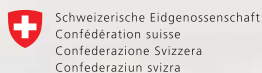


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## Policy Note 4

# Maximizing Opportunities from Global Supply Chains: an Agenda for Reform



Swiss Confederation

Federal Department of Economic Affairs,  
Education and Research EAER  
State Secretariat for Economic Affairs SECO



Kingdom of the Netherlands



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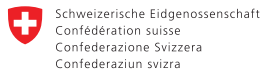
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# Policy Note 4

## Maximizing Opportunities from Global Supply Chains: an Agenda for Reform

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Federal Department of Economic Affairs,  
Education and Research EAER  
State Secretariat for Economic Affairs SECO



Kingdom of the Netherlands



# Abstract

**Maximizing Opportunities for Global Supply Chains: an Agenda for Reform**

The pattern of global trade in goods has changed substantially over the last two decades with a rapid increase in trade in intermediate inputs, such as parts and components, and a significant increase in the role of services inputs. Indonesia can benefit greatly from increasing its participation in global supply chains. With GDP expected to grow 5-6 percent annually, Indonesia will by 2030 have an additional 90 million middle class consumers, while 70 percent of the population will be of working age. At present, Indonesia is not reaping gains from economic globalization to the fullest extent due to weak integration into global supply chains. Better integration would allow Indonesia to further diversify its economy. To do so, however, Indonesia needs to improve its infrastructure, the business environment and education levels in order to better participate in, and reap the benefits from, global supply chains.

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The pattern of global trade in goods has changed substantially over the last two decades with a rapid increase in trade in intermediate inputs, such as parts and components, and a significant increase in the role of services inputs (see policy note III of this series). The rapid increase in the parts and components trade has come about due to technological development and innovations in telecommunications and transportation. These developments have enabled firms to fragment their production processes into smaller segments in which components of production or assembly can be relocated to different places. Trade and investment liberalization in many developing countries has also made it possible for other countries to relocate there. In addition, these production blocks have a tendency to cluster together in close proximity to take advantage of the agglomeration arising from a pool of workers with specialized skills, the availability of specialized inputs and services, and technological spillovers. Product fragmentation depends to a great degree on services that connect production

## Chapter 1

# Introduction



centers and ensure that they interact efficiently. These services include transportation, design, quality control, insurance, R&D, telecommunications and other services.

**Product fragmentation becomes important for a developing country, for several reasons.**

By joining global production networks, a country does not need to have competencies in all aspects of production but can focus on the mastery of just one facet of the production process. A developing country can begin with production of more labor-intensive components and then gradually move on to more capital and knowledge intensive activities. Rather than trying to create or reproduce entire production chains, firms can first build competency in specialized segments of the production chain as a stepping stone to more complex products, and ultimately to further economic development. The success of several East Asian countries in joining the electronics and automotive global production networks shows how specialization and joining production networks fostered economic development. These examples highlight some of the factors necessary for a country to successfully join production networks. These factors are (i) reliable workers, (ii) a business-friendly environment, and (iii) proximity to an advanced technology nation willing to offshore some of its factories.

**Indonesia can significantly benefit from increasing its participation in the global supply chain.**

With GDP expected to grow 5-6 percent annually, Indonesia will by 2030 have additional 90 million middle class consumers. It can also expect to reap a demographic dividend as 70 percent of the population will be working age. These new consumers will provide a lucrative market opportunity for consumer services, agriculture and fisheries products, resources and education. As Indonesian firms join global supply chains, they can achieve efficiency gains, making it easier in turn to serve a burgeoning domestic market.

**However, Indonesia, as Southeast Asia's largest economy, is not presently reaping gains from economic globalization to the fullest extent due to its weak integration into global supply chains.**

While Indonesia is relatively open to trade in goods with low tariffs, ranking for instance 17<sup>th</sup> of 132 countries in the Market Access sub-index of the World Economic Forum's 2012 Enabling Trade Index, it lags neighboring countries in the extent to which it participates in two of the most important global supply chains: electronics parts & components, and auto parts. Indonesia's exports of electronics parts and components was the lowest of the ASEAN-5 countries (Indonesia, Malaysia, Philippines, Thailand and Singapore). The value of Indonesia's electronics parts and components exports was only \$1.8 billion Indonesia's exports of auto parts was around \$5 billion, lower than Thailand \$13.7 billion and Singapore \$7.5 billion, but higher than the Philippines \$3.3 billion and Malaysia \$3 billion.

**This policy note discusses global supply chains and how Indonesian firms can benefit from the significant opportunities they entail.**

The first part will discuss global supply chains and what we know so far. It includes several success stories from countries being involved in global production networks, the importance and disadvantages of integrating into global supply chains. The following section discusses exactly how global supply chains can benefit Indonesian firms and how they can seize this opportunity. This section also discusses the determinants of successful involvement in the global supply chain and the reasons why Indonesia has been left behind. A possible agenda for policy reforms concludes the note.





A **production network** is the nexus of interconnected functions and operations through which goods and services are produced, distributed and consumed. A global production network takes place when an industry can fragment their production processes into smaller segments (production centers), thus enabling components of productions or assembly to be relocated in several countries through a vertically integrated production process. Global supply chains are also known as “international production sharing” (Ng and Yeats, 2001), “distributed manufacturing” or “dispersed manufacturing” (Cheng and Kierzkowski, 2001). The global supply chain enables developing countries to join supply chains instead of building their own.

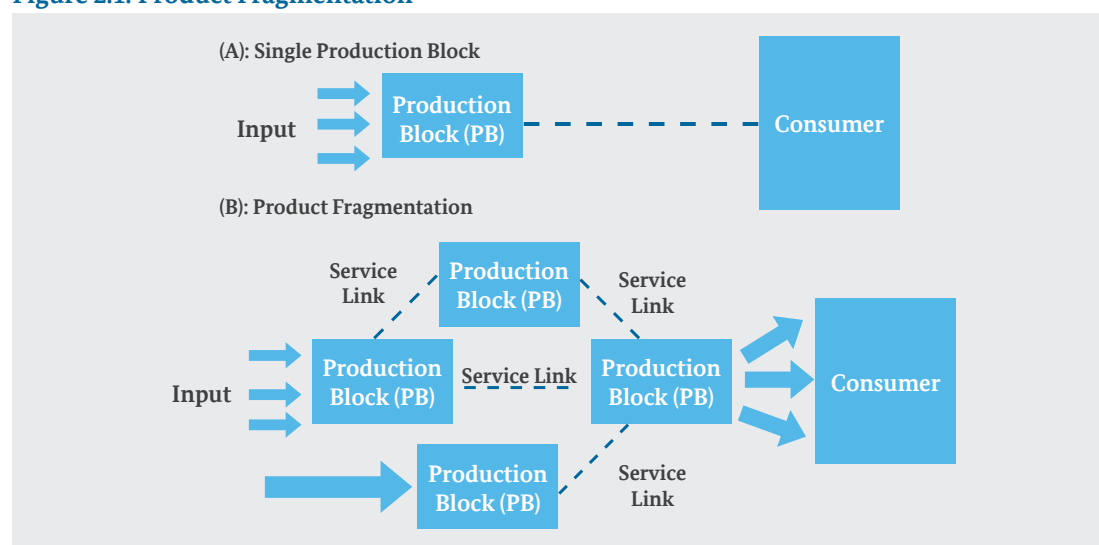
## Chapter 2

# Global Supply Chains: What We Know So Far

**Several patterns of interdependence between production centers and service sector links can be envisaged.** As shown in the Figure 2.1 in the initial formulation, all production processes were conducted in one place as a single integrated production center. However, technological development, together with innovations in telecommunications and transportation, gave rise to the development of fragmented production processes which consist of more than one production center. These production centers are not independent, but are connected through service sector links such as transportation, design, quality control, insurance, R&D, telecommunications and other services. One possibility is that an output from one production center can become an input for another production center, while a more complex relationship among production centers exists where there is a simultaneous operation of production centers and the output of each of these is assembled in the final assembly or production center. The degree of fragmentation can be measured by the number of stages or production centers. As the degree of fragmentation increases, so does the importance of service sector links.

