Priority Integration Sectors in ASEAN: Supply-side Implications and Options

THITAPHA WATTANAPRUTTIPAISAN

There are 12 priority integration sectors of strategic importance for the Association of Southeast Asian Nations (ASEAN). Exports from the nine largely goods sectors, with almost three quarters of merchandise export value, are dominated by electronics-related equipment and products. Priority goods have diverse supply and trade characteristics but among the common performance issues and development options for attention in ASEAN are the high levels of trade and nontrade costs and complications. These are mainly caused and compounded by inadequate transport connectivity, cross-border clearance problems, and diverse and exacting trade rules and technical regulations. Meanwhile, greater supply linkages have yet to be achieved for enhanced collective efficiency in textiles and clothing within the region and/or across ASEAN, People's Republic of China, and South Asia. Higher levels of product and process creativity and innovation, moreover, are needed to lift local value addition and to upgrade to high-premium, more sophisticated activities and services, especially in electronics-related sectors. All these issues and options have become more pressing against the backdrop of People's Republic of China's speedy progress in competence building, technology catch-up, and manufacturing competitiveness. The extensive and complex agenda for further research and information dissemination concerning regional integration and competitive globalization in ASEAN, and more generally East Asia, is thus well highlighted.

I. INTRODUCTION

Leaders of the Association of Southeast Asian Nations (ASEAN) decided in October 2003 to establish an ASEAN Economic Community (AEC) by 2020 (the Bali Concord II). Paving the way for the AEC is the accelerated integration of 11 priority sectors,[1] with logistics as the 12th priority integration sector (PIS) added in 2006. The Framework Agreement for the Integration of Priority Sectors

[1] These 11 priority sectors are: agro-based goods, air transport, automotive products, e-ASEAN (including ICT equipment), electronics goods, fisheries, health care products, rubber-based goods, textiles and clothing, tourism, and wood-based products.

Thitapha Wattanapruttipaisan is Head, Agreements and Compliance Unit, Bureau for Economic Integration and Finance, ASEAN Secretariat. The author thanks two referees for several useful comments; Sri Wardhani Bakrie of the Statistical Unit and Beny Irzanto of the Agreements and Compliance Unit for efficient assistance in data processing and research; and desk officers at the ASEAN Secretariat for supplying the updated information. The views expressed in this paper do not necessarily represent those of the ASEAN Secretariat. Mention of any firm or process does not imply endorsement of it by the ASEAN Secretariat.

(Framework Agreement) and its Integration Protocols for the 11 sectors were signed in November 2004. Additionally, the target year for AEC formation was accelerated to 2015 at the ASEAN Summit in January 2007.

Sector-level integration and AEC building is expected to foster and multiply regional linkages forward and backward, thus transforming ASEAN into a single market and production base, thus sustaining the region as a dynamic and competitive player in the global value chains and supply networks. Nevertheless, there has been no comparative, in-depth analysis to date of PIS trade performance and development issues for consideration of government and business, and for information dissemination within and outside ASEAN. As is evident below, the agenda for further research is both complex and extensive. The following paper is part of the series of comparative papers and policy briefs on PIS and AEC building at the ASEAN Secretariat. It focuses on nine priority-goods sectors, thus excluding the air transport, tourism and logistics sectors.[2]

The discussion is organized as follows. Section II clarifies certain issues concerning PIS data and product coverage. The major features of PIS structure and trade performance are examined next. Section IV then considers some of the policy measures and options for enhancing PIS supply-side efficiency, competitiveness and linkages in ASEAN. Due attention is given to information and communications technology (ICT) equipment, electronics, and textiles and clothing (T&C), which collectively account for around 80 percent of total priority-goods exports.

II. COVERAGE OF DATA AND PRODUCTS

PIS products included in this paper are those listed at the 2-digit chapter level and, as appropriate, at the 4-digit heading level of the Harmonized Commodity Description and Coding System (HS).[3] Detailed trade data on those products are available only up to 2004 when this research work was carried out. Also notably, a large number of priority goods are "parked" in the negative lists of the Framework Agreement at present, and different ASEAN countries have different lists for each of the nine PIS. The total number of tariff lines in all the

[2]Notably, several sectors (such as air transport, e-ASEAN, health care, tourism, and logistics) have an important services dimension. However, there are tariff lines and serial data for only nine priority sectors of the Framework Agreement, hence the focus on those nine sectors only.

