDE/ERIA-GSM 5.

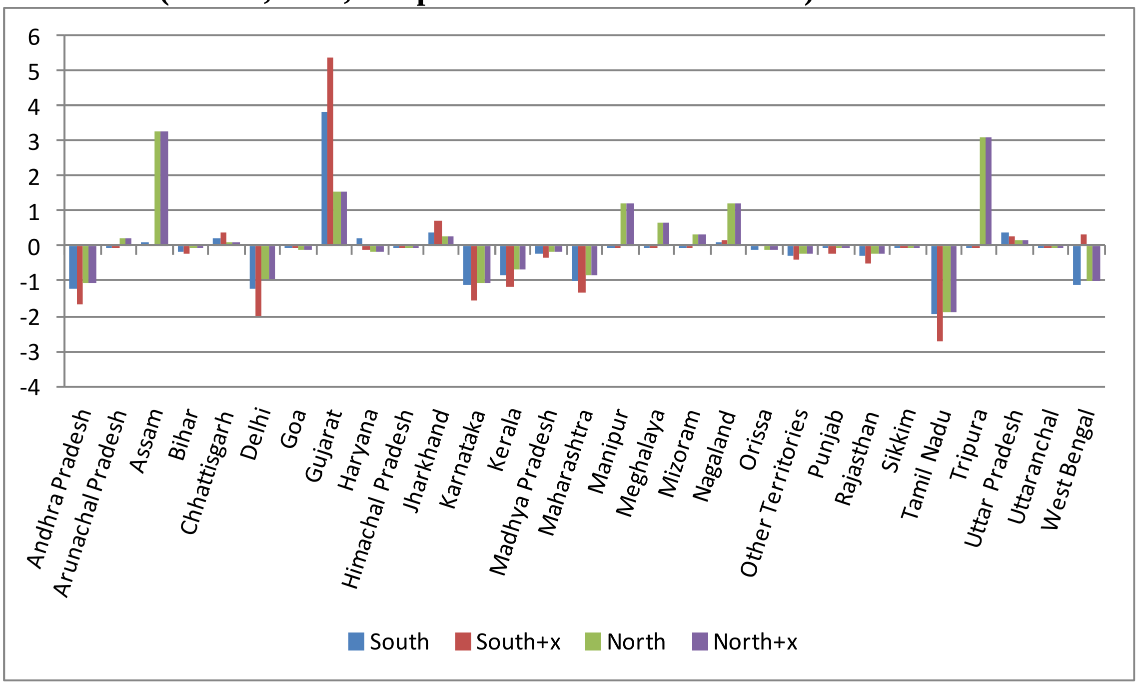
Figures 14 and 15 compare the impacts of the four different scenarios on each state in India. Figure 14 uses the percentage of each state's GRDP as of 2030 in the baseline scenario, explaining importance of impacts on each state. Figure 15, on the other hand, uses an index where the total GDP of India in 2030 in the baseline scenario is 10,000, denoting importance of impacts on the whole country, or absolute value. We find North-East India will benefit by North and North+x scenarios. Manipur, Mizoram and Tripura will have negative impacts by South route, because the route doesn't connect these states.

Figure 14: Economic Impacts of South and North Route Scenarios on India (percentages, 2030, compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

Figure15: Economic Impacts of South and North Route Scenarios on India (indices, 2030, compared with baseline scenario)



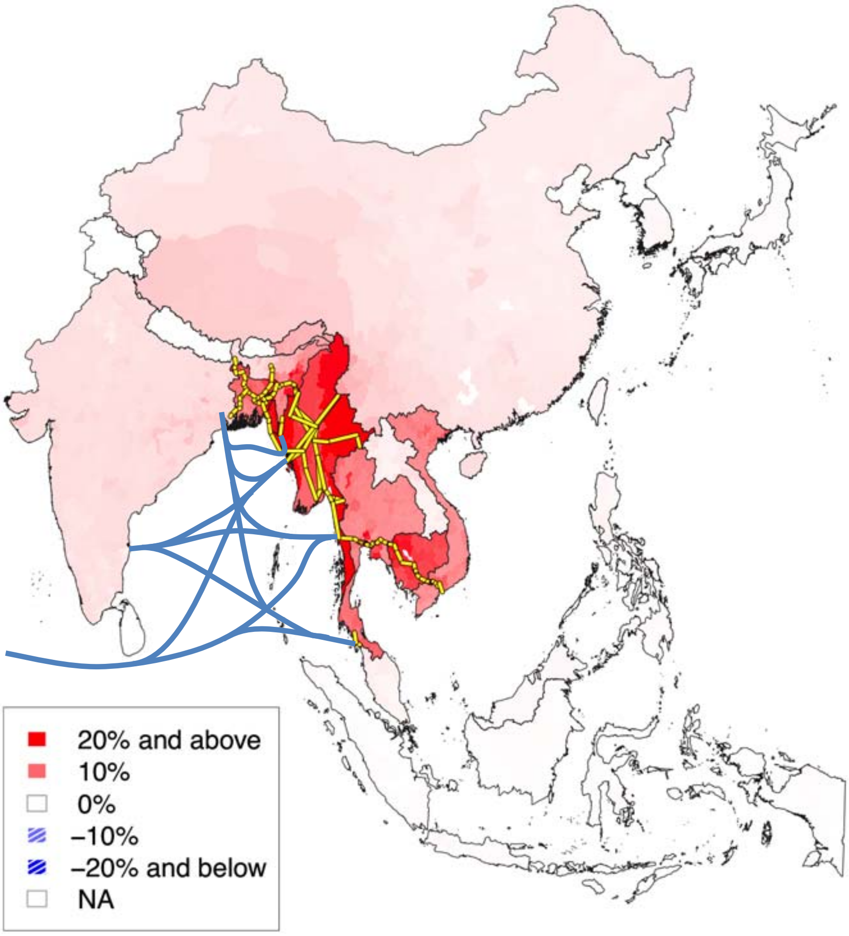
Note: Total GDP of India (2030, the baseline scenario)=10,000

Source: IDE/ERIA-GSM 5.

3-6. All Developments

Finally, we combine all development scenarios. Figure 16 shows the impacts of "All" Scenario where related countries (Vietnam, Cambodia, Thailand, Myanmar, Bangladesh, China and India) reduce PCBs 2% per year. Infrastructure development with PCBs reduction will contribute higher economic growth, especially for relatively small countries such as Myanmar, Bangladesh, Cambodia and Vietnam[4].

Figure 16: Economic Impacts of "All" Scenario (2030, compared with the baseline scenario, lowering PCBs)



Source: IDE/ERIA-GSM 5.

Figure 17 shows the impact on each country. Myanmar, Cambodia and Bangladesh

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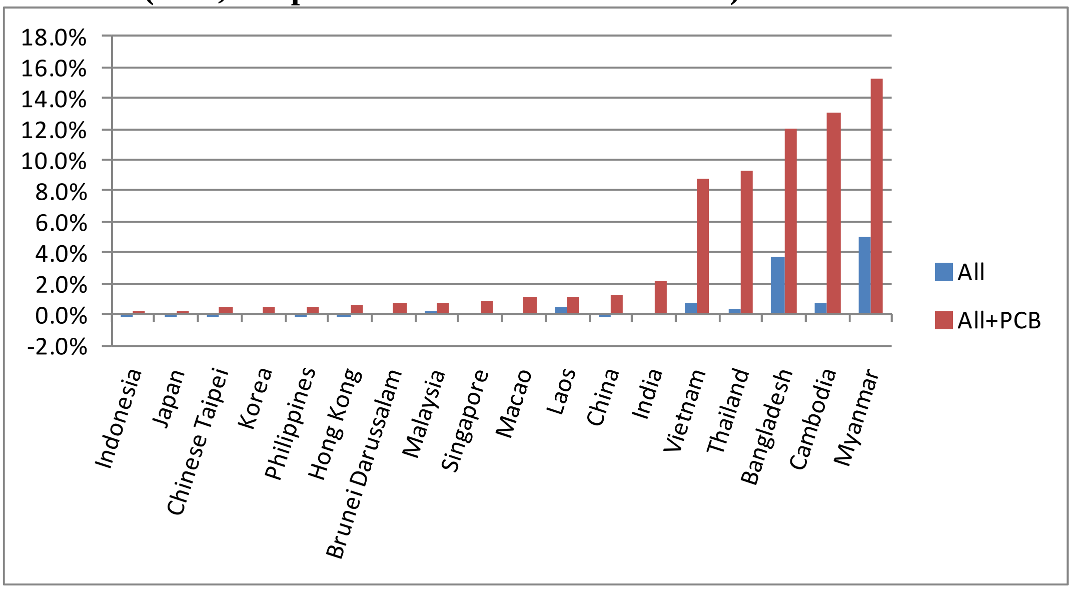
[4] Note that Laos doesn't reduce PCBs in this scenario, while it also takes some benefit thanks to the infrastructures and PCBs reduction of surrounding countries.

have larger positive impacts, in terms of percentage increase. India has smaller impact, relatively, but all states in India will have positive impacts when we reduce PCBs steadily, as shown in Figures 18. We find PCBs reduction has large economic impacts[5]. In absolute value of GDP, India, China and Thailand are the top receivers of the benefit, followed by Bangladesh and Vietnam. In India, states of North-East India will get higher economic impacts.

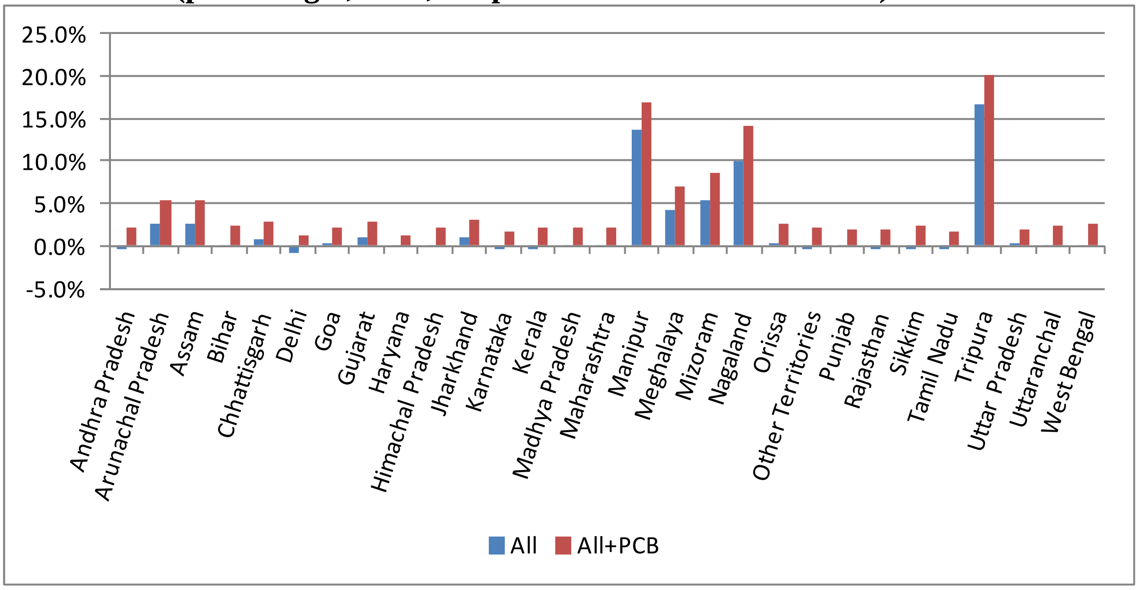
Figure 17: Economic Impacts of "All" Scenario, by country (2030, compared with the baseline scenario)



Source: IDE/ERIA-GSM 5.

[5] Banomyong *et al.* (2011) focuses on the PCB related issues.

Figure 18: Economic Impacts of "All" Scenarios on India (percentages, 2030,compared with baseline scenario)



Source: IDE/ERIA-GSM 5.

4. Conclusions and Policy Implications

Better connectivity between ASEAN and India will benefit ASEAN newcomers and Bangladesh in terms of percentages of each country, and mainly benefit India and Thailand in terms of absolute value of GDP. We conclude with some findings and policy implications from the simulation results.