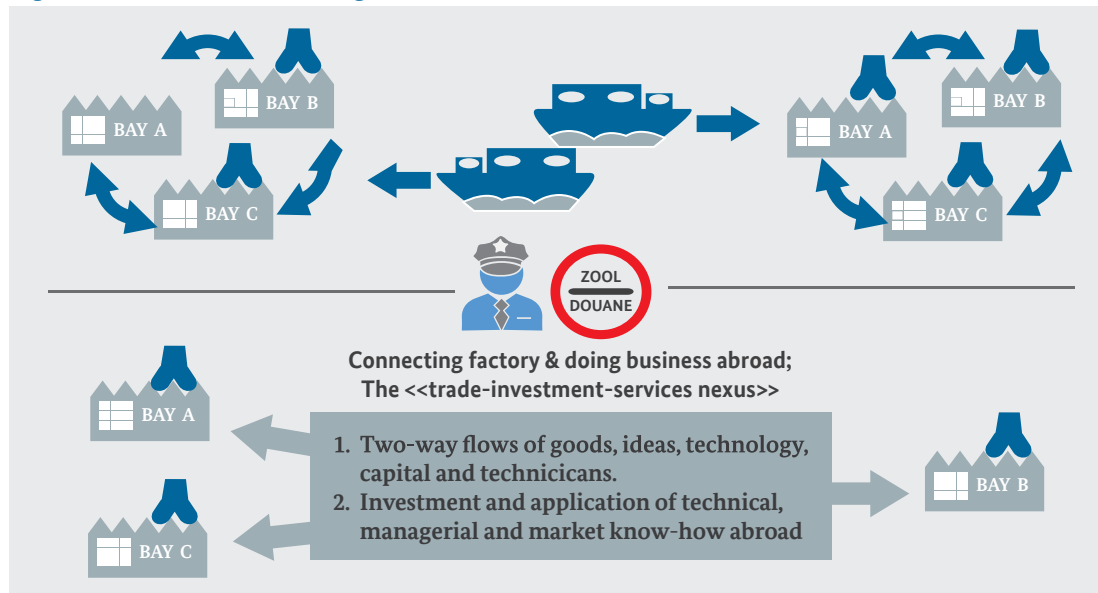
**An example of the increasing role of global supply chains is the significant increase in trade in parts and components over the last two decades.** This rapid growth was made possible by technological development and innovations in telecommunications and transportation, referred to as the ‘2<sup>nd</sup> unbundling’ by Baldwin (2011). In the first unbundling of production, which happened in the 20<sup>th</sup> century (the top panel of Figure 2.2), goods were made in one nation, put on ocean cargo and shipped to other countries. While in the 2<sup>nd</sup> unbundling, the two-way flows of goods, people, training and investment now took place across borders rather than just within factors (and thus within borders) as depicted in the bottom panel of Figure 2.2. This creates a Trade – Investment Nexus, where there is an intertwining of (i) Trade in parts and components, (ii) International investment in production facilities and associated material and non-material inputs and (iii) Strong demand for a range of services to coordinate dispersed production processes.

**Figure 2.1. Product Fragmentation**



Source: Jones and Kierzkowski(1990)

Figure 2.2. Second Unbundling of Production



Source: Baldwin (2011)

**Production fragmentation can be very important for a developing country for several reasons.** First, fragmentation and component specialization eliminates the need to gain competency in all aspects of production and allows emerging countries to enter into the network of global production sharing by focusing on the mastery of just one facet of the production process. Instead of building a supply chain, a developing country can industrialize by joining one. In some industries, there is no need to have a one-nation supply chain. No nation today produces all the parts and necessary components to build aircrafts, cars and electronics. Some countries are ‘headquarters-economies’ and others are ‘factory-economies’. Second, given the relative factor endowments, a country may begin by developing competency in the more labor-intensive components of complex products and gradually move on to more capital and knowledge intensive activities.

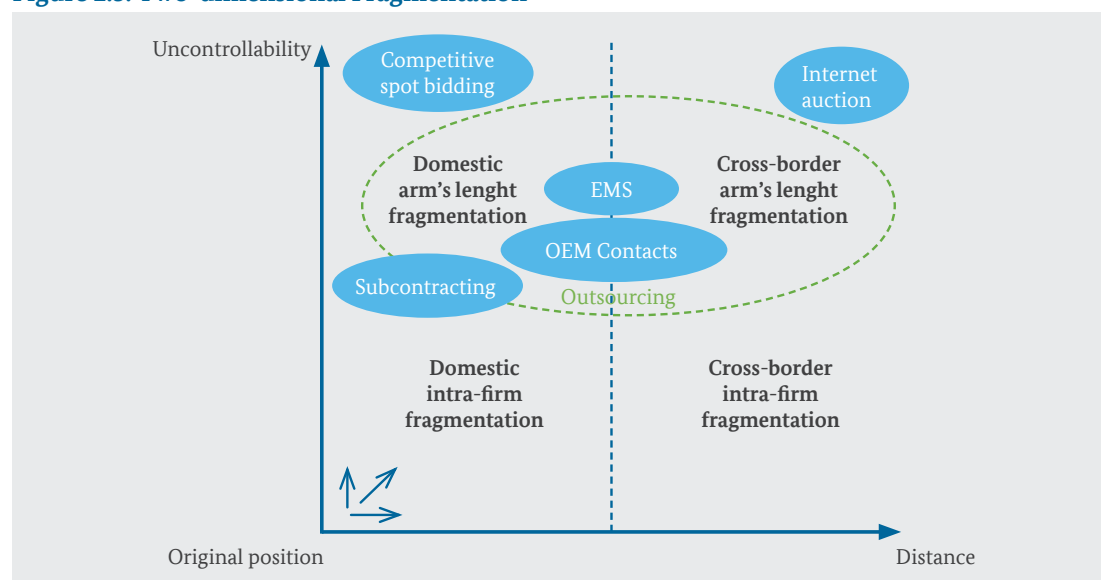
Third, by focusing on comparative advantage, it increases industrial competitiveness as well as employment, output and wages. For example, producers of labor-intensive consumer products in high-wage countries can increase output and employment and raise workers’ wages by giving up home production of the most labor-intensive components of those products. Fourth, when production is fully integrated, access to scale economies is limited by the volume of the end-product. With fragmentation, volume will rise whenever firms in one country supply not only their own industry, but foreign ones as well, thereby expanding the potential gains from scale. Rather than trying to create or reproduce entire production chains, firms can first build competency in specialized segments of the production chain as a stepping stone to more complex products and ultimately economic development.

**The intensity of product fragmentation depends on four factors** (Lall et al., 2004). First, *the technical “divisibility” of the production process*: not all production processes can be divided into

separate stages. Some industries have discrete stages of production and components with different scale, skill and technology requirements which enable the stages to be separated by geography and by manufacturer. Electronics and automotive manufacturing are examples of these industries. On the other hand, the chemical industry, for example, has a continuous production process<sup>1</sup> and therefore is not economically separable. Second, *the factor intensity of the process*: the relocation of a production process to a low-wage site is economical only if it is labor intensive and the reduced cost from labor is greater than the transportation and coordination costs. Third, *the technological complexity of each process*: it is not always economical to relocate a labor intensive process to a low-wage site unless the technology accompanying this process is simple and stable enough to be conducted by low-wage countries. Fourth, *the value-to-weight ratio of the product*: if the parts and components are light and of high value then the relocation of the process to a further location in order to exploit cost differences may still be economical. If the parts and components are heavy and have low value then it may be economic to encourage agglomeration.

Production networks in East Asia have been formed through a sophisticated combination of intra-firm and arm's length transactions as some fragmented production processes have been outsourced, leading to the development of specialized industrial clusters (Kimura and Ando, 2005). There is a wide variety of fragmentation types in the production networks in East Asia. Data from foreign affiliates of Japanese firms collected by Japan's Ministry of Economy, Trade & Industry provides useful information: For machinery industries, there is a clear-cut pattern of intra-firm and arm's length transactions. Transactions between Japanese firms are predominantly intra-firm while those in the host country's market are mostly arm's length.