[3]Thus, the agro-processed sector comprise HS 01-02 and 04-24; the automotive sector, HS 87; the e-ASEAN sector (ICT equipment), HS 84-85, 90, and 3818 (but excluding those within the electronics sector); the electronics sector, HS 8414-5, 8418, 8471 8509, 8510, and 8516; the fisheries sector, HS 03; the health care sector, HS 3303-07, 3401, 9018, 2936-37, and 3001-06; the rubber-based sector, HS 40; the T&C sector, HS 50-63; and the wood-based sector, HS 44-48. A detailed rationale for adopting the above levels of product aggregation in the nine PIS is provided by Austria (2004).

negative lists from each country, however, has to be less than 15 percent of the 4,273 ASEAN Harmonized Tariff Nomenclature tariff lines covered in the Framework Agreement.

Negative-list goods are not subject to tariff reductions or removal in accordance to the Common Effective Preferential Tariff (CEPT) Agreement of the ASEAN Free Trade Area (AFTA).[4] The inclusion of negative list products in the nine priority-goods sectors is necessary because the period of analysis, 2000–2004, predates the Framework Agreement. Thus, the computed data will be useful as baseline benchmarks for the monitoring and evaluation of priority-sector integration and AEC building efforts in ASEAN**.** In addition, the AEC is envisaged as a single market and production base with a free flow of goods and services, among others. Thus, most priority-sector products are likely to be candidates for graduation out of their negative lists before 2015.

The period of analysis, 2000–2004, provides a longer-term perspective to the discussion, and 5-year averages are frequently used to smooth out considerable year-to-year fluctuations. Meanwhile, the discussion focuses on ASEAN-8, as there are incomplete details on PIS trade in the case of Lao People's Democratic Republic (Lao PDR) and Viet Nam; the latter is a sizable priority-goods trader (more in Section IIIA). The absence of complete data on these two countries, however, does not alter the main structural features and overall trade performance of priority goods in ASEAN as a whole. On the other hand, most of the implications and options for enhancing PIS efficiency and integration in ASEAN-8 (as examined in Section IV) are also of direct relevance to Lao PDR and Viet Nam.

In several parts of ASEAN, there is a thriving but nonformal border trade in, among others, agro-based, fisheries, T&C, health care, ICT, and electronics products. However, reliable and multi-year estimates concerning such trade do not exist. Also notably, PIS data include re-exports, which are substantial only in the case of Singapore. It is impossible, on one hand, to approximate such re-exports because of inadequate data at the sector and product levels of re-exports and related imports, which are subsequently re-exported.

[4]AFTA was initiated in January 1992 and the tariff reduction exercise began a year later. The CEPT Agreement of AFTA provides for 0–5 percent tariff rates on most traded products by 2003 in ASEAN-6, by 2006 in Viet Nam, by 2008 in Lao PDR and Myanmar, and by 2010 in Cambodia. As of July 2007, some 98.7 percent of the products in the CEPT Inclusion List of ASEAN-6 have been brought down to the 0–5 percent tariff range, with about 71.5 percent of those products having zero import tariffs. Thus, the CEPT tariffs now average around 1.6 percent, down from 12.8 percent in 1993. As regards ASEAN-4, almost 97.3 percent of their traded products have been moved into their respective CEPT Inclusion Lists. About 86.9 percent of those items are already within the 0–5 percent tariff band**.** The consolidated tables in year 2007 of the AFTA/CEPT packages of all ASEAN countries are available at http://www.aseansec.org/20937.htm.