- For India, the developments of GQ and NSEW have larger positive impacts than the additional alternative scenarios, meaning that connecting the domestic market is crucial.
- However, some areas in Middle India may be left behind from the economic development, as shown in Figure 3. GQ and NSEW are not enough for the areas, even though these projects have large positive impacts on national GDP.
- India will have greater positive impacts by reducing PCBs, together with several projects discussed above. It is implying that soft infrastructure development is a key to maximize the benefit of better connectivity.
- For Myanmar, both the development of highways and PCBs reduction are essential.

To reduce PCBs, we need several measures, such as shortening the time for procedures before shipping, providing information in appropriate languages, enhancing the capacity of medium-sized firms, and establishing more reliable dispute settlement.

- For Thailand, Dawei port development, PCBs reduction and other connectivity to India will benefit the regions surrounding Bangkok, Lamphun and Kanchanaburi as in Figure 16. Main beneficiaries will be large and multinational manufacturing companies, because they want to enlarge export and import with India and EU.
- We need to combine with other projects on IMT (Indonesia-Malaysia-Thailand) and BIMP-EAGA (Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area) to foster the connectivity between ASEAN and India.
- Laos also needs attention, while the country will benefit from Dawei port development and sound customs facilitation between Kanchanaburi and Dawei. Firms in Laos will be able to utilize both Laem Chabang port and Dawei port by destination.

APPENDIX: GENERAL EXPLANATION OF IDE/ERIA-GSM 5

A1. INTRODUCTION[6]

A1-1. Background

IDE/ERIA-GSM was developed with two main objectives, namely, (1) to determine the dynamics of the locations of populations and industries in East Asia over the long-term, and, (2) to analyze the impact of specific TTFMs on regional economies at sub-national levels (Kumagai *et al.* 2008, 2009, 2010, 2011 and 2012).

For the first objective, we can obtain the population (or the number of employees) and real and nominal GDP by industry at a sub-national level for the years 2005-2030. Through the model we can change some of the macro-parameters, such as the national population growth rate and exogenous productivity growth rate and see the results.

For the second objective, we can change the various TTFM settings and see the difference between the baseline scenario and an alternative scenario, typically 15 years after the implementation of specific TTFMs (Figure A1, which is a simplified version of Figure 1). TTFMs include the Development of Physical Infrastructure (PI), Reduction in Non-Tariff Barriers (NTBs), and Reduction in Tariffs. In this chapter, we separate the reduction in NTBs into Customs Facilitation (CF) and other NTBs. The latter contains multiple reductions in tariffs, and is called the Reduction in Policy and Cultural Barriers (PCBs) (Figure A2).

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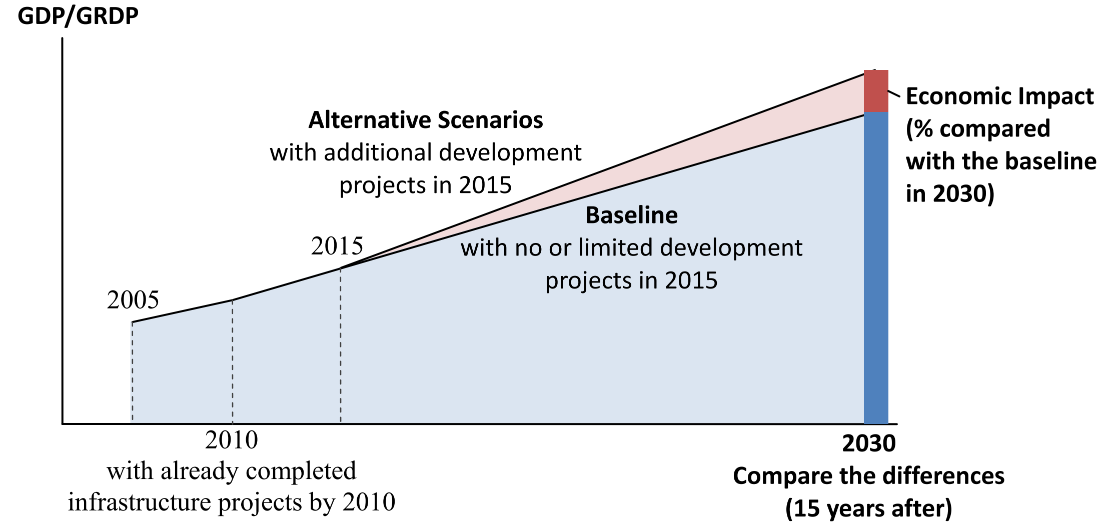
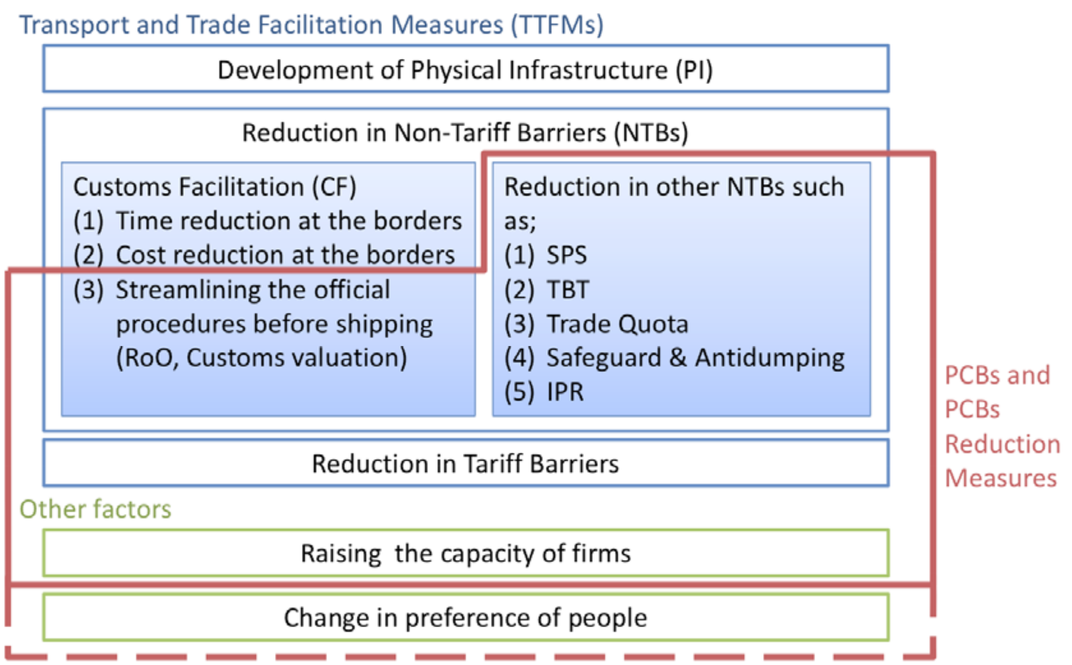
[6] This appendix is excerpted and modified from Kumagai *et al.* (2012)

Figure A1: Taking a look at the Difference between Baseline Scenario and other Alternative Scenarios



Source: Authors.

Figure A2: The Structure of Trade and Transport Facilitation Measures

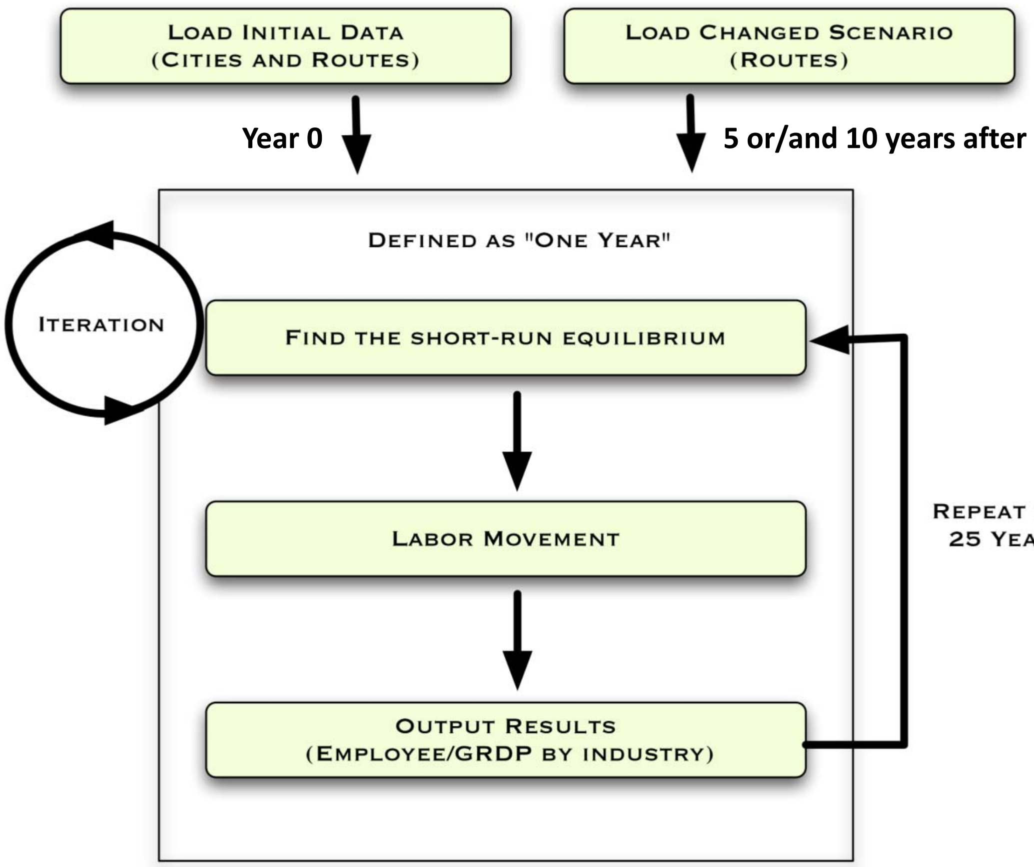


Source: Authors.

A1-2. Basic Structure

IDE/ERIA-GSM works as outlined in Figure A3. The computational procedures are: 1) Load initial Data, 2) Find short-run equilibrium, 3) Add Labor Movement, 4) Check Output Result, then back to 2) for 25 years (typically). To run an alternative scenario, change the transportation route data to be loaded into the simulation twice reaching 5 and 10 years into the future.

Figure A3: The Computational Procedure of IDE/ERIA-GSM



Source: Authors.

(1) Load initial data

The dataset consists of two files, namely, the city file and transport route file. The city file includes the city's name and its attributes. The transport route file includes all of the routes to the connecting cities. These two files should be compatible. Before running the simulation, load the city file and the route file of the baseline scenario. Both in the baseline scenario and alternative scenarios, additional route data are added 5 years after starting the simulation to represent already completed TTFMs by 2010. To run an alternative scenario, other route data are loaded typically 10 years after starting the simulation. However, it is possible to change the scenario after an arbitrary number of years, and it is also possible to change the scenario more than twice.

(2) Find short-run equilibrium

IDE/ERIA-GSM calculates the short-run equilibrium (equilibrium under a given distribution of population) values of such items as GRDP, employment, nominal wage, price index and so on, by region and industry. IDE/ERIA-GSM uses the iteration technique to solve this multi-equation model.

(3) Labor Movement

Once the short-run equilibrium values are found, IDE/ERIA-GSM calculates the dynamics of the population, or the movement of labor, based on the difference in real wages among countries, regions or industries. Labor moves from the countries, regions or industries with lower real wages to the countries, regions or industries with higher real wages. However, international migration of labor is prohibited in the IDE/ERIA-GSM at this moment. Although this looks like a rather extreme assumption, it is reasonable enough taking into account the fact that most countries included in the model strictly control incoming foreign labor.

(4) Output Results

To examine the related variables in the time series model, GSM exports the equilibrium values of the nominal and real GDP by sector, the number of employees by sector, the nominal wage by sector, the price index, and so on for each year. These can be checked using a statistical language, or GIS package.