Figure 2.3. Two-dimensional Fragmentation



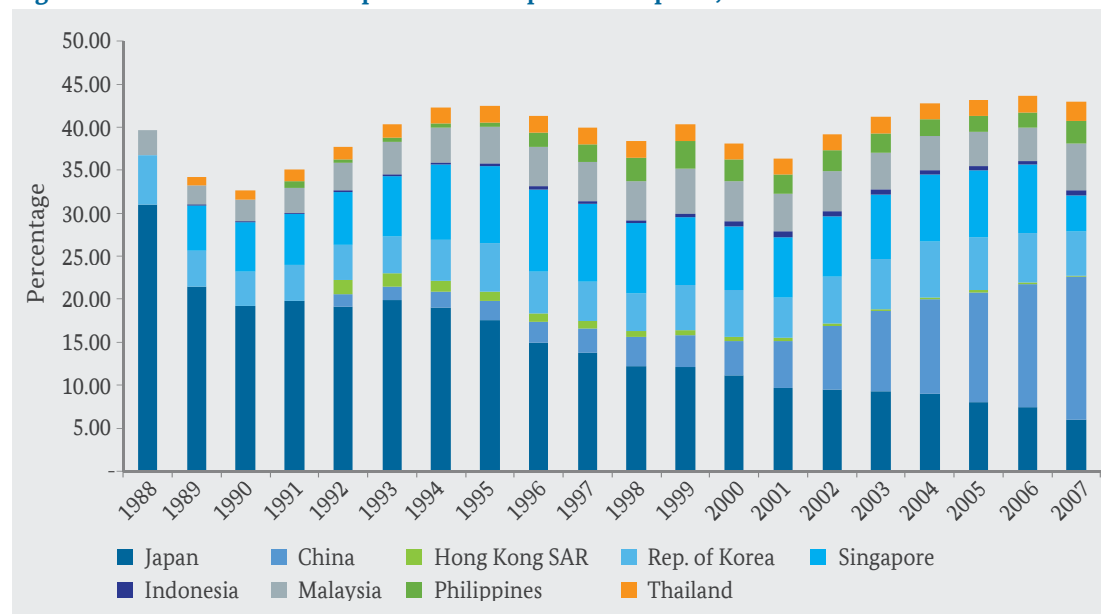
Source: Kimura and Ando (2005).

1 Continuous production is called a continuous process, or a continuous flow process, because the materials, either dry bulk or fluids that are being processed are continuously in motion, undergoing chemical reactions or subject to mechanical or heat treatment.

**East Asia is a favorable choice for US and Japanese electronics firms wishing to relocate production stages to lower-labor-cost countries.** The first factor is the East Asian experience of having developed a significant consumer electronics industry during the late 1960s. This experience equipped East Asian countries with basic technological capacities. In addition, East Asian countries provide abundant low cost labor which is relatively skilled. East Asia also provides a large consumer market, making it easier for firms to achieve economies of scale. Compared to other developing countries, East Asian countries have relatively stable political and economic conditions with a more open environment for foreign investment, along with export oriented policies and low tariff barriers. These factors are supported by global development in transportation and communications, such as cheaper and more reliable shipping and air freight, as well as lower cost and more reliable internet and international phone connections. This lowers the service link costs which are crucial to the development of production networks. Figure 2.4 depicts the share of global electronics parts and components exports for several East Asian countries, among which, China's export share has been increasing over time while Japan's has been declining. Indonesia's export share is the smallest, indicating that Indonesia lags behind other East Asian countries in terms of global production network participation.

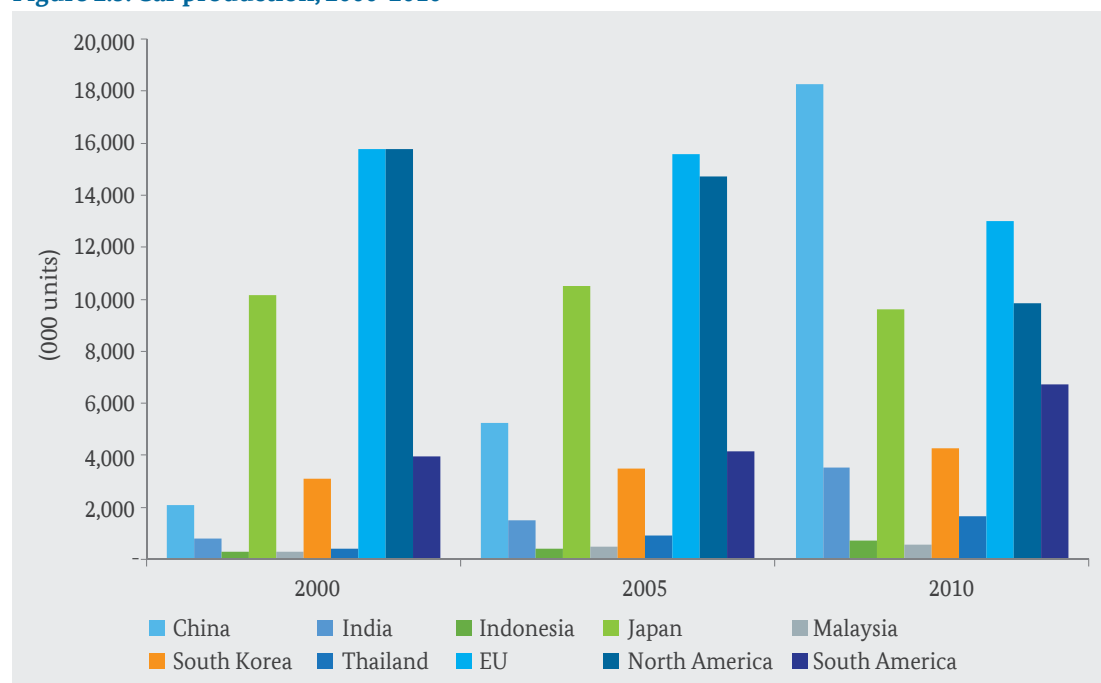
**In contrast to the electronics industry, East Asia is a far less significant player in the automotive industry (this includes auto parts and final assembly industry), except for Japan and China in recent years.** The automotive industry has an extremely concentrated firm structure, with a small number of giant companies dominating global production. The top 20 manufacturers contribute almost 90 percent of global automotive production. General Motors (GM) dominated until 2008 when Toyota replaced GM as top producer. Of the 20 top manufacturers, six are Japanese. Germany, the US and China are each represented by three firms, two are French, while Indian, Italy and Korea are each represented by a single firm. The pattern of global auto production experienced a change as shown in Figure 2.5. Before 2000, production was dominated by North America and Europe. In 2000, China began production, contributing more than 2 million units per annum. This reduced the dominance of Germany, the US and Japan. In 2000, Canada, South Korea and Malaysia experienced higher production growth compared to other countries. This reflects the spread of technology from the US and Japan to surrounding countries. However, after the Asian financial crisis in 1998, the growth in auto production slowed down, with only 2.6 percent annual growth in 2000-2005 and even lower growth in 2005-2010. Asian countries still experienced positive and relatively high growth, however. In 2005, Asian countries contributed 30 percent of global production of autos, with the highest growth occurring in China and Thailand (22 percent each). In 2010, the Asian share of global auto production increased further to almost 50 percent, with China and Japan the main contributors.

**Figure 2.4. Share of electronic parts and components exports, 1988-2007**



Source: UN-COMTRADE.

**Figure 2.5. Car production, 2000-2010**



Source: UN-COMTRADE.



### Box 2.1. Success stories from the Electronics Industry in East Asia

#### Success Story from the Electronics Industry in East Asia

Chinese manufacturing has undergone remarkable development as it has successfully upgraded its Information and Communication Technology (ICT) industry, marking a shift from assembly of imported goods to the manufacture of high-tech intermediate goods (Amighini, 2005). As a result, import dependence has declined and the domestic value added of exports has increased from under 20% in 1993 and 1994 to 35% in the late 1990s. Vertical specialization in its ICT industry has enabled China to rapidly diversify its exports of consumption goods and switch its comparative advantages across the production process from unskilled, labor-intensive assembly to more advanced processing activities. Although China put in place a constrained open door policy for foreign direct investment, companies benefited from the low-cost, technically proficient workforce provided by the universities and many public sector technology institutes. China started with unskilled labor-intensive sectors but quickly began to develop ambitious plans to upgrade its industry to skilled-labor intensive sectors and even technology intensive sectors. Chinese firms began by sub-contracting for medium-sized firms from Hong Kong, gradually becoming part of the overseas Chinese network, based on family and clan linkages in many countries.

Singapore, with its flexible and effective location for Contract Electronics Manufacturing (CEM), became a hub of ASEAN countries and Newly Industrialized Economies (NIEs) in the global electronics production network. Previously, outsourcing took place in the form of Original Equipment Manufacturing (OEM), where local companies produce products with exact specifications from the buyer (usually large international companies). Then the products are marketed through the buyer's own distributional channel under their own brand name. OEM helps newcomers with technology transfer and to attain economies of scale. The buyers also provide advice on capital equipment, training for management, engineers and technicians. Meanwhile, CEM firms are usually large-scale firms, with highly automated manufacturing production systems and are responsible for process innovation, leaving product design and marketing to MNCs. With a highly automated manufacturing process, CEM requires a very large capital investment and skilled engineers, as well as control over a supply chain of specialist materials and equipment suppliers. Singapore, with its advantageous geographic location became an important location for CEM, especially for new products and prototype designs. The Singapore-Johor-Riau Growth Triangle serves to facilitate integration of high-end activities in high-cost Singapore with low-end activities in low-cost Johor and Riau (Vind and Fold, 2007).