On the other hand, netting out all the re-exports from priority-goods trade is also not fully justified for the purpose at hand. Firstly, the distinction between re-exports and re-imports and goods for (outward) processing is increasingly less clear-cut conceptually and less accurately recorded by way of statistical collection (IMF 2004). This problem is further compounded by the spread of international production sharing and the fragmentation of vertical integration in cross-border value chains and supply networks involving East and Southeast Asian economies (Asian Development Bank 2006). Secondly, the paper is more concerned with PIS trade flows and their current and prospective integration in ASEAN. Re-exports are important in this regard as they produce substantial economic benefits for the producers or countries concerned.[5]

III. TRADE PATTERNS AND CHARACTERISTICS

A. Overall Structure of Priority Goods Trade

Firstly, priority-goods exports averaged US$310.3 billion a year, or 73 percent of total merchandise exports from ASEAN-8 during 2000–2004. The lower level of imports related to priority goods, averaging US$238.2 billion annually, led to trade surpluses which were healthy but showed only a modest expansion: US$71.7 billion in 2000 and US$74.5 billion in 2004. On average, priority-goods exports were growing more slowly (5.1 percent a year) than priority-goods imports (6.4 percent), merchandise exports (7 percent) or merchandise imports (8.2 percent) between 2000 and 2004. As a result, the priority-goods export surplus was equal to 21 percent of merchandise imports of ASEAN-8 in 2000 but only to just over 16 percent in 2004. Measures and options for supply-side strengthening are discussed in Section IV below.

Secondly, non-ASEAN economies accounted for an average of 77–78 percent of both exports and imports related to priority goods during 2000–2004. In particular, some 90 percent of exported T&C, electronics, and fisheries products went extraregionally. Cambodia, Philippines, and Thailand had higher than average ratios of extraregional exports of priority goods (80–96 percent). The great importance of extraregional economies to ASEAN provides thus a

[5]Intermediation in re-exports used to focus on matching external buyers to the regional suppliers of final goods. However, trade intermediation now covers the entire supply chain, and the many intermediate steps involve and necessitate frequent cross-border, round-trip transactions (Meredith 2006). For such services, intermediaries' commission is around 7–12 percent of the value of filled re-export orders. In the case of Hong Kong, China, for example, mark-ups on re-exported goods from the People's Republic of China (PRC) averaged 24 percent during the period 1988–1998. Earnings on such services were equal to as much as 10 percent of Hong Kong, China's gross domestic product (GDP) in 1996, compared to 7 percent for manufacturing value-added (a sharp structural change from 24 percent of GDP in 1980). For details, see Hanson and Feenstra (2001).

sharp contrast to the rapid increases in and the higher levels of intraregional trade seen in several other preferential trade arrangements (PTAs) and free trade arrangements (FTAs), as will be examined further in Section IV below.

Thirdly, Singapore and Malaysia had a stable average share of 58.5 percent (or US$181.5 billion) of priority-goods exports, while Indonesia and the Philippines had 21.2 percent in 2000–2004. Thailand's relative share, however, was up from 16.8 to 19.5 percent between 2000 and 2004 to an average 18 percent (or US$55.9 billion) for the whole period. Other ASEAN-8 economies are minor traders of priority goods. Generally, these goods have generated substantial trade surpluses for the main regional economies, for example, US$24.9 billion (or 35 percent of the total priority-goods surplus) for Singapore plus Thailand in 2000, and US$35.8 billion (or 48 percent) in 2004. The surplus in priority-goods trade of Indonesia and Malaysia was stable at US$17–18 billion each while that of the Philippines declined from around US$12 to US$3 billion in those two respective years.[6]

For the sake of completeness, priority goods such as T&C, wood products, and coffee accounted for one-half of merchandise exports (US$0.36 billion in 2004) from Lao PDR. Electricity exports brought in another US$0.1 billion. Large trade deficits, however, persisted in that country in the recent years (for example, US$0.14 billion in 2004). Viet Nam's earnings on exported T&C, fisheries, wood-based products, rice, and coffee were worth US$9.5 billion (or 36 percent of merchandise exports of US$26.5 billion) in 2004. Export growth averaged almost 17 percent a year between 2000 and 2004 but the merchandise trade deficits, for example, amounted to US$5.4 billion in 2004 (Asian Development Bank 2005).