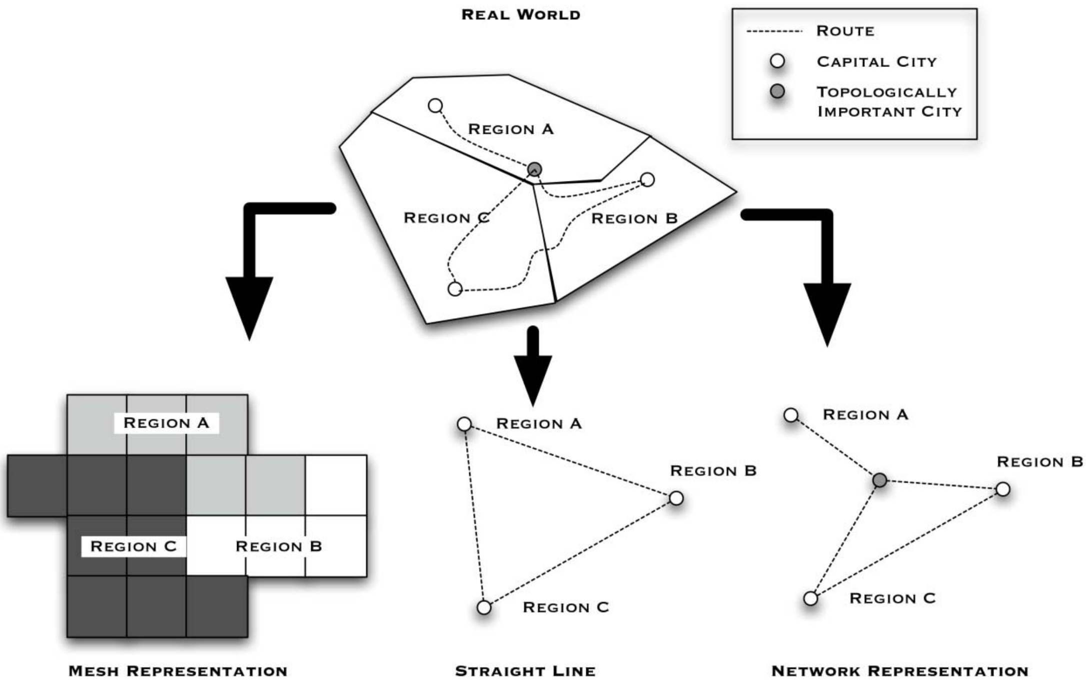
(5) Back to (2)

Proceed back to (2), find the new equilibrium under the new distribution of population. The return to calculation process 2 implies a one-year time advance in the simulation. The simulation is typically run for 25 years, and the difference at the end of the simulation between the two scenarios is compared.

A1-3. Features

IDE/ERIA-GSM has three main features. The first feature is that it incorporates a realistic network of cities and the routes among them. In the case of theoretical studies in spatial economics, "geography" is incorporated in the model as cities on a line or cities on a circle (the so-called "race-track economy" in Fujita, *et al.*1999, hereafter to be referred to as FKV 1999). On the other hand, the previous empirical models used to incorporate geography such as "mesh" or "grid" representation or "straight line" representation, which simply connected cities as places of production and consumption to one another using straight lines (Figure A4). There is no topology, or geography in these models that refers to the distances between cities.

Figure A4: Three Representations of Geography



Source: Authors.

The network representation of geography has some advantages over the other representations. First, it makes it possible to incorporate a realistic choice of routes in logistics, whereas the mesh representation does not necessarily incorporate routes explicitly. Second, it is possible to add "interchange cities," without taking into consideration their populations or industries for the purpose of realistically capturing the topology of cities and routes. The IDE/ERIA-GSM ver. 5.0 has 4,266 topologically important cities/ports/airports. Third, it requires fewer data on cities or points compared with the mesh representation, which requires various data for a vast amount of meshes. IDE/ERIA-GSM ver. 5.0 uses 1,715 capital cities to represent the whole region. If the mesh representation (for example, 10km x 10km) is used, we need the data for more than 200,000 meshes for the same region. Although we can reduce the number of meshes by using a larger mesh, "100km x 100km x 2,000 meshes," for instance, it is too rough to capture the geographical features of the region.

The second feature is the inclusion of a realistic modal choice in the model. As explained in subsection 3.4, each firm decides the route and mode of transport considering both costs in time and money.IDE/ERIA-GSM adopts a modal mix that minimizes total transport costs. Take the modal choice between Jakarta, Indonesia and Kunming, China as an example. The textile and garments industry, which incurs relatively small time costs, uses the sea route between Jakarta and Ho Chi Minh City, Vietnam, and then uses the land route to Kunming. On the other hand, the E&E industry, which incurs relatively large time costs, uses the air routes between Jakarta and Kunming, via Bangkok. This kind of modal choice is determined automatically in the simulation model for every combination of origin/destination. The problem in making a realistic modal choice is in calculating the minimal distance between any two cities in consideration of every possible route between them. Fortunately, the Warshall-Floyd Method provided the solution for this problem, which we incorporate into the model.

The third feature is the flexibility of various settings. IDE/ERIA-GSM is programmed in a three-layered hierarchy (world-country-city), and it is possible to control various parameters at any level of the hierarchy. For instance, it is possible to set different parameters for international, intra-national, and inter-industry migration within a city. Actually, the current settings of the simulation utilize this feature, as explained in subsection3.4.

A2. THE MODEL

A2-1. What is Spatial Economics?

Since 1990, the renaissance of theoretical work on the spatial aspects of the economy - such as location and the size has been dubbed as "Spatial Economics" or "New Economic Geography." New waves of the Dixit and Stieglitz model (1977) provided new insights into industrial organization, international trade and economic growth, and also touched on economic geography. Their approach enables to unify the analysis on cities, regions and international trade as set out in Fujita, *et al.* (1999). Furthermore, by using a general equilibrium framework with imperfect competition, New Economic Geography enables us to connect the insights from Location Theories, as explained by Ottaviano and Thisse (2005). This means that a model in New Economic Geography includes the forces that really matter on the spread of economic activities.

Our simulation model is built based on the models in Fujita, *et al.* (1999) as explained below. In order to understand the mechanisms in the model, we need to clarify that the standard setting of these models is to analyze the symmetric distribution of production factors. This setting provides insights into the second factor, which causes the uneven distribution of economic activity by externalities. We are using thorough model, which factors in asymmetric settings in order to capture more realistic results.

Another main difference is the number of regions. Thus, we need to find the shortest routes and/or the lowest transport costs anew in our calculations. We have also refined transport costs in our analysis. The explanations of these two points can be found in other sections. Thus, transport costs in this chapter can be taken to mean the lowest transport costs.

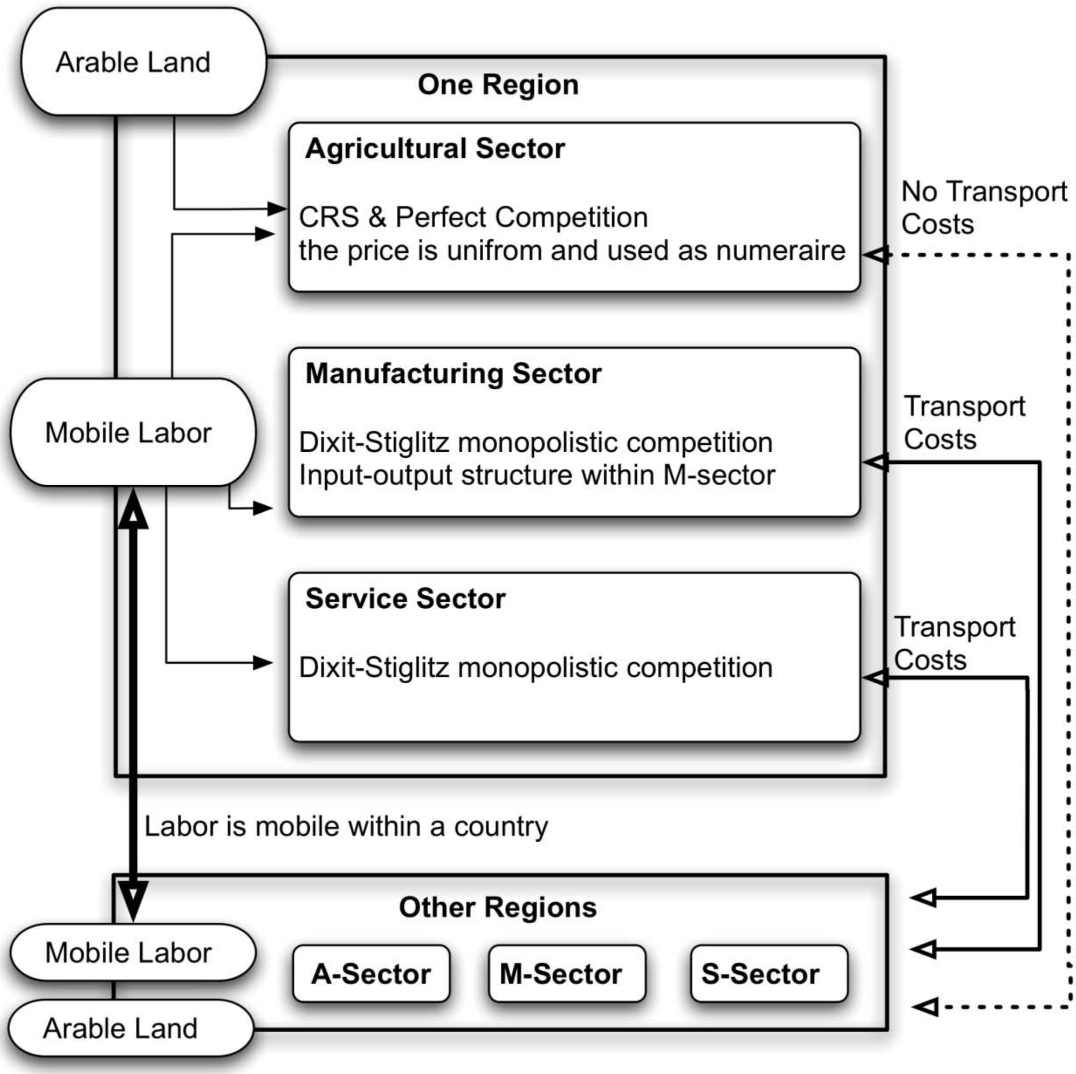
A2-2. The Basic Structure of Our Simulation Model

In our economic model, there are 1,715 locations, indexed by *r*. The basic structure of the model is shown in Figure A5. There are two endowments: labor and arable land. Labor is mobile within a country, but immobile among countries as Figure A5 shows. Arable lands are unequally spread in all regions and owned by all labors of a region.

Everyone in a country is assumed to share the same tastes. Preferences are described by the Cobb-Douglas function of consumption of an agricultural good, a manufacturing aggregate and a services aggregate. The manufacturing aggregate is expressed by a constant elasticity of substitution (CES) function of consumption of individual manufactured goods. Likewise, the services aggregate is expressed by the other CES function of consumption of individual services. This pertains to one mass of varieties of manufactured goods and another mass of varieties of services. The expenditure share of an agricultural good is meant to be so large that the agricultural good is produced in all locations.

There are three sectors: agriculture, manufacturing, and services, and the manufacturing sector is divided into 5 sub-sectors. As Figure A5 shows, the agricultural sector produces a single and homogeneous good using a constant-returns technology under conditions of perfect competition. However, manufacturing firms produce differentiated products among a mass of varieties of manufactured goods using an increasing-returns technology under conditions of monopolistic competition. Similarly, differentiated services among the other mass of varieties of services are produced using an increasing-returns technology under conditions of monopolistic competition. Economies of scale arise at the level of variety; there are no economies of scope or of multiplant operations. Since each firm produces or serves one variety of good, the spread of varieties affects the available size of inputs in each region. Inputs for agricultural products are labor and arable land, inputs for manufactured goods are labor and manufacturing aggregate, and input for services consist only of labor. That is, manufacturing firms use input-output structures, but services do not have such structures. Manufacturing intermediaries are procured from all manufacturing firms. As for labor, this sector does not have sector-specific labor; thus, labor moves to the sectors that offer higher nominal wage rates in the region.

Figure A5: Basic Structure of the Model in Simulation



Source: Authors.

All products in the three sectors are tradable. Transport costs for an agricultural good are assumed to be zero. Note that the price of an agricultural good is chosen as the numeraire, so the price of the good is the same in each region's economy. Transport costs of manufactured goods and services are supposed to be of the iceberg type. That is, if one unit of product is sent from one location to another, only a portion of the unit arrives. Depending on the lost portion, the supplier sets a higher price. The increase in price compared to the manufacturer's price is regarded as the transport cost. Transport costs within the same region are considered to be negligible.