South Korea, with its major conglomerates (*chaebol*) and heavy government intervention, has maintained its export share at around 5-6 percent during the period 1995-2007. The *chaebol* have been able to develop sufficient industrial strength and market knowledge to make and execute strategic decisions independently of government. The government has provided macroeconomic stability for much of the period since the 1960s as well as incentives for export-led development. Moreover, Korea's geographic proximity and colonial and industrial links to Japan made Japan a role model for Korean companies and policy makers. Another key success of Korean industrialization is the policies on trade, human resource development and technology (Kim, 2005).



### Box 2.2. Success Stories from the Auto Industry in East Asia

#### Success Stories from the Auto Industry in East Asia

**Thailand is considered a major hub of automotive production for regional and global markets.** The Thai auto sector has grown rapidly over the past twenty years. This rapid development results from a combination between a change in the global auto sector and the favorable policy environment put in place by the Thai government. Thailand has pursued a more open FDI policy compared to other Asian countries. Firstly, Thailand provides income tax breaks and equal treatment for foreign and domestic investors. Like other Asian countries, Thailand also applied foreign ownership limitations in 1977 but it only applied to domestic-market joint ventures and foreign investors had an option to set up a business without getting approval from the Board of Investment (BOI), although they were not eligible for investment subsidies. With full ownership, a foreign carmaker is willing to bring in the latest technology and improve managerial practices and supervision of assembly/production by bringing in foreign technicians and managers.

Although domestic parts manufacturers have not developed as much as expected in Thailand, foreign parts manufacturers play important roles in supplying car assemblers in Thailand because of its favorable FDI policies. An open foreign investment policy and trade liberalization are necessary conditions for participation in globalization but are not sufficient unless they are accompanied by a business-friendly environment. Thailand improved infrastructure and industrial estate development which attracted foreign investors to establish plants outside the Bangkok area.

**China is considered perhaps the most important example because of its huge domestic market.** Both Japanese and European car makers have increased their investment in China to take advantage of this potential; however US firms find entry into the Chinese market more difficult. The Chinese government imposes very strict FDI policies so that foreign investors can only invest in China in the form of a joint venture with existing Chinese firms. The Chinese automotive industry consists of a small number of state corporation groups and joint ventures between members of these groups and foreign firms. In 2010, China became the world's top car producer with total production of 18.3 million units, outstripping Japan's production of 9.6 million units. Although China has domestic brands, most production is of foreign brands. The production of parts grew quickly in the 1990s. Major producers are linked to state, provincial or municipal conglomerates. Joint ventures from Taiwan are usually more efficient and produce parts of acceptable quality, but they still have a relatively low level of sophistication (tires, batteries, radio, steering wheels, lights, piston rings, brakes, crank shafts). Meanwhile, Japanese firms are criticized because they often provide dated technology although they do pass along quality control and on-time delivery practices to local firms.

**After Japan and China, South Korea is the third biggest auto producer in Asia.** The development of the auto industry in Korea has been supported by highly interventionist trade and industrial policies. Imports of cars were prohibited until the 1990s and the government provides subsidized loans, tax incentives for investments and export subsidies for the automotive industry. Korea has a large auto parts industry to support both OEM and replacement goods (REM). The development of the auto parts sector in Korea is supported by a strong national innovation system, along with engineering and metal working skills, and backward linkages with the steel industry. After the financial crisis in 1998 which resulted in the bankruptcy of four out of every five domestic assemblers, many small auto parts firms had to exit the industry because of debt and cash flow problems. The crisis also forced some conglomerates to divest their firms and this paved the way for foreign investors to acquire significant shareholdings in Korean component producers.

**The experience of several East Asian countries in joining the electronics and auto production networks highlights some of the factors necessary for a country to successfully join production networks.** (See Box 2.1 and Box 2.2 for detailed discussion). These factors are (i) reliable workers, (ii) business-friendly environment, and (iii) proximity to an advanced technology nation willing to offshore some of its factories. These countries were also successful in fostering ‘technology transfer’ rather than ‘technology lending’ due to the capacity of local manufacturers to imitate foreign producers selling into domestic markets. On the other hand, some countries have not been so successful in joining global supply chains, notably Malaysia in the auto industry and Indonesia in electronics. The failure of firms in these two countries to join global supply chains was caused by a non-conducive business environment coupled with the low capability of workers to assimilate the necessary production technology. Malaysia’s failure is due a highly protected domestic auto industry which ensured the auto parts industry in Malaysia remained small scale, inefficient and lacking in technological capacity. Meanwhile, in the case of Indonesia, low-skilled workers have become relatively more expensive compared to Vietnam, encouraging the electronics industry to relocate assembly and production facilities to Vietnam. Indonesian firms cannot yet participate in more advanced stages of production as the capability of higher skilled workers does not yet meet production requirements.

**A country’s involvement in global supply chains is not limited to the high-tech manufacturing sector but also includes agricultural products and food and beverages supply chain.** Global supply chains in agricultural products have developed on foot of several factors such as saturation of markets in developed countries, changing consumer preferences, powerful application of information and communication technology and internalization of the agro-industrial sector. Developing countries, as a source of many agricultural products, can reap the benefit of this development by joining the supply chain. The benefits of joining the agricultural supply chain are (i) expand traditional markets and thus increase sales volume, (ii) reduce delivery cost of products below the cost of competing chains which then increase their gross margin and (iii) target specific

markets with specific products so they can differentiate their products and charge premium prices. Global supply chains in food and beverages are important factors for a successful food and beverages industry. The supply chain enables them to react to changing demand (new food trends, shifting consumers' preferences, etc.) by swiftly communicating these needs to suppliers and helping manage food-safety risks and regulatory compliance. Firms in home countries have the best knowledge of their consumers' preferences, knowledge which is needed by the international food and beverages industry. In many developing countries the food and beverages industry consists of small to medium-sized firms, many of which are family owned. There are a number of very large processors and these are typically vertically integrated, owning primary production, processing and distribution facilities. Joining global supply chains in food and beverages will enable domestic firms to scale up their production and reap the benefits of globalization.

**Services are a crucial but often overlooked element in the global supply chain.** Services act as enablers in the global supply chain. They link each part of the global supply chain, ensuring that they can operate effectively. Advancement of services such as telecommunication, transportation, logistics, distribution, marketing, design etc. contribute to the reduction of service sector link costs.

**Supply chains go where logistics are smooth.** Trade logistics performance is critical to the smooth functioning of supply chains, and countries with better logistics performance tend to be better able to integrate into global production networks. New research by Saslavsky and Shepherd (2012) finds that networked trade in parts and components is more sensitive to logistics performance than is trade in final goods. They find this dynamic to be particularly important for importing countries, in the East Asia & Pacific region and for trade between less developed countries.

**The exercise of market power by a dominant entity that controls access to key services or a lack of competition may hinder the functioning of some parts of a supply chain;** examples include port operations, airport cargo handling and freight transport providers. (Hoekman and Jackson, 2013). Input from service providers contribute much to finished goods. For example, in the auto industry, services inputs account for close to 30 percent of the value of the finished goods. (For a detailed exploration of the impact of competitiveness in the services sector on productivity in Indonesian manufacturing more generally). Compared to assembly and manufacture, services provide higher value added to the production process. Therefore one way to move up the value chain is to move towards the provision of services in the global supply chain.

**However, joining a global supply chain can have some disadvantages for a country.** First, there is a possibility that the industrialization process in the home country could slow because of 'technology lending' by multinational companies to domestic producers instead of the 'technology transfer'. With technology lending, once a multinational decides to switch production of a particular component from one country to another, for example from Indonesia to China, then producers in Indonesia cannot produce the same component since the technology will also be transferred from Indonesia to China. On the contrary, if the multinational is willing to transfer its technology to domestic firms, then relocation from one country to another will not remove production capacity from the home country. Second, it increases inter-dependency among countries. If one nation suffers from economic disruptions, it is most likely that all other dependent nations are also affected. Thus, the risks become more global, such as happened during the 2008 financial crisis.