B. Sector-level Trade Flows

Firstly, priority-goods trade in ASEAN-8 is heavily concentrated in ICT goods, which averaged 58.7 (72.3) percent of total priority-goods exports (imports) during 2000–2004 (Table 1). However, the average ICT export growth was 4.1 percent a year, compared to 6.6 percent for ICT imports; this faster rate reflected the rapid spread of e-usage and the related demand increases in the region. Consequently, the ICT trade surplus fell from US$15.9 billion (or 22.2 percent of the priority-goods export surplus) in 2000 to US$9.5 billion (or 20 percent) in 2002; and further to US$1.9 billion (or just 2.4 percent) in 2004. If continued, this accelerating trend will soon lead to a deficit position.[7] Some of

[6]The patterns, characteristics and performance of ASEAN-8 as traders of priority-goods, and the related policy implications and options in regional sourcing and integration, are matters for consideration in other papers and briefs on the PIS at the ASEAN Secretariat.

[7]Terms of trade movements are pertinent in this context. There are, however, no studies on the relative changes in ICT-related inputs and final-product quantities, values, and unit

the policy implications and options for improved competitiveness and local value addition of the ICT sector are discussed at greater length in Section IV.

Table 1. **Export Values and Relative Shares of Priority Goods in Nine PIS Exports and in Total Merchandise Exports of ASEAN-8 in 2000, 2002, and 2004**
(values in US$ billion and relative shares in percentage)

	2000		2002		2004	
Sectors	**EV**	**RS**	**EV**	**RS**	**EV**	**RS**
Agro-based	21.5	7.0	24.6	8.8	32.9	9.0
Fisheries	4.9	1.6	4.1	1.5	4.5	1.2
Health Care	3.4	1.1	3.4	1.2	5.1	1.4
Rubber-based	6.6	2.2	7.1	2.5	12.5	3.4
Wood-based	13.5	4.4	12.2	4.3	13.6	3.7
Textiles and Clothing	23.9	7.8	21.1	7.5	23.8	6.5
Electronics	40.3	13.2	37.6	13.4	47.0	12.8
ICT	186.2	61.0	164.9	58.7	216.8	59.1
Automotive	5.0	1.6	5.7	2.0	10.8	2.9
Subtotal: PIS-9 exports	305.3	100.0	280.7	100.0	367.0	100.0
Total Exports	410.1	74.4	383.9	73.1	525.6	69.8

EV = export values; RS = relative shares; ICT = information communications technology.
Source: Computed from the trade database at the ASEAN Secretariat.

Secondly, much smaller in size are the electronics sector, with an average relative share of 12.9 (5) percent of annual priority-goods exports (imports) of ASEAN-8 during 2000–2004; and the agro-processing sector, with an annual share of 8.3 (7.3) percent. However, these PIS have performed well: electronics has the largest trade surplus, which averaged US$28.2 billion per year during 2000–2004 but which amounted to US$33.6 billion (or 49.4 percent of the priority-goods export surplus) in 2004. The agro-trade surplus is smaller but agro-based exports expanded faster, by 13.3 percent on annual average, so that the excess agro-exports, at US$12 billion in 2004, was about double the surplus level in 2000.

Thirdly, T&C had a relative share of just below 8 percent of priority-goods exports, and the T&C trade surpluses averaged US$11.2 billion a year during

prices at a sufficiently disaggregated level in ASEAN. Export and import quantities and values on the six largest (in terms of export earnings) ICT products and components at the eight-digit HS level are available from Indonesia and the Philippines for 2002–2004. They showed generally better terms of trade for those products between 2002 and 2004. The improvement was particularly sharp for the Philippines's integrated circuits and micro-assemblies, storage units, and portable data processing machines; and for Indonesia, its printers, parts and components of printers, and printer heads. However, 2001 witnessed a downturn in ICT-related demand and prices. It is therefore not clear to what extent the terms-of-trade improvements during 2003–2004 reflected the upswing phase of the ensuing electronic cycle. The falling export surplus of the ICT sector implies thus the overwhelming impact of the quantum jumps in ICT import demand on ICT-related total spending in ASEAN, relative to the region's earnings on total ICT-related exports.