A2-3. The Specifications of Our Simulation Model

Our simulation model is used to determine twelve values of the following regional variables: nominal wage rates in three sectors; land rent, regional income; regional expenditure on manufactured goods, price index of manufactured goods and of services; average real wage rates in three sectors, population share of a location in a country and population shares of a sector in three industries within one location. The dynamics of labor are decided by three differential equations. We start from the specification of the equation, which determines each variable under a given distribution of labor, and then we explain the dynamics of labor selection working within a sector in a location.

A2-3-1. Wage Equation in Agriculture Sector

Nominal wage rates in the agriculture sector are derived from cost minimization in the agriculture sector subject to the production function of the agriculture sector

$$f_A(r) = A_A(r) L_A(r)^{\alpha} F(r)^{1-\alpha}, \tag{2.1}$$

where $A_A(r)$ is the efficiency of production at location *r*; $L_A(r)$ represents the labor inputs of the agriculture sector at location *r*; and $F(r)$ is the area of arable land at location *r*. Since the price of an agricultural good is the same in all locations, nominal wage rates in the agriculture sector in location *r*, which is expressed as $w_A(r)$, are the value of the marginal product for labor input as follows:

$$w_A(r) = A_A(r)\alpha \left(\frac{F(r)}{L_A(r)} \right)^{1-\alpha} \tag{2.2}$$

When used with the production amount, land rents are not used explicitly.

A2-3-2. Regional Income

Regional incomes in the NEG model correspond to regional GDPs in our simulations. Supposing that revenues from land at location *r* belong to households at location *r*, GDP at location *r* is expressed as follows:

$$Y(r) = w_M(r) L_M(r) + f_A(r) + w_S(r) L_S(r) \tag{2.3}$$

where $w_M(r)$ and $w_S(r)$ are, respectively, nominal wage rates in the manufacturing sector[7] and the services sector at location *r*, and $L_M(r)$ and $L_S(r)$ are labor input of the manufacturing sector and the services sector at location *r*, respectively.

A2-3-3. Regional Expenditure on Manufactured Goods in the Manufacturing Sector

Regional expenditure on manufactured goods at location *r*, which is expressed as $E(r)$, consists of household purchases as final consumption and manufacturing firms as intermediary consumption:

$$E(r) = \mu_M Y(r) + \frac{1-\beta}{\beta} w_M(r) L_M(r) \qquad (2.4)$$

where μ_M is the consumption share of expenditures on manufactured goods and β is the input share of labor in output. Thus, the first term in (2.4) shows expenditure on manufactured goods, and the last term in (2.4) expresses the expenditure on manufactured goods as an intermediary purchase since $1-\beta$ shows the share of intermediary purchases in the output of manufacturing firms.

A2-3-4. The Price Index of Manufactured Goods in the Manufacturing Sector

The price index of manufactured goods at location *r* is expressed as follows:

$$G_M(r) = \left[\sum_{s=1}^{R} L_M(s) A_M(r)^{\sigma_M - 1} w_M(s)^{(1-\sigma_M)\beta} G_M(s)^{-\sigma_M(1-\beta)} T_{rs}^{M\,-(\sigma_M-1)} \right]^{\frac{1}{-(\sigma_M-1)}} \qquad (2.5)$$

where T_{rs}^M stands for the iceberg transport costs from location *r* to location *s* for manufactured goods and σ_M is the elasticity of substitution between any two differentiated manufactured goods. To derive (2.5), we substitute the price of manufactured goods and the number of varieties with the minimum cost of purchasing a unit of the manufacturing aggregate. Manufacturing firms at location *r* produce using the composite of labor and manufacturing aggregate. The technology for the composite

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[7] In the actual model, the manufacturing sector is divided into 5 sub-sectors. So, the subscript *M* consists of M_1 to M_5. For simplicity, these subsectors are represented as a group by the "Manufacturing" sector in this description

requirements is the same for all varieties and in all locations and is expressed as a linear function of production quantity with a fixed input requirement. The price of manufactured goods is set as $p_M(r) = w_M(r)^{\beta} G_M(r)^{1-\beta} / A_M(r)$ where $w_M(r)$ is the nominal wage of the manufacturing sector at location *r*, and $G_M(r)$ is the price index of manufactured goods at location *r*. Here, the marginal input requirement is supposed to equal to the price-cost markup. The supply of a variety is decided by the zero-profit condition. The quantity of supply depends on the size of the fixed input requirement. Using the supply of manufactured goods and choosing the size of the fixed input requirement adequately, the number of manufacturing firms at a location is determined by using the relation between the share of β labor input and the demand for manufactured goods. As a first step, the price index of manufactured goods is derived from the expenditure minimization of a constant-elasticity-of-substitution function.

A2-3-5. The Price Index of Services

The price index of services at location *r* is expressed as follows:

$$G_S(r) = \left[\sum_{s=1}^{R} L_S(s) A_S(r)^{\sigma_S - 1} w_S(s)^{-(\sigma_S - 1)} T_{rs}^{S-(\sigma_S - 1)} \right]^{\frac{1}{-(\sigma_S - 1)}} \tag{2.6}$$

where T_{rs}^{S} is the iceberg transport costs from location *r* to location *s*, for services, σ_S is the elasticity of substitution between any two differentiated services. We choose the production units of a firm that equals the inverse of the consumption share of services. Note that the derivation processes are slightly different. Using only labor, the technology is the same for all varieties and in all locations is expressed as a linear function of production quantity with a fixed input requirement. The price of services is set as $p_S(r) = w_S(r) / A_S(r)$ where $w_S(r)$ is the nominal wage of the service sector at location *r* and $A_S(r)$ is the production efficiency of the service sector at location *r*. The number of varieties of services is decided from the equality of wage payment and the expenditure share of labor at location *r*.

A2-3-6. Nominal Wages in the Manufacturing Sector

Nominal wages in the manufacturing sector at location *r* at which firms in each location break even is expressed as follows:

$$w_M(r) = \left[\frac{A_M(r)\beta^{\frac{1}{\sigma_M}} \left[\sum_{s=1}^{R} E(s) {T_{rs}^{M}}^{1-\sigma_M} G_M(s)^{-(1-\sigma_M)} \right]^{\frac{1}{\sigma_M}}}{G_M(r)^{1-\beta}} \right]^{\frac{1}{\beta}}, \qquad (2.7)$$

using the equality of demand and supply on a variety of manufactured goods.

A2-3-7. Nominal Wages in the Service Sector

Similarly, nominal wages in the service sector at location *r* are expressed as follows:

$$w_S(r) = A_S(r) \left[\sum_{s=1}^{R} Y(r) {T_{rs}^{S}}^{1-\sigma_S} G_S(s)^{-(1-\sigma_S)} \right]^{\frac{1}{\sigma_S}}. \qquad (2.8)$$

A2-3-8. The Dynamics of Labor Migration among Sectors in a Region

From (2.1) to (2.8), the variables are decided using a given configuration of labor. Derived regional GDP, nominal wage rates, and price indexes are used to determine labor's decision on a working sector and place. The dynamics for labor to decide on a specific sector within a location is expressed as follows:

$$\dot{\lambda}_I(r) = \gamma_I \left(\frac{\omega_I(r)}{\overline{\omega}(r)} - 1 \right) \lambda_I(r), \quad I \in \{A, M, S\}, \qquad (2.9)$$

where $\dot{\lambda}_I(r)$ is the change in labor (population) share for a sector within a location, γ_I is the parameter used to determine the speed of switching jobs within a location, $\omega_I(r)$ is the real wage rate of any sector at location *r*, and $\overline{\omega}(r)$ is the average real wage rate at location *r*. The population share for a sector within a country is expressed as follows:

$$\lambda_I(r) = \frac{L_I(r)}{L_A(r) + L_M(r) + L_S(r)}.$$

A2-3-9. Dynamics of Labor Migration between Regions

The dynamics of labor migration between regions is expressed as follows:

$$\dot{\lambda}_L(r) = \gamma_L \left(\frac{\omega(r)}{\bar{\omega}_C} - 1 \right) \lambda_L(r) \tag{2.10}$$

where $\dot{\lambda}_L(r)$ is the change in the labor (population) share of a location in a country, γ_L is the parameter for determining the speed of migration between locations, and $\lambda_L(r)$ is the population share of a location in a country. In (2.10), $\omega(r)$ shows the real wage rate of a location and is specified as follows:

$$\omega(r) = \frac{Y(r)/(L_A(r) + L_M(r) + L_S(r))}{G_M(r)^{\mu} G_S(r)^{\nu}},$$

where ν shows the consumption share of services. Furthermore, $\overline{\omega_C}$ in (3.10) shows the average real wage rate at location *r*.

Notice that labor migration is affected by per capita regional GDP and price index. Using two dynamics, (2.9) and (2.10), we decided the spread of labor among locations and the selection of sectors in a location.

A3. PARAMETERS

A3-1. Consumption Share

The Consumption share of consumers by industry is uniformly determined for the entire region in the model. It would be more realistic to change the share by country or region, however at this time we do not have enough reliable consumption data. The consumption share by industry is identical to the GDP share by industry for the entire region as shown in Table A1.

Table A1: Consumption Share by Industry

	Consumption Share
Agriculture	0.08002
Automotive	0.02323
E&E	0.02007
Textile & Garment	0.02429
Food Processing	0.03228
Other Manufacturing	0.17286
Services	0.64697

Source: Authors.

A3-2. Labor Input Share

The labor input share for each industry is uniformly determined for the entire region in the model, according to that of Thailand in the year 2000 as taken from International Input Output table by IDE. We could differentiate the value by country, according to the I-O Table, but we have avoided it intentionally. Due to the fact that the simulation is run for more than 20 years, it is not realistic to fix the labor input share for such a long period of time, especially for a developing country. We do not have the methodology to change the share with confidence, so we decided to use an "average" value, in this case, that of Thailand as a country at the middle-stage of economic development. The labour input share is shown in Table A2. Please note that the labour input share is calculated by 1 – (value of intermediate input share).

Table A2: Labor input share by industry

	Labor Input Share
Agriculture	0.633
Automotive	0.621
E&E	0.633
Textile & Garment	0.654
Food Processing	0.796
Other Manufacturing	0.733
Services	1.000

Source: Authors.

A3-3. Product Differentiation (Sigma)

We adopt the elasticity of substitution for manufacturing sectors from Hummels (1999) and estimate that for services as follows: 5.1 for Food, 8.4 for Textile, 8.8 for

Electronics, 7.1 for Transport, 5.3 for Other manufacturing, and 5.0 for Services. The estimates for the elasticity for services are obtained from the estimation of the usual gravity equation for services trade, including importer's GDP, exporter's GDP, importer's corporate tax, geographical distance between countries, a dummy of free trade agreement, a linguistic commonality dummy, and the colonial dummy as independent variables. The elasticity for services is obtained from the transformation of a coefficient for the corporate tax because it directly changes services' prices. For this estimation, we mainly employ the data from "Organisation for Economic Co-operation and Development (OECD) Statistics on International Trade in Services".[8]

A3-4. Transport Costs

This subsection explains how transport costs between regions are calculated. We first estimate the multinomial logit model on firms' behavior in shipping their products by using firm-level data. Next, we estimate some parameters such as holding time across borders. By employing these estimates in addition to the multinomial logit results, we can specify a transport costas a function for calculating the transport costs between regions. After that, we estimate Policy and Cultural Barriers (PCBs). Finally, we arrive at the transport costs between regions to be used in the simulation.