**A big domestic market and a large pool of labor are advantages which can help Indonesia join global production networks.** One factor which encourages a firm to relocate its production process to other locations is to take advantage of lower labor costs and economies of scale. With GDP expected to grow 5-6 percent annually, by 2030 Indonesia will have an additional 90 million middle class consumers. It will also benefit from a demographic dividend with 70 percent of its population being of working age (Oberman et.al. 2012). These new consumers will purchase not just the basic necessities but also discretionary goods and services. This will be a lucrative market opportunity for consumer services, agriculture and fisheries products, resources and education. By joining global supply chains, Indonesia's firms can become more efficient and better serve this

### Chapter 3

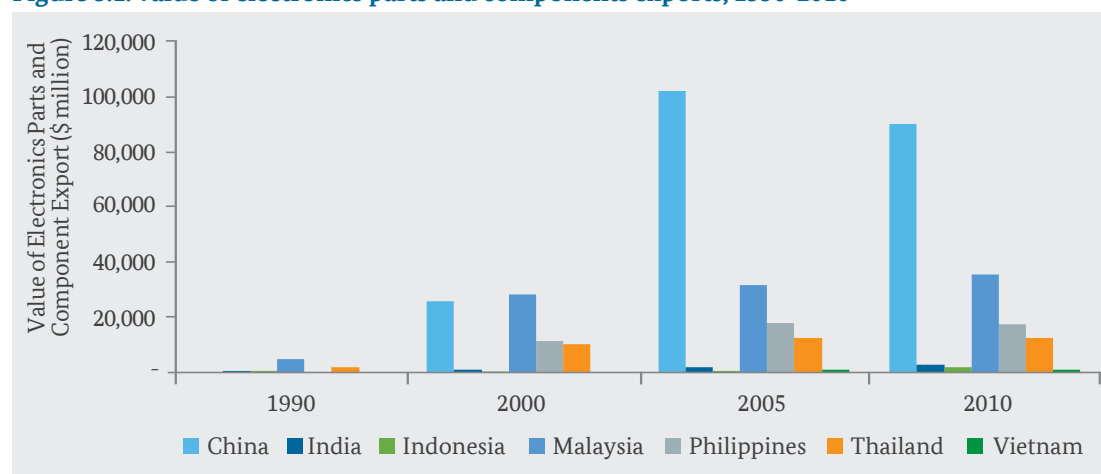
## What's in it for Indonesian Firms and How Can They Benefit

big domestic market. Unlike other Asian countries which face an aging population, Indonesia's young population means that this large pool of labor will attract production networks to Indonesia if equipped with the required skill-sets.

**What are the factors that determine a country's participation in global supply chains?** Based on the Jones and Kierzkowski's (1990) fragmentation theory, there are three contributory factors that enable product fragmentation. First is the development in production technology that enabled slicing the production process into different tasks with different factor requirements; second is trade liberalization and third are the advances in communications and transportation that have contributed to a decline in the cost of service sector links. Soejachmoen (2012) analyzes the determinants of participation in the global supply chain in East Asia and finds that determinants of Asian countries' participation in production networks, both in the electronics and auto sectors, are FDI openness, infrastructure, trade costs, labor quality and competitiveness. Other studies find the similar results such as Lall (2000) and Fagerberg (1996) on the quality of labor, Golub et al. (2007) on infrastructure, Arndt and Huemer (2007) and Athukorala and Yamashita (2009) on competitiveness and Kimura and Takahashi (2004) on trade costs.

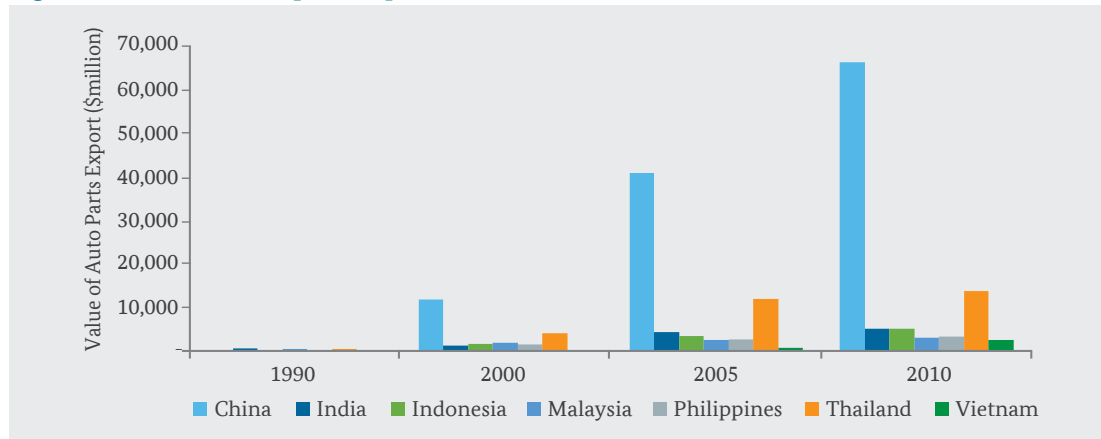
**However, Indonesia's participation in global supply chains is relatively low compared to other East Asian countries.** A common indicator to measure a country's participation is the export value of parts and components and the share of parts and components exports value in total manufacturing exports. As depicted in Figure 3.1 and Figure 3.2 below, Indonesia's exports of both electronics parts and components and auto parts are much lower compared to other East Asian countries. For electronics parts and components, Indonesia lags behind other ASEAN-5 countries (Malaysia, the Philippines, Singapore and Thailand). Indonesia's exports were only \$1.8 billion (0.25% of GDP) in 2010 while other ASEAN-5 countries were more than \$12 billion (0.7%). However, participation in the auto production network is relatively high. In 2010, Indonesia's auto parts exports value were \$5.1 billion, second among ASEAN-5 countries after Thailand with \$13.8 billion.

**Figure 3.1. Value of electronics parts and components exports, 1990-2010**



Source: UN-COMTRADE.

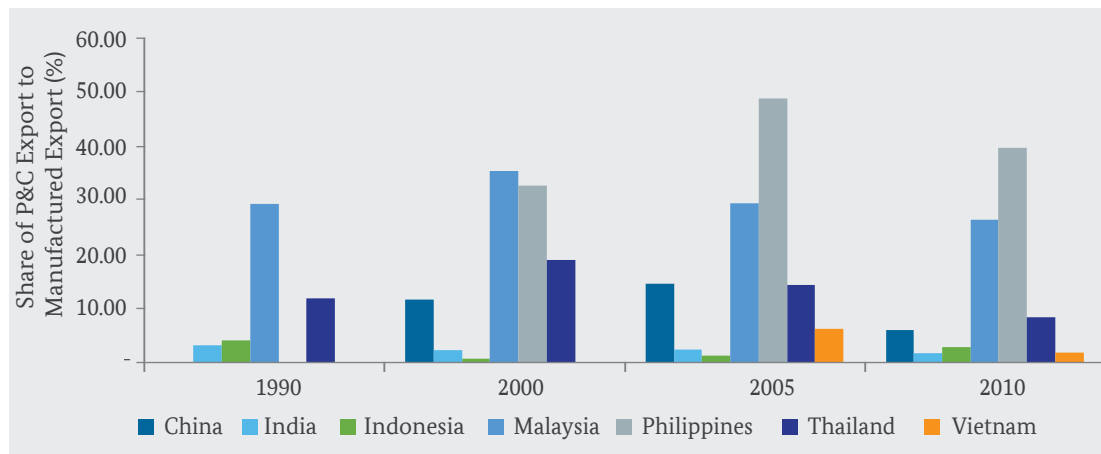
Figure 3.2. Value of auto parts exports, 1990-2010



Source: UN-COMTRADE.

**The contribution of parts and components to manufactured exports is low in Indonesia.** Not only are Indonesia's export values relatively lower, the share of parts and components exports in overall manufactured exports is also relatively low compared to other East Asian countries (Figure 3.3 and Figure 3.4). The share of electronics parts and components in 2010 was only 3 percent while other ASEAN-5 countries were above 8 percent. At almost 40 percent of its manufactured exports, the Philippines have the highest share of electronics parts and components exports. The Philippines has benefited from FDI from the US, Japan and Taiwan. Firms in the Philippines began with integrated circuit packaging and assembly of consumer goods. The development of the new high-technology manufacturing zone in Subic Bay, with support from the Taiwanese government in providing infrastructure, is a major factor in the rapid development of the Philippine electronics industry. Meanwhile, Indonesia's share of auto parts exports as a proportion of overall manufactured exports in 2010 was relatively high (8.7 percent), the second highest in the ASEAN-5 countries after Thailand (9.3%). This is due to the fact that some of the firms in Indonesia are affiliated with foreign parent companies equipped with global procurement systems.