2000–2004. However, the value of both T&C exports and surpluses were stagnant, implying thus falling relative shares in priority-goods trade earnings and export surpluses. In particular, the combined market share of the five largest ASEAN exporters of garments to the United States (US) and the European Union (EU) fell from 13.2 (7.8) percent in 2001–2002 to 12.7 (6.3) percent in 2004–2005. In comparison, the PRC's shares in the US went up from 9 (18.9) percent to 17.9 (26.8) percent in those respective periods.[8] The stronger competition in quota-free global trade could possibly lead to even lower T&C exports and surpluses for ASEAN-8 producers from 2006.[9] The prospects for intra- and extra-ASEAN T&C supply chain formation for enhanced efficiency and competitiveness are discussed further in Section IV.

The relative trade shares of five other PIS, although less than 4 percent each in ASEAN-8, showed a more dynamic export performance, and greater competitiveness and better growth prospects than some of the major PIS reviewed above. In particular, rubber-based exports (at US$12.5 billion in 2004) expanded by 22 percent a year between 2000 (with a relative share of 4.2 percent of priority-goods export earnings) and 2004 (9.4 percent share). Similar to the case of agro-processed goods, the rubber-based trade surplus also doubled to US$9.4 billion in 2004. Thailand accounted for around 43 percent of natural rubber production (some 7 million tons) in ASEAN, with approximately another 48 percent coming from Indonesia plus Malaysia in the mid-2000s. Generally, the prospects for more rubber-based manufacturing in ASEAN are promising: regional consumption is only about 15 percent of output and some three-quarters of the exported rubber are used as raw materials in the tire industries.

[8]Indonesia, Cambodia, Thailand, Philippines, and Malaysia, respectively, were the five largest regional exporters of clothing to the US in the early 2000s. Four of those countries plus Viet Nam (replacing Malaysia) were also the five biggest ASEAN exporters of T&C to the EU.

[9]For the relevant discussions and estimates on post-quota scenarios, see Asian Development Bank (2006), Whalley (2006), Wattanapruttipaisan (2005b), Mayer (2004), Nordas (2004a), and the references cited therein.

Table 2. **Trade Surpluses or Deficits (ES/D) of Priority Goods in Total PIS Trade and Total Merchandise Trade Surpluses of ASEAN-8 in 2000, 2002, and 2004**
(surpluses or deficits in US$ billion and as percentage of total PIS surpluses or deficits)

	2000		2002		2004	
Sectors	**ES/D**	**Percentage**	**ES/D**	**Percentage**	**ES/D**	**Percentage**
Agro-based	5.9	8.2	7.8	12.3	12.0	16.1
Fisheries	3.4	4.7	2.3	3.6	2.2	3.0
Health Care	–0.4	(0.6)	–0.6	(0.9)	–0.6	(0.8)
Rubber-based	4.2	5.9	4.7	7.4	9.4	12.6
Wood-based	7.2	10.0	6.7	10.6	6.7	9.0
T&C	11.7	16.3	10.5	16.5	12.4	16.6
Electronics	28.6	39.9	26.1	41.1	33.6	45.1
ICT	15.9	22.2	9.5	15.0	1.9	2.6
Automotive	–4.7	(6.6)	–3.7	(5.8)	–3.1	(4.2)
Subtotal: PIS-9 surplus	71.7	100.0	63.5	100.0	74.5	100.0
Total export surplus	64.3	n/a	55.7	n/a	65.7	n/a

ES/D = trade surpluses or deficits; T&C = textiles and clothing; ICT = information communications technology.
Source: Computed from the trade database at the ASEAN Secretariat.

Most dynamic, however, is the automotive sector, with export growth averaging 29 percent a year between 2000 and 2004 (worth US$10.8 billion). Health care goods exports were also expanding rapidly, by 13 percent annually to reach US$5.1 billion in 2004. There are debit items, nevertheless: both sectors are very small and have a persistent deficit. The health care trade deficit remained stable at about 10 percent of health care imports during 2000–2004. The large automotive deficit, which fell rapidly from 48 to 22 percent of automotive imports between those two years, is likely to decline further in the medium term.

However, the automotive sector in ASEAN could face difficult challenges ahead without greater integration and technological upgrading. The sector is small-scale and predominantly of a product cycle nature with limited opportunities and prospects for product and process innovations locally (more in Section IV). Small- and medium-size enterprises (SMEs) are also prominent in the automotive supply chains. Externally, the PRC (and possibly India) could become a major competitor of ASEAN in the export of both vehicles and automotive parts and components in third- and home-markets, as has been the case with many other manufactured goods (see footnote 10 below).