A3-4-1. Firm-level Transportation Modal Choice

This section estimates the following model in which firms choose a transportation mode from among the following three: air, sea, and land:

$$V_M \equiv U_M + \varepsilon_M = \alpha \cdot Abroad_{ji} + \sum_s \beta_s^M u_s \ln d_{ji} + \sum_k \gamma_k^M v_k + \varepsilon_M , \qquad (3.1)$$

where ε_M denotes unobservable mode characteristics, while $Abroad_{ji}$ takes unity if regions i and j belong to different countries and zero otherwise; d_{ji} is the geographical distance

[8] The use of OECD data has two kinds of shortcomings. The first one is that the services trade statistics in the OECD database are based on balance-of-payments, which primarily covers modes 1 and 2. This implies that our estimate is based on a quite-limited part of services. Second, trade data between non-OECD countries are not widely available. Thus, our use of the OECD database does not include almost all trade among our GSM sample countries. In other words, our estimation is valid only when we assume that the elasticity of substitution in services is almost same between developed countries (OECD countries) and developing countries (GSM countries).

between regions i and j. u_s is industry dummy. When ε_M is independent and follows the identical type I extreme value distribution across modes, the probability that the firm chooses mode M is given by:

$$\Pr\left(Y_i = M \mid Abroad_{ji}, \ln d_{ji}\right) = \frac{e^{U_M}}{1 + e^{U_{Air}} + e^{U_{Truck}} + e^{U_{Sea}}}$$

$$\text{for M = Air, Sea, Truck.} \qquad (3.2)$$

The coefficients are estimated by maximum likelihood procedures. In other words, a multinomial logit (MNL) model is used to estimate the probability that a firm chooses one of the three transportation modes: air, sea, and truck. In the following, truck is a base mode.

The geographical distance affects firms' modal choices through not only a per-unit physical charge for shipments but also shipping time costs due to the nature of demand for shipments. Transportation time has a larger influence on the price of products that decay rapidly over time; for example, time-sensitive products include perishable goods (fresh vegetables), new information goods (newspapers) and specialized intermediate inputs (parts for Just In Time production). A lengthy shipping time may lead to a complete loss of commercial opportunity for products and their components, which is more likely to be significant for goods with a rapid product life cycle and high demand volatility. Given the value of timeliness in selling a product, time costs are small for timely shipments (short transport time). In other words, time costs will be the highest for shipping by sea and the lowest for shipping by air. On the other hand, the physical transport costs will be highest for air and the lowest for sea. Truck transport will have a medium level of costs comparing air and sea transport. As a result, the coefficient for the geographical distance represents the (*average*) difference in the sum of the above two kinds of transport costs (time and physical transportation) per distance between truck and air/sea.

Furthermore, three points are noteworthy. Firstly, as mentioned above, shipping time costs obviously differ among industries. Such differences among industries are controlled by introducing the intercepts of industry dummy variables (u_s) with distance variables. Secondly, the level of port infrastructure is obviously different among countries. This yields different impacts of the aforementioned two kinds of transport costs among shipping countries. To control such differences among countries in which reporting firms locate, we introduce country dummy variables (v_k). Lastly, qualitative differences between intra- and international transactions are controlled by introducing a binary variable (*Abroad*), taking unity if transactions are international ones and zero if otherwise.

Our main data source is the Establishment Survey on Innovation and Production Network for selected manufacturing firms in four countries in East Asia for 2008 and 2009 (Table A3). The four countries covered in the survey were Indonesia, the Philippines, Thailand and Vietnam. The sample population is restricted to selected manufacturing hubs in each country (JABODETABEK area, i.e., Jakarta, Bogor, Depok, Tangerang, and Bekasi, for Indonesia; CALABARZON area, i.e., Cavite, Laguna, Batangas, Rizal, and Quezon, for the Philippines; Greater Bangkok area for Thailand; and Hanoi area and Ho Chi Minh City for Vietnam). This dataset includes information on the mode of transport that each firm chooses in supplying its main product and sourcing its main intermediate inputs. From there, the products' origin and destination can be also identified. In our analysis, however, the combination between origin and destination is restricted to one accessible by land transportation.

Let's take a brief look at a firms' choice of transportation mode. Table A3 reports the combination of trading partners in our dataset. There are three noteworthy points here. Firstly, as mentioned above, firms in the Philippines and Indonesia are restricted to the ones with intranational transactions, although most of the firms in the other countries in our dataset are also engaged in intranational transactions. Secondly, there are a relatively large number of Vietnamese firms trading with China. Third, Table A4 shows the transportation mode by the location of firms, indicating that most of our sample firms tend to choose truck. Intuitively, this may be consistent with the first fact that most of the firms trade domestically.

Table A3: The Combination of Trading Partners in the Dataset

	Indonesia	Philippines	Thailand	Vietnam
Cambodia				1
China			6	52
Hong Kong				5
Indonesia	449			
Malaysia				2
Myanmar			1	
Philippines		254		
Singapore				2
Thailand			151	7
Vietnam				382

Source: The Establishment Survey on Innovation and Production Network.

Table A4: The Chosen Transportation Mode by Location of Firms

	Indonesia	Philippines	Thailand	Vietnam
Air	19	7	2	11
Sea	17	11	6	51
Truck	413	236	150	389

Source: The Establishment Survey on Innovation and Production Network.

The MNL result is provided in Table A5. There are three noteworthy points. Firstly, in trading with partners abroad, firms are likely to choose air or sea. Secondly, the coefficients for distance are estimated to be significantly positive, indicating that the larger the distance between trading partners, the more likely the firms are to choose air or sea. Specifically, this result implies that the two kinds of transport costs per distance are lower in air and sea than in truck. Third, the intercept term of distance in machinery industries has a significantly positive coefficient for air. This result may indicate the large amount of time costs in the machinery industry.

Table A5: Result of Multinomial Logit Analysis

Truck as a basis	Air			Sea		
	Coef.		S.D.	Coef.		S.D.
Abroad	3.573	***	0.736	2.915	***	0.428
ln Distance (Food as a basis)	0.444	***	0.170	1.268	***	0.167
*Textiles	0.104		0.126	-0.151		0.094
*Machineries	0.300	**	0.135	0.112		0.086
*Automobile	0.201		0.174	-0.104		0.154
*Others	0.148		0.106	-0.068		0.066
Constant	-5.711	***	0.760	-9.621	***	0.993
Country dummy: Indonesia as a basis						
Philippines	-0.336		0.470	0.364		0.446
Thailand	-2.239	**	0.904	-0.794		0.624
Vietnam	-2.483	***	0.683	-0.437		0.419
Statistics						
Observations			1,312			
Pseudo R-squared			0.3407			
Log likelihood			-321.5			

*Note:****, **, and * show 1%, 5%, and 10% significance, respectively.

Lastly, we conduct some simulations to get a more intuitive picture on the transportation modal choice. Specifically, employing our estimators, we calculate the distance between trading partners in which the two transportation modes become indifferent in terms of their probability. For example, suppose that a firm in the food industry in Bangkok trades with a partner located in another city. Our calculation reveals how far the city is from Bangkok if the probability of choosing air/sea is equal to that of choosing truck. In the calculation, we set Abroad to the value of one, i.e., international transactions. The results are reported in Table A6. In Bangkok, for example, firms in the machinery industry choose air or sea if their trading partners are located more than 400 km away. On the other hand, firms in the food industry basically only use truck.

Table A6: Probability Equivalent Distance with Truck (Kilometer): Domestic and International Transportation from Bangkok

	Domestic		International	
	Air	Sea	Air	Sea
Food	60,300,000	3,699	19,254	371
Textiles	2,022,900	11,218	2,968	825
Machineries	44,009	1,899	361	229
Automobile	225,394	7,693	886	628
Others	684,540	5,909	1,634	520

Source: Authors' calculation based on the MNL result in Table A5.

A3-4-2. The Estimation of Speed and Holding Time

In this section, we estimate some parameters necessary for calculating transport costs in Section A3-4-3. Specifically, we estimate transportation speed and holding time. Our strategy for estimating those is very straightforward and simple. We regress the following equation:

$$Time_{ij}^{M} = \rho_0 + \rho_1\, Abroad_{ij}^{M} + \rho_2\, Distance_{ij}^{M} + \varepsilon_{ij}^{M}.$$

The coefficients ρ_0^M and ρ_1^M represent mode M's holding time in domestic transportation and its additional time in international transportation, respectively. The inverse of ρ_2^M indicates the average transportation speed in mode M. We use the same data as in the previous section. However, the estimation in this section does not require us to restrict our sample to firms with transactions between regions accessible by truck.

The OLS regression results are reported in Table A7. Although some of the holding time coefficients, i.e., ρ_0^M and ρ_1^M, are estimated as being insignificant, their magnitude is reasonable enough. As for the distance coefficient, its magnitude in sea and truck is reasonable, but that in air is disappointing and too far from the intuitive speed, say, around 800 km/h. One possible reason is that "time" in our dataset always includes the land transportation time to airport. This will cause the air transportation speed to be understated.

Table A7: Results of OLS Regression: Holding Time and Transportation Speed

	Air	Sea	Truck
Estimation Results			
Abroad	9.010	11.671	10.979***
	[8.350]	[13.320]	[2.440]
Distance	0.018*	0.068***	0.026***
	[0.010]	[0.018]	[0.002]
Constant	6.123	3.301	2.245***
	[7.940]	[13.099]	[0.739]
Holding Time (Hours)			
Domestic	9.010	11.671	10.979
International	15.133	14.972	13.224
Speed (Kilometers/Hour)	55.556	14.706	38.462
Observations	51	34	754
R-squared	0.1225	0.3698	0.1772

Notes: ***, **, and * show 1%, 5%, and 10% significance, respectively. A dependent variable is transportation time.

A3-4-3. Specifying Transport Cost Function

We specify a simple linear transport cost function, which consists of physical transport costs and time costs. We assume the behavior of the representative firm for each industry as follows:

- A representative firm in the machinery industry will make a choice between truck and air transport and choose the mode with the higher probability in (3.2).
- A representative firm in the other industries will make a choice between truck and sea transport and choose the mode with the higher probability in (3.2).

Specifically, the transport cost in industry s by mode M between regions i and j is assumed to be expressed as:

$$C_{ij}^{s,M} = \underbrace{\left[\left(\frac{dist_{ij}}{Speed_M}\right) + \left(1 - Abroad_{ij}\right) \times ttrans_M^{Dom} + Abroad_{ij} \times ttrans_M^{Intl}\right]}_{Total\ \ Transport\ \ Time} \times ctime_s$$
$$+ \underbrace{dist_{ij} \times cdist_M}_{Physical\ \ Transport\ \ Cost} + \underbrace{\left(1 - Abroad_{ij}\right) \times ctrans_M^{Dom} + Abroad_{ij} \times ctrans_M^{Intl}}_{Physical\ \ Transshipment\ \ Cost} \quad , (3.3)$$

where $dist_{ij}$ is the travel distance between regions i and j, $speed_M$ is travel speed per one hour by mode M, $cdist_M$ is physical travel cost per one kilometer by mode M, and $ctime_s$ is time cost per one hour perceived by firms in industry s. The parameters $ttrans_M^{Dom}$ and

$ctrans_M^{Dom}$ are the holding time and cost, respectively, for domestic transshipment at ports or airports. Similarly, $ttrans_M^{Intl}$ and $ctrans_M^{Intl}$ are the holding time and cost, respectively, for international transshipment at borders, ports, or airports.

The parameters in the transport function are determined as follows. Firstly, by using the parameters obtained from the results of Section 3.4.2 and borrowing some parameters from the ASEAN Logistics Network Map 2008 by JETRO, we set some of the parameters in the transport function as in Table A8. Notice that our estimates of $Speed_{\mathrm{Air}}$ and $ttrans_{\mathrm{Air}}^{Intl}$ in Table A8 went beyond our expectations. Thus, we set $Speed_{\mathrm{Air}}$ at the usual level (800 km/h) and we made $ttrans_{\mathrm{Air}}^{Intl}$ consistent with the ASEAN Logistics Network Map 2008.

Secondly, after substituting those parameters for the equation (3.3) under domestic transportation, $C_{ij}^{s,M}$ becomes a function of $dist_{ij}$ and $ctime_s$. To meet the above-mentioned assumptions on firms' behavior, we add the following conditions:

Table A8: Parameters from Estimation and ASEAN Logistics Network Map 2008

	Truck	Sea	Air	Unit	Source
$cdist_M$	1	0.24	45.2	US$/km	Map
$Speed_M$	38.5	14.7	800	km/hour	Table 5
$ttrans_M^{Dom}$	0	11.671	9.01	hours	Table 5
$ttrans_M^{Intl}$	13.224	14.972	12.813	hours	Table 5 & Map
$ctrans_M^{Dom}$	0	190	690	US$	Map
$ctrans_M^{Intl}$	500	N.A.	N.A.	US$	Map

Notes: Costs are for a 20-foot container. The parameter $ctrans_M^{Dom}$ is assumed to be half of the sum of border costs and transshipment costs in international transport from Bangkok to Hanoi. The parameters $ttrans_M^{Dom}$ and $ctrans_M^{Dom}$ for sea and air include one-time loading at the origin and one-time unloading at the destination.