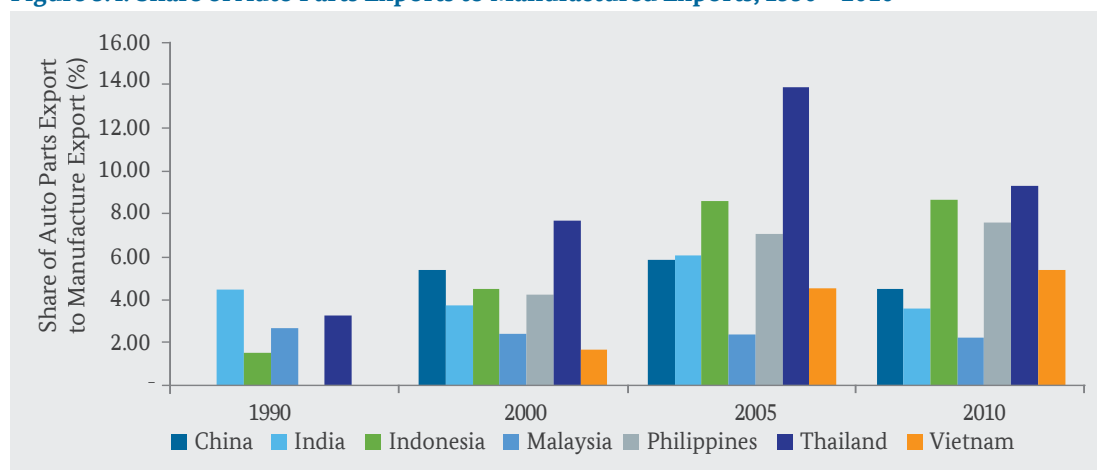
Figure 3.3. Share of Electronics Parts and Components Exports to Manufactured Exports, 1990-2010



Source: UN-COMTRADE.



Figure 3.4. Share of Auto Parts Exports to Manufactured Exports, 1990 – 2010

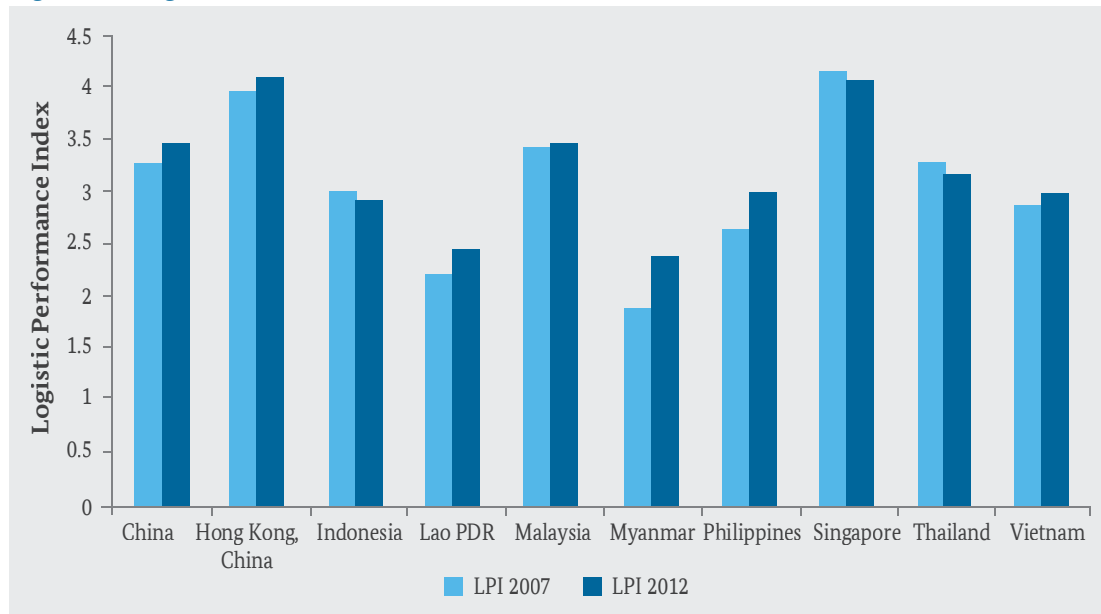


Source: UN-COMTRADE.

**Infrastructure is the most important determinant of whether Asian countries participate in global supply chains.** One of the important factors that affect trade is the effectiveness of port management, and of logistics between port and warehouse. The condition of Indonesia's ports and transport infrastructure is quite poor compared to neighboring countries. Poor infrastructure in Indonesia is considered to be the second most problematic factor for doing business in Indonesia (IMD, 2009) and in terms of adequacy of infrastructure, Indonesia was ranked 55th among 57 countries in 2009, far behind Malaysia (26<sup>th</sup>) and Thailand (42<sup>nd</sup>). A survey by Japanese affiliates ranks underdeveloped infrastructure as the most important barrier to investment in the Indonesian manufacturing sector and the third most important in services (JETRO, 2009). Based on the Logistic Performance Index (LPI), conducted by the World Bank every two years, Indonesia's ranking on infrastructure condition is deteriorating over time. In 2007, Indonesia was 43<sup>rd</sup> out of 150 countries, but by 2012 it had dropped to 59<sup>th</sup> out of 155 countries (see Figure 3.5). Similarly, Indonesia ranks 77<sup>th</sup> out of 132 countries in the Transport & Communications infrastructure sub-index of the World Economic Forum's 2012 Enabling Trade Index, ranking particularly low, in 89<sup>th</sup> place, for availability and use of ICT. The low quality of infrastructure in Indonesia, especially that related to trade facilitation, has hampered Indonesia's ability to participate in global supply chains. Comparing Indonesia with other East Asian countries, such as China, Malaysia, Thailand, Philippines, Vietnam and Cambodia, shows that Indonesia has the second worst performance - only Cambodia being lower - in the overall logistic performance index.



Figure 3.5. Logistics Performance Index, 2007 and 2012



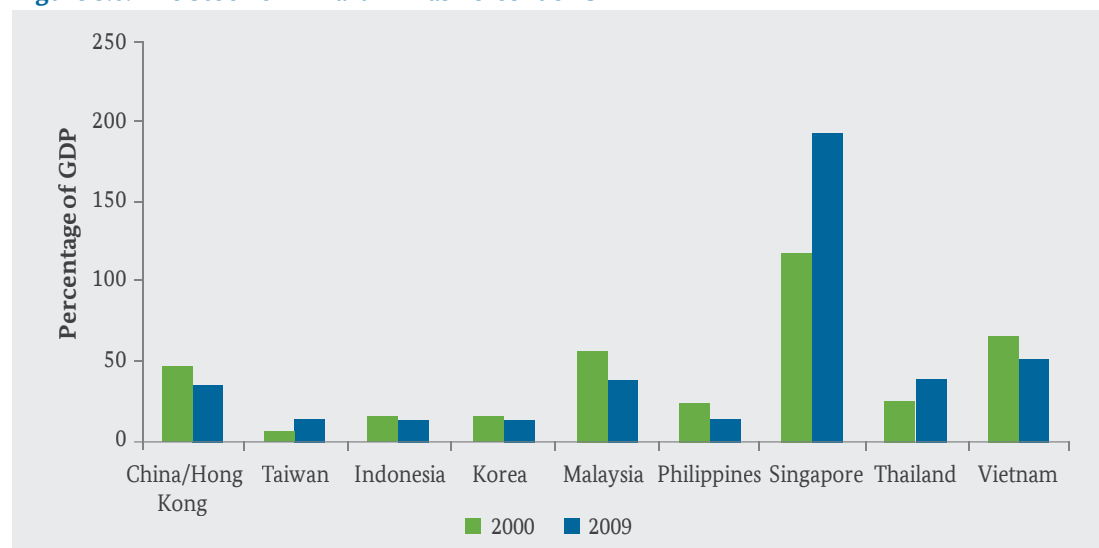
Source: Logistic Performance Index, 2007 and 2012.

**Port facilities provide crucial supports to production networks.** Most transportation of parts and components is conducted through container shipping because it is much faster to unload in ports. Most containers in Indonesia are processed through its three main container ports: Tanjung Priok in Jakarta, Tanjung Perak in Surabaya and Tanjung Mas in Semarang. Tanjung Priok, with a total peak throughput capacity of 4.2 million 20-foot equivalent units per annum, is the country's largest international container terminal. However, accessibility of Tanjung Priok port, which is the main international gateway in Indonesia, to Indonesia's largest industrial area in Greater Jakarta is relatively poor by comparison to accessibility of Port Klang of Malaysia or Leam Chabang of Thailand from largest industrial area in each of these respective country.