The two remaining PIS, fisheries and wood-based products, have not performed as well, showing largely stagnant export earnings of US$4–5 billion for fisheries and US$13 billion for wood-based products in recent years. Consequently, their trade shares and trade surpluses among the priority goods were declining; the surplus had been sizable in 2000 (US$7.2 and US$3.4 billion for the wood-based and fisheries sectors, respectively). Fisheries production in ASEAN, mostly for domestic consumption, has shifted increasingly from capture to culture in response to the ongoing decline in the coastal stocks and the

associated economic and ecological losses. There is also a need to ensure compliance with exacting and multiple standards and other requirements in the major import markets. By and large, the same issues of concern as regards over-exploitation (for industrial raw materials or commercial agriculture) and compliance also apply to the wood-based sector.

IV. SUPPLY-SIDE IMPLICATIONS AND OPTIONS

Greater integration and closer linkages of ASEAN economies and their priority sectors would lift collective efficiency and reduce transactions costs. The consequent gains are estimated to shave off as much as one-fifth of production costs of consumer goods in ASEAN (Schwarz and Villinger 2004). But integration gains can still be elusive without on-going improvements in the PIS supply side.[10] Some of the options and measures for enhancing the efficiency, competitiveness, and intraregional and extraregional linkages among the priority goods producers and suppliers are considered below.

A. Nontrade Costs

Distance determines the initial geography of trade flows but it is the speed, frequency, and ease of transport and its connectivity; border clearance and transit services; along with the expenses of wholesale and retail distribution and language and currency barriers that have determined trade, and hence a country's socioeconomic development itself. More trade leads to less expensive, faster, more frequent, and better timeliness of both transport and transport connectivity and cross-border clearance and transit services, which in turn lead to greater and more diversified trade (UNCTAD 2007, 161–6). However, nontrade costs have remained more substantial than tariff barriers for developing countries despite

[10]On one hand, external competition is now much stronger and comes from all over the globe. In particular, the PRC has become a formidable competitor in both world and home markets, including in T&C, footwear, furniture, engineering products, automotive parts and vehicles, and ICT equipment (Wattanapruttipaisan 2005a, Lall and Albaladejo 2004). On the other hand, higher benchmarks of performance, product and process innovation, and good manufacturing practices are now expected from all producers, competitors, and workers alike (Wattanapruttipaisan and Lam 2006, Lam and Wattanapruttipaisan 2005b). All these have led to the constant introduction of new, differentiated, safer, more reliable, and better designed goods and services. At the same time, there is the speedy appearance of less expensive substitutes for, as well as cheaper imitations of, those newly introduced goods and services themselves. In particular, the time lapse between the introduction of a new product and the appearance of largely the same product from competitors was about 33 years during 1870–1906, 14 years during 1927–1946, and less than 3.5 years in the two decades ending in 1986 (Agrawal and Gort 2001, 161–77).

globalization, proliferation of interregional value chains and industry supply networks, and rapid advances in ICT and transport technologies and equipment.

Indeed, it is not developed-country import tariffs per se that are a direct hindrance to trade. The estimated tariff barriers on developing countries' exports average 3 percent in the EU and the US. A reduction of 40 percent of such tariffs would lead to market access gains of only 2.3 percent for developing countries. The full elimination of import tariffs in the Organization for Economic Cooperation and Development (OECD) countries, an unlikely development under most scenarios, would increase developing economies' and world exports respectively by 6 and 10 percent on average (Djankov et al. 2006). In comparison, the costs of institutional, logistical and regulatory barriers to trade are estimated to be equivalent to an average tariff rate of 44 percent on developing countries' exports (Asian Development Bank 2006, 293; Anderson and Wincoop 2004, 4).