- The transport cost using trucks becomes the lowest among the three modes when $dist_{ij}$ is zero for each industry.
- If the transport cost is depicted as a function of $dist_{ij}$, a line is drawn by the function where truck intersects with it at only one point for air and sea for the machinery industry, and at only one point for the other industries with all non-negative $dist_{ij}$.

Under the probability equivalent (domestic) distances in Table A6, the transport cost $C^{s,Air}$ should be equal to $C^{s,Truck}$ in machineries, and $C^{s,Sea}$ should be equal to $C^{s,Truck}$ in the other industries. By using this equality, we calculate $ctime_s$ for each industry as in

Table A9. The functions meet the above conditions.

Table A9: Time Costs per One Hour by Industry perceived by Firms (*ctimes*): US$/hour

	Food	Textile	Machineries	Automobile	Others
$ctime_s$	15.7	17.2	1803.3	16.9	16.5

Source: Authors' calculation.

Thirdly, by substituting these parameters again, including $ctime_s$ and $ctrans_{\mathrm{Truck}}^{Intl}$ under international transportation, $C_{ij}^{s,Truck}$ becomes a function of only $dist_{ij}$, and $C_{ij}^{s,M}$ for air and sea becomes a function of $dist_{ij}$ and $ctrans_{\mathrm{M}}^{Intl}$. Then by using the probability equivalent (international) distances in Table A6again, we can calculate $ctrans_{\mathrm{Air}}^{Intl}$ and $ctrans_{\mathrm{Sea}}^{Intl}$ for each industry. Lastly, $ctrans_{\mathrm{Sea}}^{Intl}$ is uniquely set as the average among the other industries. These parameter values are reported in Table A10. The functions obtained also fulfill the above conditions.

Table A10: Costs for Transshipment in International Transport ($ctrans_M^{Intl}$): US$

	Truck	Sea	Air
$ctrans_M^{Intl}$	500	504.2	1380.1

Source: Authors' calculation.

Additionally, $ttrans^{Dom}$ and speed of railway are estimated in Section 3.4.2 by the same dataset and the same estimating equation. Due to the minimal usage of railways in international transactions in the dataset, we adopted the same value for the time and cost of international transactions as in trucks from Table A11. Finally, we set the cost per km as half the value of road transport[9].

[9] The ASEAN Logistics Network Map 2008 offers an example where the cost per km for railway is 0.85 times that of trucks. However, it is only for the case when we ship a quantity that can be loaded onto a truck. Railway has much larger economies of scale than trucks in terms of shipping volume so some industries such as coal haulage incur much lower cost per ton kilometer. Therefore, we need to deduct this from the value in the ASEAN Logistics Network Map 2008.

Table A11: Parameters for Rail Transport

	Railway	Unit	Source
$cdist_M$	0.5	US$/km	Half of Truck
$Speed_M$	19.1	km/hour	Estimation
$ttrans_M^{Dom}$	2.733	hours	Estimation
$ttrans_M^{Intl}$	13.224	hours	Same as Truck
$ctrans_M^{Intl}$	500	US$	Same as Truck

Source: Authors' calculation.

A3-4-4. Policy and Cultural Barriers (PCBs)

We explain how to quantify our measure of Policy and Cultural Barriers (PCBs). So far, we estimate several components of transport costs including cost for Transportation time, cost for transshipment time (holding time), physical transport cost, and physical transshipment cost. These costs are collectively called "GSM transport cost" in this subsection. However, some important components of the broadly defined "transport costs" remain excluded in the model. Their examples include tariffs, non-tariff trade barriers (e.g. quota restriction), procedures before shipping, costs arising from political situations or some certain risks, cost arising from preference differences and cost arising from commercial custom differences. Those costs are called PCBs, whose estimation method is explained below. To estimate the PCBs, we employ the "log odds ratio approach", which is initiated by Head and Mayer (2000), in order to avoid the problem of data availability in the estimation of the model similar to our GSM model.

The theoretical model is the same as the GSM model, except that it assumes no inputs of consumption goods in the manufacturing sector and identical technology among regions. Thus we state that the ratio of country j's imports from country i in industry s (X_{ij}^s) to those from country j (X_{jj}^s) can be expressed as:

$$\ln\left(\frac{X_{ij}^s}{X_{jj}^s}\right) = \ln\left(\frac{n_i^s}{n_j^s}\right) - \sigma^s \ln\left(\frac{w_i^s}{w_j^s}\right) - (\sigma^s - 1)\ln\left(\frac{T_{ij}^s}{T_{jj}^s}\right)$$

The number of firms in industry s in country j is denoted by n_j^s. Denoting the total value of production industry s in country r and the quantity produced by each firm as M^s_r and q^s, respectively, we obtain $M^s_r = q^s p^s_r n^s_r$. This is based on the assumption of identical technology across firms and countries as noted above. Following Head and Mayer (2000), this relationship is used to eliminate a number of firms from the estimation equation since the appropriate data is unavailable. Thus, the above equation can be written as:

$$\ln\left(\frac{X_{ij}^s}{X_{jj}^s}\right) - \ln\left(\frac{M_i^s}{M_j^s}\right) = -\sigma^s \ln\left(\frac{w_i^s}{w_j^s}\right) - (\sigma^s - 1)\ln\left(\frac{T_{ij}^s}{T_{jj}^s}\right) \qquad (3.4)$$

In order to avoid a simultaneity problem between X^s_{ij} and M^s_j, as in Head and Mayer (2000), we move M^s_j to the LHS. The iceberg trade costs are further specified as follows:

$$\ln T_{ij}^s = \ln PCB_j^s + \alpha \ln GSMtransportcost_{ij}^s \qquad (3.5)$$

As a proxy for wages, we simply use GDP per capita.

By capturing PCB through coefficients for importer dummy variables, the substitution of (3.9) into (3.8) gives us the following estimation equation:

$$\ln\left(\frac{X_{ij}^s}{X_{jj}^s}\right) = \beta_1 \ln\left(\frac{GDPpercapita_i}{GDPpercapita_j}\right) + \beta_2 \ln\left(\frac{GSMtransportcost_{ij}^s}{GSMtransportcost_{jj}^s}\right)$$
$$+\gamma_1 Thailand_j + \gamma_2 Philippines_j + \gamma_3 Malaysia_j + \gamma_4 Indonesia_j$$
$$+\delta_1 Food_s + \delta_2 Textile_s + \delta_3 Machinery_s + \delta_4 Automobile_s$$
$$+\delta_5 Others_s + \epsilon_{ij}^s \qquad (3.6)$$

GDP per capita$_j$ indicates Country *j*'s GDP per capita, *GSM transport cost$_{ij}^s$* stands for GSM transport costs between Countries *i* and *j* in Industry *s*, *Country$_j$* is a dummy variable taking unity if *j* is *Country*, and *Industry$_s$* is a dummy variable taking unity if *s* is *Industry*. To keep enough degrees of freedom, we try to obtain the country-by-industry estimators on PCB by introducing importer dummy and industry dummy variables separately, rather than introducing importer-by-industry dummy variables. Furthermore, due to the data limitation, we estimate this equation only for Thailand, the Philippines, Malaysia, and Indonesia. The data on GDP per capita are drawn from the World Development Indicator (World Bank). The dependent variable is constructed by employing the Asian International Input-Output Table published by the Institute of Developing Economies (IDE).

The OLS estimation results are reported in Table A12. In order to obtain only the estimates of PCB, we need to conduct some manipulation because PCBs are included in a logarithmic form and the importer dummy coefficients include the elasticity of substitution. For example, the tariff equivalent of Thai PCBs in the Machinery Industry can be calculated as $\exp\{(\gamma_1+\delta_3)\}/(1-\sigma^s)\}-1$. Their elasticity is estimated in Section 3.3. The estimates for all sample countries are reported in Table A13. In order to obtain the estimates for the other GSM sample countries, we regress days for customs clearance in importing (Days), of which data is drawn from the "Doing Business Indicator" in the World Bank, on the above estimates of PCBs. Specifically, we estimate the following equation: $(\gamma_i + \delta_s) = a + b\ ln\text{Days}_i + u_s + u_{is}$. Using the estimates of a, b, industry dummy coefficients and substituting Days for each of the remaining countries, we can get the predicted values for dependent variables for all countries. As a result, tariff equivalents of PCBs in the other GSM countries are provided as in Table A14.

Table A12: Estimation Results: Log Odds Ratio Equation

	Coef.	Std. Err.	
GDP per capita ratio	0.432	0.204	**
GSM Transport cost ratio	-0.134	0.136	
Malaysia	1.791	0.450	***
Philippines	0.856	0.423	**
Thailand	1.584	0.395	***
Textile	0.630	0.421	
Machinery	3.198	0.421	***
Automobile	0.045	0.421	
Others	1.373	0.421	***
Constant	-6.319	0.469	***
Adjusted R-squared	0.5433		
Observations	80		

*Note:**, **, and * show 1%, 5%, and 10 % significant, respectively.

Table A13: Tariff Equivalents of PCBs (%)

	Food	Textile	Machinery	Automobile	Others
Indonesia	162.9	42.2	105.0	326.0	189.4
Malaysia	108.6	18.6	69.4	202.0	108.5
Philippines	127.9	27.1	82.2	244.5	136.3
Thailand	144.6	34.4	93.2	282.6	161.2

Source: Authors' estimation.

Table A14: Tariff Equivalents of PCBs for the Remaining Countries (%)

	Food	Textile	Machinery	Automobile	Others
Bangladesh	184.7	51.3	118.9	379.5	223.9
Brunei	132.3	29.1	85.1	254.4	142.8
Cambodia	188.6	52.9	121.4	389.5	230.4
China	152.2	37.6	98.1	300.5	172.8
Hong Kong	123.4	25.2	79.3	234.3	129.7
India	204.5	59.5	131.4	430.1	256.5
Japan	91.7	11.0	58.0	166.2	84.8
Korea	97.6	13.7	62.0	178.6	93.0
Laos	185.9	51.8	119.7	382.6	225.9
Myanmar	207.9	60.9	133.5	438.9	262.1
Singapore	34.2	0.0	17.8	56.7	11.5
Vietnam	148.5	36.0	95.7	291.7	167.1

Source: Authors' estimation.

A3-4-5. Obtaining the Transport Costs for the Simulation

Now we can obtain the transport costs between regions by industry to be used in the simulation, using the transport cost function, several parameters, and PCBs.

Firstly, we choose the economically shortest routes between regions by industry, adopting the transport cost function to all possible routes between regions. The shortest routes and utilized modes may differ among industries, even in the same regional pairs.

Next, we calculate the transport costs between regions by industry. This cost is defined as the monetary cost when shipping products by a 20-foot container. Due to the fact that transport costs in this simulation are the ratio associated with the value of products being shipped, we need to transform the costs to fit in the simulation. Except for the electronics and electric appliance industries, we adopt the average values in a 20-foot container from the preliminary survey results of the FY2010 ERIA-GSM Project, as in Table A15. As for the electronics and electric appliance industries, we assumed firms ship 2 tons per 20-foot container. The value in 20-foot container for the electronics and electric appliance industries is calculated independently as 376,611 USD based on the trade value and volume data in Thailand. The reason why we adopt another value for those industries is the fact that some electronics firms answered in the survey that they selected mainly air transport, and that they did not utilize containers. This implies the existence of a sample selection bias in this survey for those industries.

Finally, we transform the transport costs associated with the value of the products. PCBs are multiplied by the factors shown in the equation (3.5) when the products are imported to corresponding countries.

Table A15: Average value in 20-foot container (USD)

	# of Sample	Average Value
Automobile	6	89,691
E & E	11	92,746
Garment and Textile	10	34,560
Agro and Food processing	9	37,233
Others	8	59,450
Total	44	

Source: Preliminary survey results of FY2010 ERIA-GSM Project.

A3-5. Technology

As proposed in subsection 3.2, the wage equation includes the variable *A*, which represents technology, or the productivity of each region and set by industry. *A* is calibrated at the beginning of the simulation to match the expected wage rate from the wage equation and the actual wage rate. It is a kind of "residual," including everything that affects the wage level, other than the variables explicitly included in the wage equation.