**Compounding Indonesia's infrastructure deficit, challenges in border administration also serves to undermine the country's ability to join global supply chains and yield the maximum benefits from trade.** The low performance of Tanjung Priok is also due to the length and number of bureaucratic processes for clearance, waiting time, and port access. Movements within the main Indonesian port are slow due to both congestion and burdensome procedures. A truck entering the port must make multiple stops and complete redundant paperwork before proceeding to pick up or delivery points. Indonesia ranks 65<sup>th</sup> of 132 countries in the Border Administration sub-index of the World Economic Forum's 2012 Enabling Trade Index. Although it scores relatively well on efficiency of import-export procedures, ranking 38<sup>th</sup>, it scores less well on customs administration efficiency (69<sup>th</sup>) and, particularly, border administration transparency (88<sup>th</sup>). Implementation of a one-stop service within the ports would significantly increase efficiency - streamline the process as much as possible and then establish an office where representatives of all the remaining functions can be co-located to complete all required documentation. The elimination of *ad hoc* obstacles should be a priority (Asrofi 2011).

The second major factor that discourages the MNCs from investing in Indonesia is uncertainties around business environment, particularly towards FDI. Indonesia ranks 77<sup>th</sup> of 132 countries in the business environment sub-index of the World Economic Forum's 2012 Enabling Trade Index, ranking 49<sup>th</sup> for the quality of its regulatory environment, and only 91<sup>st</sup> for physical security. Meanwhile, Indonesia's stock of inward FDI as percent of GDP is relatively low compared to other East Asian countries as depicted in Figure 3.6.

Figure 3.6. The Stock of Inward FDI as Percent of GDP



Source: UNCTAD website.

Studies pointed out to a long tradition of skepticism towards foreign investment in general, and multinational firms in particular (for example, Lipsey and Sjöholm, 2010). Indonesia announced the 2007 Investment Law, which is considered to be a landmark piece of legislation. It gives standard protection to investors against expropriation and enshrines national treatment. The investment law also guarantees equal treatment of foreign and domestic firms in open sectors. However, there is no equal opportunity to invest in all sectors. Restrictions on foreign equity ownership persist and regulated through the Negative List.<sup>2</sup> Moreover, the foreign ownership restrictions imposed by the government for 25 sectors is a major concern for the MNCs especially for the industries that are technology intensive and have proprietary rights, e.g. the electronics and automotive sectors. Such restrictions can limit ability of MNCs to deploy the best technology yet less worried about imitation. Ownership sharing has been abandoned in many other countries, since it does not provide any additional benefits to the host economy, and might deter inflows of FDI (Blomström and Sjöholm 1999).

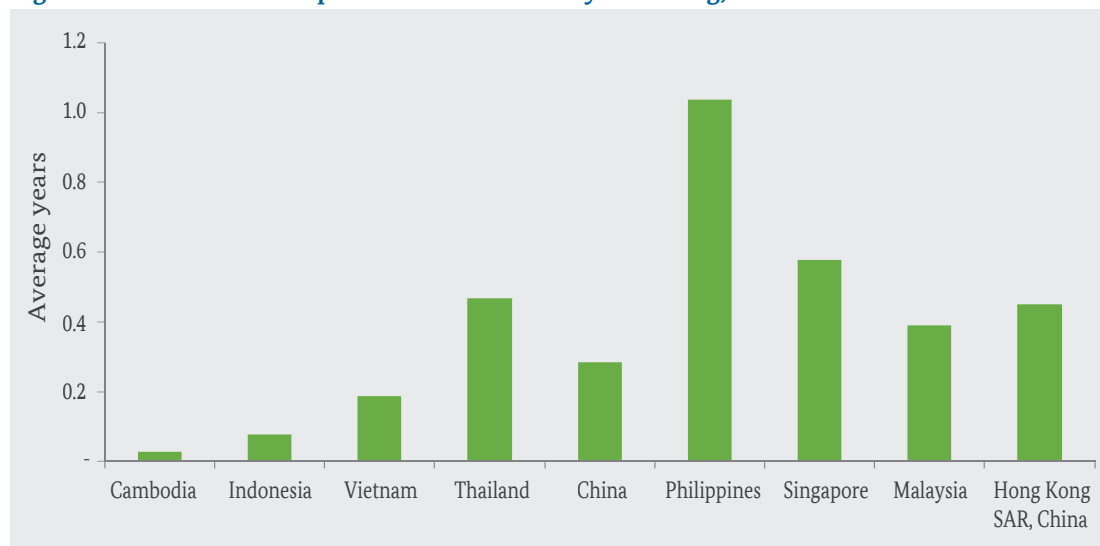
The success of the Special Economic Zones (SEZs) in China in attracting foreign investment inspired the Indonesian government to do the same, enacting the Law of Special Economic Zones

2 Sectors where private investment is not permitted or where foreign investors are subject to restrictions has added to transparency, and the list has been streamlined (OECD, 2010)

in 2009. One of the SEZs is Batam, Bintan and Karimun (BBK) Islands, located in close proximity to Singapore, is an expansion of successful Batam Island SEZ established in 1989. If the BBK can be successfully developed into a SEZ, it will be used as a successful model for the development of other SEZs in throughout the country. Based on their business environment and resource endowment, each island specializes in particular sectors. Batam will be a location for electronics, electrical equipment, mechatronics, and ICT; Bintan will develop garment, food industries, footwear, canning, moulding and marine tourism; and Karimun will develop shipyard and components and casting, foundry and forging, agro base industry, fishery and marine tourism. Indonesia has had an Economic Cooperation Agreement with Singapore since 2006, a key feature of which is that Singapore will assist with the development of the three islands as an SEZ. Partnering Singapore and these three islands to form production networks will tap the unique complementary locational advantages of the two locations, thereby reducing network set-up cost, service sector link costs and production costs *per se* (Heng and Kee, 2009). Over the last ten years, investments in Batam and Bintan have generally done well. The industrial parks in these locations have together attracted \$1.7 billion in investment and employ 80,000 Indonesians. However, the government targets new investment of \$1 billion and another 100,000 new jobs in the next three years.

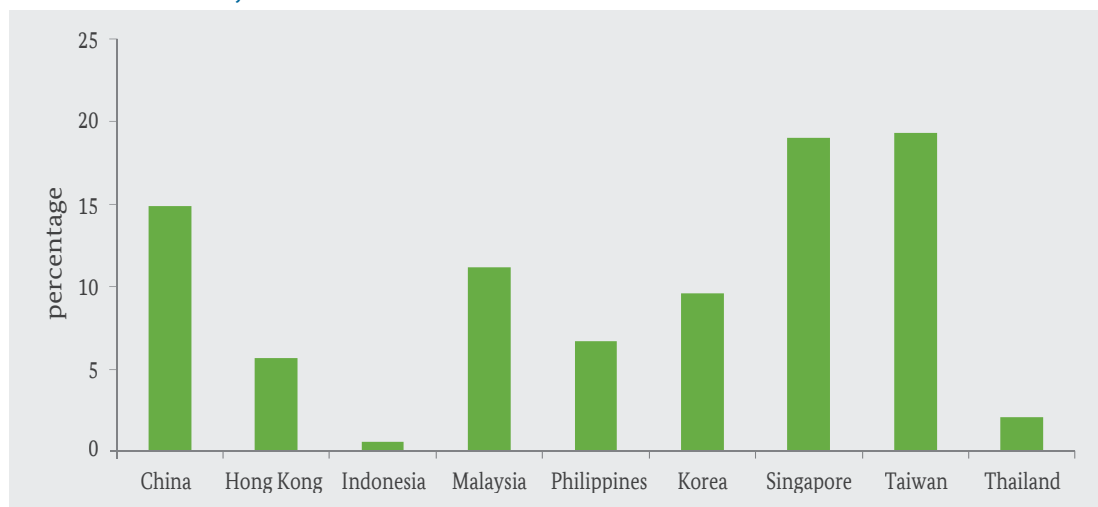
**For Asian countries, labor costs and technological capacity are the other key determinants that determine participation in the global electronics production network.** Labor costs depend not only on wage levels but also on labor productivity. Labor productivity and technological capacity are closely related to a labor force's education and skill level. The quality of Indonesia's human capital still lags its neighbors. First, skill levels in Indonesia are relatively low compared to neighboring countries. The completion rate of tertiary education is very low, only 1.4 percent in 2010, while the completion rates for primary and secondary education were 37.4 percent and 22.8 percent respectively in 2010. Comparing Indonesia with other South East Asian countries reveals that in terms of quality of labor force, in 2010 Indonesia is the second lowest of ten countries. Improving education in Indonesia is important not only for attracting FDI, but also for increasing Indonesia's absorptive capacity as described above.