A is basically fixed though the simulation period, but can be changed exogenously as described in subsection 3.7.

A3-6. Speed of Adjustment

The parameters for labor mobility is set out on three levels, namely, international labor mobility (γ_N), intranational (or intercity) labor mobility (γ_C), and inter industry labor mobility (γ_I) within a region. What does γ mean? If γ=0.1, it means that a country/region/industrywith two times higher real wages than the average attracts 10 percent labor inflow a year.

Set γ_N =0. This means that the international migration of labor is prohibited. Although this looks like a rather extreme assumption, it is reasonable enough, taking into account the fact that most ASEAN countries strictly control incoming foreign labor.

Set γ_C=0.02. This means that a region with two times higher real wages than the national average induces 2 percent labor inflow a year.

Set γ_I=0.05, too. This means that an industrial sector with two times higher real wages than the average in the region induces 5 percent labor inflow from other industrial sectors a year.

A3-7. Exogenous Growth Parameters

One of the important topics in constructing a realistic simulation model is how to incorporate economic growth into the NEG model. These models are known as NEGG (new economic geography and growth) models, such as in Baldwin and Forslid (2000). The authors incorporated the capital production sector (knowledge) into the typical CP model, and found that periphery industries are relatively better off by agglomeration, although they benefit from the overall growth of the economy in some cases as well. However, the NEGG model is an analytical model that is not easy to apply to realistic simulations.

Without incorporating a "growth engine" sector in the model, there are two sources of endogenous growth in the IDE-GSM model, assuming the technology is different in each region and fixed throughout the simulation period. The first source of growth is migration from a rural area, in which the level of technology is generally low, to an urban area, in which the level of technology is generally high. This causes an increase in output in the urban areas that is greater than the decrease in output in the rural areas. The second source of growth is inter-industry migration within a region, from an industry in which the level of technology is generally low, to another industry in which the level of technology is generally high. This causes an increase in output in the region. These two sources of growth are naturally extracted by the population dynamics, from lower wage region/industry to higher wage region/industry.

In addition to the endogenous growth, there are two external sources of economic growth. One is exogenous population growth, given the predicted rate of population growth provided by the United Nation Population Division (Table A16). This contributes to the endogenous economic growth.

The other source of growth is that technological progress coming into the region externally. It is possible to change the level of technology, A of each region arbitrarily. However, it is difficult to set a “proper” rate of technological progress exogenously. Therefore, the technology variable is fixed through the simulation at this moment.

Table A16: Expected Population Growth Rate (2005-2030)

Malaysia	1.47%	China	0.51%
Thailand	0.49%	Hong Kong	0.56%
Singapore	0.92%	Macao	0.84%
Cambodia	1.69%	India	1.29%
Lao PDR	1.56%	Bangladesh	1.80%
Myanmar	0.74%	Indonesia	1.00%
Vietnam	1.18%	Philippines	1.66%
Brunei	1.74%		

Source: United Nation Population Division.

A4. DATA

A4-1. Regional Data

A4-1-1. Items

The regional data consists of the following items:

- **Capital City:** The name of the city that represents a region, or the name of the port, airport or railway station.
- **Latitude:** Latitude of the city, port, airport or railway station.
- **Longitude:** Longitude of the city, port, airport or railway station.
- **Region:** The name of the region represented by “Capital City.” Normally, the name of the sub-national region.
- **Country:** The name of the country to which “Region” belongs
- **Habitable:** take 1 if “Capital City” has population and economic activity, otherwise take 0. The “Capital Cities” that take the value 0 is a port, airport, railway station or city at a point of land.
- **Population:** Total population of “Region.”

- **Employment:** The number of employees of the “Region.” However, this is identical to “Population” at this moment and not loaded into the model.
- **Employment A, M1 to M5, and S:** The number of employees of the “Region” by economic sector. A is agriculture. M1 is the automotive sector. M2 is the E&E sector. M3 is the textile and garment sector. M4 is the food-processing sector. M5 is other manufacturing sectors. S is the service sector. However, these are not loaded into the model and most of them are proportional to GDP by sector.
- **GDP:** nominal GRDP of “Region.”
- **GDP A, M1 to M5, and S:** nominal GRDP of “Region” by economic sector. The meaning of A, M1 to M5, and S are identical to those of “Employment A, M1 to M5, and S”
- **Area:** The area of arable rand in sq. km of “Region.”
- **Mining:** It takes 1 if the “GDP A” of the “Region” in largely comes from mining. Otherwise take 0.

A4-1-2. Data Source

Bangladesh:

The data is based on three-sectors (primary, manufacturing, and service) GDP data by state from various sources. Next, the manufacturing sector has been divided into five subsectors using value-added data from industrial censuses conducted in 2002 and 2003.

Cambodia:

Cambodia’s GDP data is available on the national level. The Japan International Cooperation Agency (JICA) estimated provincial income and employed labor in three industries, namely, primary, secondary, and tertiary industries based on Cambodia’s socioeconomic survey iCSES03-05j, conducted between 2003 and 2005. Provincial gross value added by industries was calculated by applying the ratio of income to national GDP. Nationwide M1 to M5 was calculated based on annual statistics published by the appropriate authorities and used as a coefficient to divide provincial GDP of secondary industries into five sectors.

China, Hong Kong, and Macau:

The GDP of the subdivisions of China's provinces was collected from the provincial statistical yearbook. Industrial GDP was derived using GDP to calculate the share of the number of employees in each industry at the provincial level. These derived values were considered as industrial GDP at the provincial level. Population and arable land were obtained from the provincial yearbook. When the GDP of the subdivisions is not published, provincial industrial GDP is divided by the share of the population in each subdivisions.

Data on Hong Kong's GDP and employment were obtained from the 2003 annual survey of industrial production and the 2003 social and economic trends in Hong Kong. Data used for the simulation was derived using the same procedure used for China's data.

The 2005 statistics yearbook was used to obtain relevant data for Macau. However, note that only employment data in the textile industry was available. The data used for simulations was derived in the same way as the data for China.

India:

Population data was derived from the website http://www.censusindia.gov.in/. Population and area size data at the district level was derived from the Population Census 2001. District GDP data was taken from the "District GDP of India, 2005-06" by INDICUS. The manufacturing GDP for five sectors was compiled from the value added by industry in the Indian annual survey of industry (ASI).

Japan:

The administrative division of Japan follows prefectures, cities and towns. The geographical unit employed in GSM is the prefecture level. The number of prefectures is 47. While there have been a number of mergers of municipalities recently, the boundaries of the prefectures remain unaffected. Although the Japan Standardized Industrial Classification (JSIC) is different from ISIC, it is possible to compile the data to accommodate the use of GSM. Prefectural GDP is available in official statistics at the 30-sector level. For detailed industrial classification, *Kogyo-tokei* (industrial statistics from Japan's Ministry of Economy, Trade, and Industry) is utilized to obtain the GDP at a finer industrial level.

Korea:

The administrative division of Korea is arranged into eight provinces (*do*), one special autonomous province (*teukbyeol jachido*), six metropolitan cities (*gwangyeoksi*) and one special city (*teukbyeolsi*). The geographical unit employed in GSM is the provincial level comprising the above-mentioned 16 regions. The Korean Standard Industrial Classification (KSIC) generally corresponds to ISIC rev. 3 and has 17 sectors, 60 divisions, 160 groups and 333 classes. Regional GDP data is available from *Gross Regional Domestic Product and Expenditure*, and this data is officially provided. For a detailed classification at the sector level, the industrial composition is obtained from *Survey of Business Activities and Report on Mining and Manufacturing Survey*.

Lao PDR:

Provincial-level industrial statistics for Laos were obtained from several sources. Population and value-added figures for each province were based mostly on unpublished annual provincial reports on the implementation of their socioeconomic plan. The provincial values added are divided at their source among three industries, namely, agriculture, industry, and services. The value added for the industries of each province was then used to create the value added for the five sectors by splitting them according to the provincial share of labor in M1 to M5. The labor share in M1 to M5 for each province was calculated from the nationwide business establishment survey in 2005.

Malaysia:

Malaysia's data is based on three-sectors (primary, manufacturing, and service) and GDP data broken down by state has been taken from various sources. The manufacturing sector is divided into five subsectors using value-added data from the establishment survey provided by the Department of Statistics.

Myanmar:

Data consists of a national-level and three-sector GDP data and income per capita by state is based on the Report of 1997: Household Income and Expenditure Survey, published by the Central Statistical Organization. The manufacturing sector was divided into five subsectors using data from Table 6.11 in Myat Thein's (2004) Economic Development of Myanmar.

Singapore:

We used sectoral GDP data from the economic survey of Singapore. The transport sector was divided into automotive and others using the data provided by Singstat.

Chinese Taipei:

The latest administrative division of Chinese Taipei, implemented from December 2010, consists of 5 special municipalities, 3 provincial cities and 14 counties. However, the data for 2005 is from 4 special municipalities, 3 provincial cities and 18 counties, and GSM follows this administrative division. The industrial classification is completely consistent with ISIC. Since regional GDP is not available from the national authorities, provincial GDP by industry must be compiled from other statistical sources. For agriculture, *Report of the Agricultural and Fishery Census* is utilized. Except for the agricultural sector, *Report of the Industrial, Commercial, and Service Census* covers the value added in detailed classification.

Thailand:

The data for Thailand was produced in the same way as the data for China. The data was collected from the manufacturing industrial survey for Bangkok and the statistical report of Changwat. Data from the following provinces were also obtained: Chonburi(1999); Ayutthaya, Chaiyaphum, Chanthaburi, Chiangrai, Chumphon, Krabi, Lopburi, Mae Hong Son, Mukudahan, Nan, Songkhla, Yala, and Yasothon(2000); NakhonPanom(2002); NakhonRatchasima(2005); other provinces (2001). Some provincial data did not separate automotive industries from transport equipment, but the data on transport equipment was also used for automobiles. A small number of establishments in specific industries might be included in the group "others."

Vietnam:

Vietnam's data is based on three-sectors (primary, manufacturing, and service) GDP data by state from various sources. The manufacturing sector was divided into five subsectors using value-added data from an establishment survey.

A4-1-3.Basic Statistics

The statistics summary for 1,654 regions is provided in Table A17.

Table A17: Summary Statistics of Regions

	Mean	Median	Min	Max
Population (person)	1,881,000	1,232,000	260	27,980,000
GDP (mil. USD)	5,719.0	807.6	0.3346	845,000
Arable Land (sq. km)	5,746	2,381	1	417,800

Figures A6 to A7 are the distribution of population and economic activity in 2005. Figures A8 to A11 show GDP density per square km by industry.