**Figure 3.7. Education Completion Rate for Tertiary Schooling, 2010**



Source: Barro-Lee dataset, WDI website: (<http://data.worldbank.org/indicator>)

**Figure 3.8. R&D investment as a percentage of employees compensation in US majority affiliates, 2004**



Source: U.S. Bureau of Economic Analysis (2008), Tables III.J1, III.H5, and III.H3.

**As with skill levels, Indonesia's technological capacity is still limited compared to other Asian countries.** Many high-tech projects such as aircraft, shipbuilding, railroads, telecommunications, steel and machinery were developed before the Asian crisis, but these projects have since been abandoned. As a result, Indonesia remains near the bottom of the technology ladder in the region (Lipsey and Sjöholm, 2010). One indicator of this is the very low investment in research and development, not only by the public sector, but also by foreign companies operating in Indonesia. A survey by the U.S. Bureau of Economic Analysis shows that R&D investment as a percent of employee compensation in US majority affiliates in Indonesia is only 0.6 percent, the lowest rate compared to other Asian countries (such as Korea, Singapore, Malaysia, China and Malaysia). The highest percentages are in Singapore and Taiwan, at about 19 percent, followed by China (14.9 percent) and Malaysia (11.2 percent). The next lowest is Thailand, at about 2.1 percent. The reluctance of U.S. affiliates to invest in R&D is closely related to the ownership restrictions discussed above.

**It is important for firms in Indonesia to actively join global supply chains.** As mentioned earlier, joining a production networks can be beneficial for a firm. Based on interviews with several parts and components firms in Jakarta Greater area<sup>3</sup>, there are several reasons for firms to join the global production networks. Some of the firms already have a long term relationship with a Japanese car maker and therefore joining the production network is natural. All these firms have some sort of Japanese connection. Either they share the same brand, or the owner of Indonesian firm is a colleague of a Japanese businessman. Several firms join a production network because there is limited supply in Indonesia for specific products and so they are invited by their Japanese counterparts to join the production network.

3 Interviews were conducted in 2010. The greater Jakarta includes Jakarta, Bogor, Tangerang, Bekasi, Cibitung and Cikarang.

**Although it is difficult to join production networks, once a firm is in the supply chain, it can enjoy many benefits.** Some firms admitted that it is not easy to join a Japanese network since they set strict and demanding requirements for suppliers. It takes a long process to get supplier or vendor approval from a Japanese principal. Another difficulty in joining a production network is the low margin obtained by suppliers since the principal requires cost efficiency at all stages of production. Moreover, some firms cited limitations in joining a production network such as restrictions on selling products to the general market for a certain period and low profit margins due to the cost efficiency requirements of the principal. The benefits of joining a global supply chain include certainty of product market, quality maintenance, easier access to the latest technology needed for product development and access to global procurement systems which provide the cheapest and most reliable suppliers.

**However, Indonesian firms that belong to production networks seem not to have a long-term technology development strategy.** The core competencies of Indonesia's auto firms are good management skills in implementing the technology-based projects, meeting customers' demand in QCD (quality, cost, and delivery) terms, and drawing lessons from past technology-based projects. Nevertheless, an important limitation on these companies is the fact that they do not invest in research and development nor make attempts in generating their own technology for the benefit of their future technological competence (Aswicahyono, et.al, 2011). Furthermore, some manufacturing firms which are heavily foreign-owned and have a sole customer/supplier – i.e. their own principals – usually have relatively low technological capability, since their technology is provided by their principals and they have neither the responsibility nor the incentive to upgrade. Such 'technology lending' is risky for firms in Indonesia since if the principal firms transfer technology out of Indonesia, the Indonesian firms will be left without the capability to continue production.

The shortcoming of the Indonesian firms in technological competence is closely related to their innovation capability. According to Tsuji and Miyahara (2010), the innovation capability of firms is related to the patent rights, the top management having experience in MNCs (multinational companies), engineers being college-level graduates, and the granting of licensing technologies from MNCs. To avoid this 'trap', human resources should be developed in order to strengthen the firm's capability of absorbing technology spillovers from the MNCs.



Reducing supply chain barriers to trade could increase GDP up to six times more than removing tariffs. It is so effective because it eliminates resource waste, whereas eliminating tariffs mainly reallocates resources. It is more inclusive as the gains are more evenly distributed between nations than the gains from eliminating tariffs. Reducing barriers can benefit households by lowering prices and improving employment prospects. They can also be particularly beneficial for SMEs that may otherwise lack sufficient resources to meet the high fixed costs of overcoming such barriers (WEF, 2013).

## Chapter 4

# Conclusion and an Agenda for Policy Reforms



**Indonesia faces three challenges if it is to improve its participation in, and maximize gains arising from, global supply chains.** The first challenge faced is the quantity and quality of its infrastructure, especially port management and roads, which affects the certainty of the just-in-time delivery requirements in both the auto and electronics sectors. The second challenge is to ease the relatively restrictive regulations governing foreign investment, especially the ownership restrictions which discourage foreign companies from transferring the latest technology to Indonesia. Trade and custom barriers also affect Indonesia's trade openness, since cumbersome procedures and unreliable officials in the field delay export and import processes. The third challenge is that global supply chains require certainty in the business environment, low service sector link costs and economies of scale.

**Trade increases from reducing supply chain barriers are typically achieved when 'tipping points' are reached.** While piecemeal reduction in supply chain barriers may not yield perceptible success, the impact on trade and FDI can be highly significant when the implementation of a complementary set of reforms causes a change to firms' binary decisions on whether to trade or invest in a given country (WEF, 2013). Moreover, the policy-related factors that affect the operation of supply chains are numerous and interrelated (Hoekman and Jackson, 2013). This suggests that a packaged rather than incremental approach to reform may meet with more success.

**Policy implications can be drawn from these conclusions on how to increase Indonesia's participation in global supply chain networks:**

- **Improvement in freight logistics, possibly through the introduction of a one-stop service within the ports would significantly increase efficiency of port management.** Transport time is crucial for global supply chains. Indonesian firms currently suffer from chronic traffic congestion as well as lengthy cargo loading and unloading processes at the ports.
- **Implement consistent, coordinated and transparent policy making procedures.** A transparent and systematic policy making process will improve business confidence in Indonesia. Coordination, moreover, will increase the likelihood of impactful reform implementation. The government should entrust a high-level, cross-sectoral supply-chain efficiency taskforce with identifying reform 'tipping points', setting policy priorities and coordinating regulatory reform at a national level. All relevant Ministries and government agencies should be represented. This taskforce should draw on international experience on the subject, and engage in meaningful collaboration with the private sector, ensuring that all potential participants' needs are considered.
- **Streamline implementation of the 2007 Investment Law,** thereby ensuring that the Negative List is the single, comprehensive reference point for foreign investors. Although Indonesia has made good progress on trade policies in terms of lower average tariffs, the temptation to assuage resurgent nationalist sentiment manifested through the introduction of further non-tariff barriers, also hinders participation in global supply chains.
- **Reduce unnecessary red tape.** As mentioned by one firm during the interview, the long process to obtain a tax refund, which took 2-3 years and with only 80 percent of refund, is one example of how the business environment in Indonesia is less attractive compared to



neighboring countries. Other complaints concern tax collection, licensing processes and contract enforcement.

- **Develop a school curriculum that matches industry's needs.** Improving skill levels in the workforce is crucial in attracting higher technology production centers and networks to Indonesia which in turn would create more productive jobs. However, if the public education system is not able to provide such vocational training, the government could adopt South Korea's policies during the 1980s by providing incentives for firms that conduct research and development and staff training.
- **Improve the capacity of Indonesia's small and medium enterprises to enable them to join the global supply chain.** Participation of SMEs in global supply chains is important to ensure inclusive growth, especially in the agriculture and food and beverages supply chain where SMEs are the main actors. Knowledge of food safety, consistency on quality and packaging is necessary to enable them to successfully join global supply chains.
- **Revitalize the Special Economic Zone.** Since it is not possible to improve infrastructure conditions throughout Indonesia in the short-term, the special economic zones can be used as a short term solution to attract more investment. Infrastructure is a crucial factor in attracting production centers. Most of Indonesia's major infrastructure was built during the oil boom era in the 1970-1980s and there has been a little improvement since. China has shown the success of the special economic zones along its coastal regions. Although the Indonesian government has begun this initiative and invited local governments to propose special economic zones in their regions, few local governments have responded to the initiative. Therefore private sector involvement is necessary to complement government funding. To attract this investment, the government should provide certainty of land tenure and of ownership status for foreign investors.

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