Figure A6: Nominal GDP per capita by region (2005)

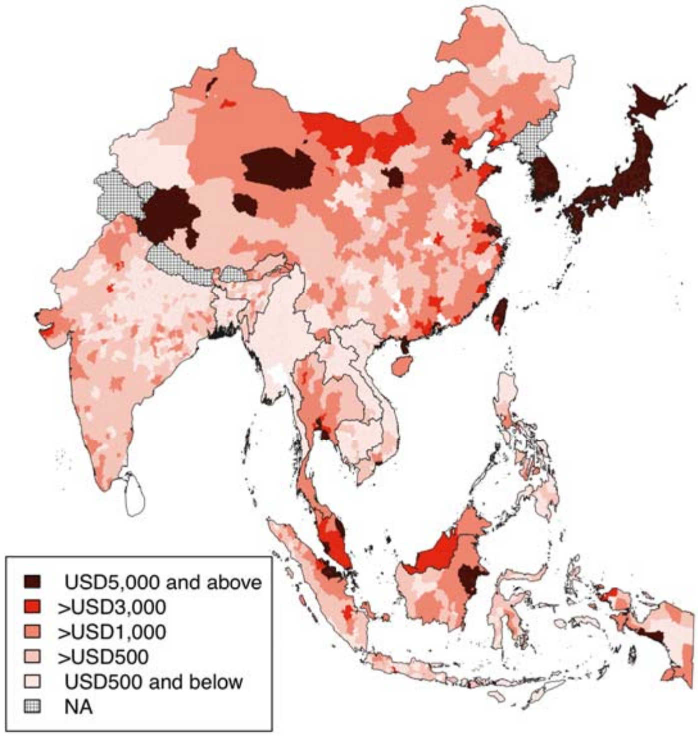


Figure A7: GDP Density (2005)

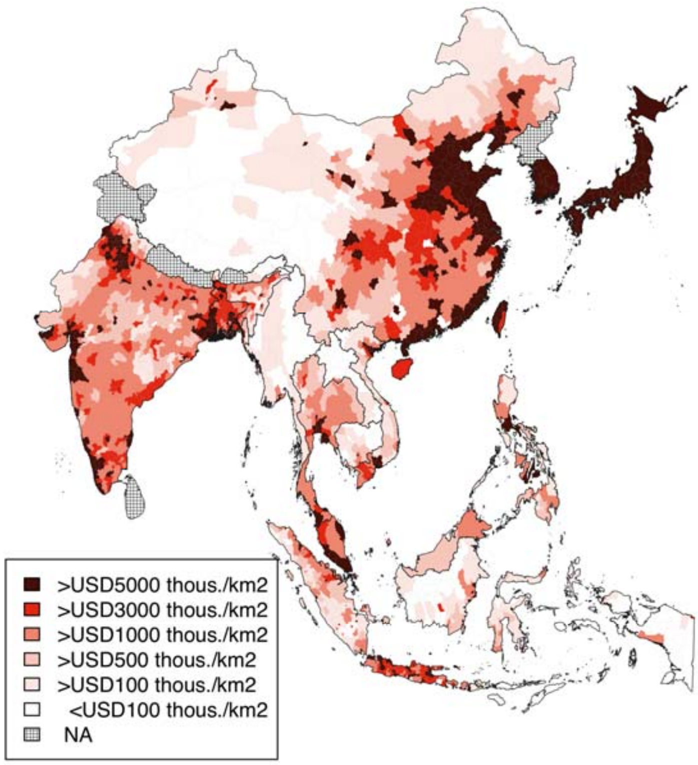


Figure A8: GDP Density (2005): Automotive Industry

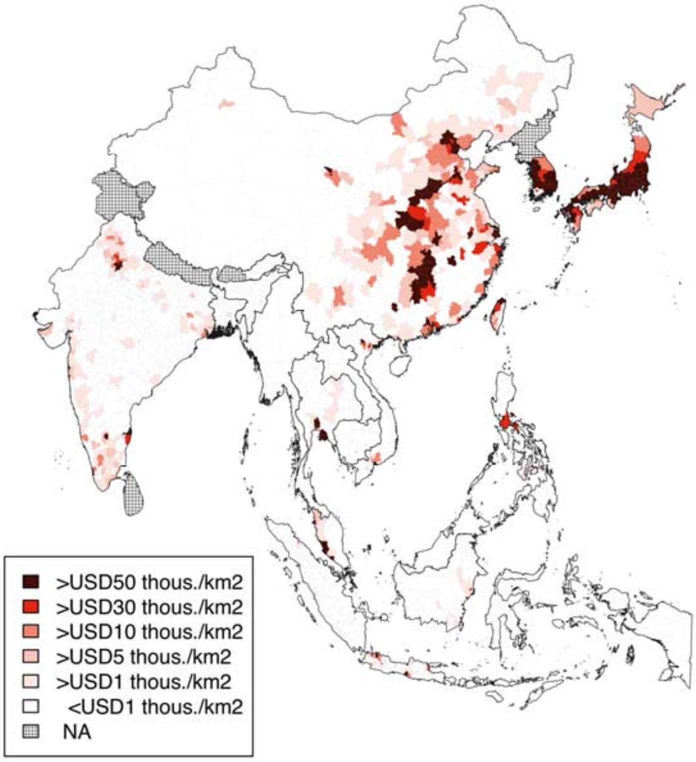


Figure A9: GDP Density (2005): Electronics Industry

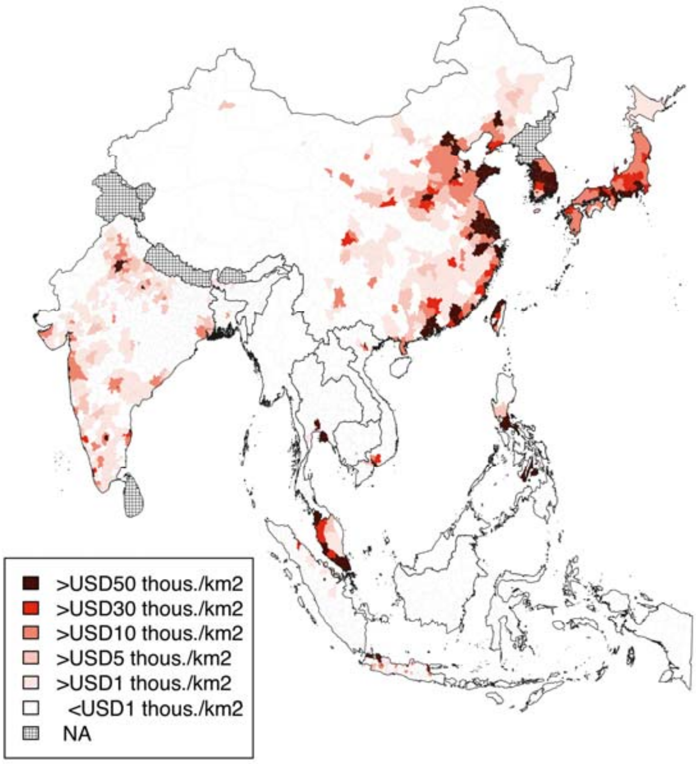
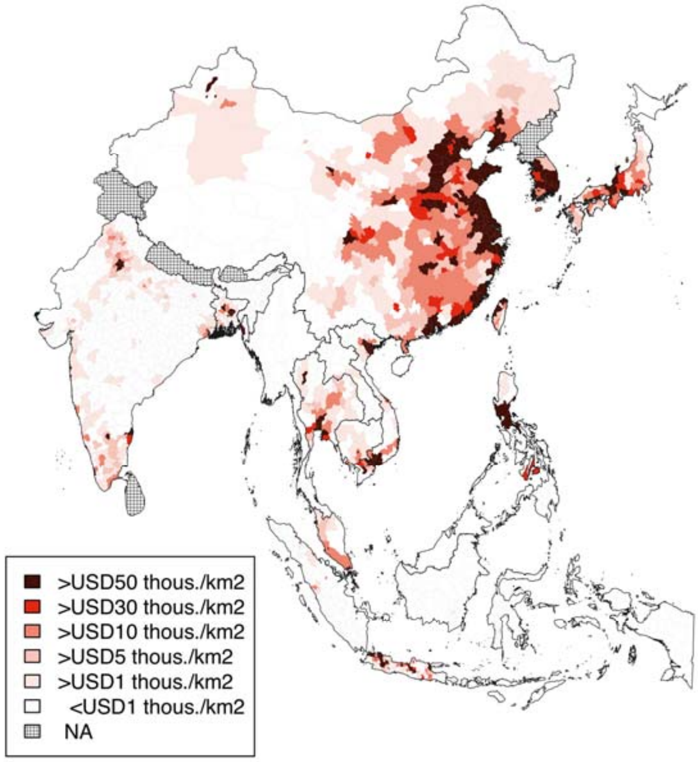


Figure A10: GDP Density (2005): Garment & Textile Industry



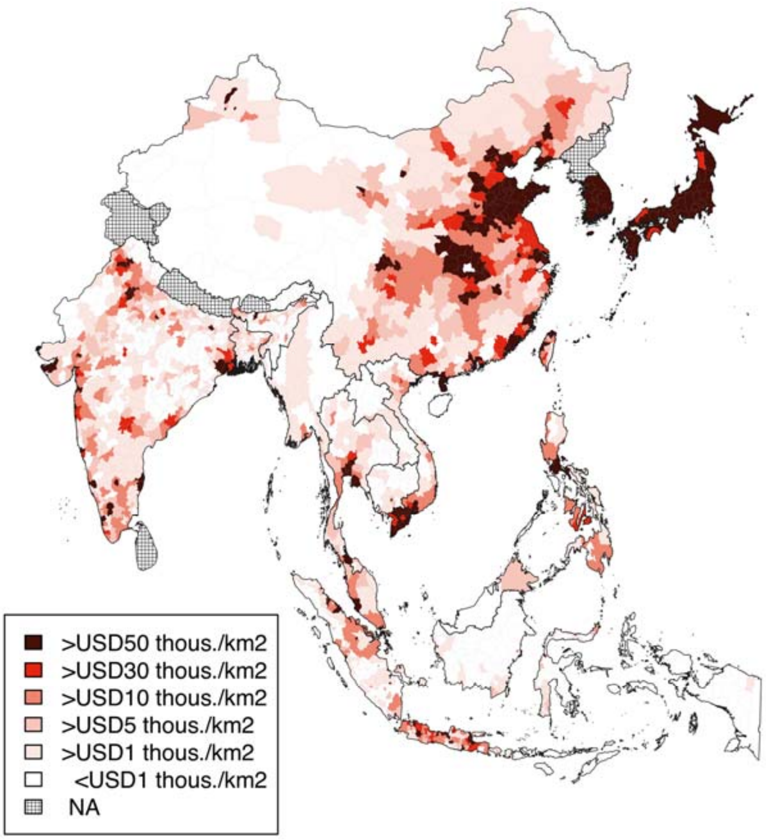


Figure A11: GDP Density (2005): Food Processing Industry

A4-2. Logistic Data

A4-2-1. Data Items

At this moment, the route A to B and the route B to Aare treated as identical. If both are included in the data, the latter is used. The Logistic Data consists of following items:

- **Start:** the name of "Capital City" at the start point of the route.
- **End:** the name of "Capital City" at the end point of the route.
- **Name:** The name of the route. Take "NA" if not available or unknown.
- **Distance:** The distance of the route. If it takes -1, the slant distance between "Start" and "End" cities are automatically calculated.
- **Speed:** The speed of the vehicle running on the route. If it takes -1, the speed of the vehicle is set based on "Quality" and "Mode" of transport, according to the table included in the model (See Table A18).
- **Border:** It takes 1 if the land/railway route goes through the national border(s). In case of air and sea routes, take 1 if "Start" and "End" cities belong different country, i.e., the route is international. Otherwise takes 0.
- **Overhead:** It takes -1 normally. If "Border" then 1, the overhead TIME going through the national border is specified. Or If "Mode" is not 0 (land transport), some overhead TIME of transshipment is set, according to Table A19, typically.
- **Loading:** It takes -1 normally. If "Border" then 1, the money costs going through the national border is specified. Or If "Mode" then it is not 0 (land transport), some overhead money costs of transshipment is set, according to Table A19, typically.
- **Mode:** 0 means land transport. 1 means sea transport. 2 means air transport. 3 means railway transport.
- **Quality:** It takes 1 to 4, from lower to higher quality of the route. It affects the speed of the vehicle going through the route (See Table A18). -1 equivalents to the default value, 3, at this moment. In case of the land transport, "Quality" means the quality of the road, literally. In case of other mode of transport, it is affected by various factors, like the frequency of the transport service.

Table A18: Default Speed of Vehicle by Mode and Route quality(km/h)

Quality\Mode	0 (land)	1(sea)	2(air)	3(railway)
1	4.0	4.0	400	10
2	19.25	7.35	400	19.1*
3	38.5*	14.7*	800*	40
4	60.0	29.4	1200	100

Note: * is the typically used value.
Source: Authors.

Table A19: Overhead Time and Loading Costs by mode of transport

		Overhead (hours)	Loading
Land	Domestic	0	0
	International	13.224	500
Sea	Domestic	11.671	190
	International	14.972	504.2
Air	Domestic	9.01	287.5
	International	12.813	575.6
Rail	Domestic	2.733	0
	International	13.224	500

Source: Authors.

A4-2-2. Data Source

The land routes between cities are based mainly on the “Asian Highway” database of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). The actual road distance between cities is used; if road distances are not available, slant distance is employed. Air and sea routes are compiled from the data set assembled by the team of the Logistics Institute - Asia Pacific (TLIAP), and 535 sea routes and 332 air routes are selectively included in the model at this moment. The railway data is adopted from various sources, such as maps and the official websites of railway companies.

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