Among the negative externalities of inadequate and inefficient logistical services are excessive spoilage for perishable products (e.g., agro-based and fisheries goods); missed seasons (T&C, electronics, etc.); and costly damage of consignments in transportation and transit. A survey conducted by McKinsey and Company in 2005 shows that many companies in Asia have experienced late deliveries of up to a quarter of all consignments while some 2–4 percent of all consigned goods are damaged in transit. Late or damaged deliveries add substantially, estimated at $100–140 million a year, to the indirect costs of inland transportation (Dobberstein et al. 2005).[11] More importantly, they have a magnified adverse impact on supply chain operations that depend primarily on such good operational practices as just-in-time delivery and lean manufacturing (e.g., automotive, food and other processed products, ICT equipment and microelectronics, and T&C).

Overall, each additional day required in logistics is estimated to reduce the value of trade by 0.5–1 percent, while a 10 percent increase in the time needed to move goods from factory to ship can lower the value of time-sensitive goods by 7 percent. Specifically, customs inspections and documentation (pre-arrival paperwork especially) and foreign trade regulations account for about three quarters of the time delay in imports; while physical infrastructure (including port and terminal loading/unloading and transportation), another quarter.[12] Other

[11]Other indirect costs include deep discounts and contract penalties because of missed seasons or rapid changes in style (e.g., in the case of toys, fashion-related T&C and consumer electronics). Delayed and unpredictable deliveries also necessitate the holding and insuring of larger (pipeline and safety) inventories at both ends; this adds another 4–6 percent to production and marketing expenses.

[12]The data sample includes detailed questionnaires completed by trade facilitators at freight- forwarding agencies in 146 countries in 2005. For exports, the time lapse extends from the packing of goods at factory to their loading and departure at the port of exit. In the case of

estimates indicate that border-related costs are twice higher than those for transportation (references cited in the previous paragraphs in the text).

Broadly speaking, among the priorities of ASEAN customs authorities are the simplification and harmonization of procedures, formalities, and documents for more uniform customs treatment and speedier clearance and release of shipments as part of the trade facilitation strategy set in motion since 2002. A pilot project on ASEAN Single Window for the integrated and automatic processing of cargo and customs documents, for example, was carried out with success. The ASEAN Single Window Agreement and the ASEAN Single Window Protocol were signed in December 2005 and December 2006, respectively. The National Single Windows of six ASEAN countries are expected to be operational in 2008 while four remaining ones will do so before 2012. Meanwhile, parallel efforts have also been made by ASEAN to develop other logistics subsectors and their networks as well as to improve the interconnectivity, interoperability, and intermodality of the regional networks with the national, regional, and international gateways.

In that connection, trade liberalization and economic deregulation and privatization in ASEAN have led to the greater participation of private-sector enterprises in the logistics industries, including through joint ventures with their overseas counterparts. Scale and alliances are important, especially in the transport and communications segments. Nevertheless, the number of logistics players on a regional and global scale is limited in ASEAN.[13] Besides, many logistics subsectors remain fragmented and most logistics suppliers are SMEs in the region. There is, moreover, much scope for greater harmonization and better enforcement of existing policies and regulations; for improved and less costly services (particularly in various transport and communications modes and their maintenance and operations); for larger agglomeration economies through improved clustering of transport and communications nodes; and for better networking and alliances among the regional logistics suppliers.

As a whole, nontrade costs are still significant within ASEAN, especially in the less developed and newer members of the grouping. In 2005, for example, the number of days needed for exports (imports) were in the range of 43–66 (55–78) in Cambodia and Lao PDR; 20–35 (22–36) in Indonesia, Malaysia, Philippines, Thailand, and Viet Nam; and 6 (8) in Singapore. Comparatively, the

imports, the time lapse starts from the ship's arrival at the port of entry to their delivery at the factory warehouse. For further details on sample size and methodologies, see World Bank (2006), Djankov et al. (2006), and Hausman et al. (2005). Nordas (2004b) provides a review of published papers on trade-related transport costs.

[13]The most notable exception is Singapore, which overtook Hong Kong, China in 2005 as the world's largest container port, handling 22.3 million of 20-foot equivalent containers. The Port of Singapore Authority International (formerly known as PSA only) processes some 41 million containers a year at 19 ports it operates in 11 countries. The top 10 port operators control one half of the global container shipping business (Levinson 2006, 36 and 40).

time periods required for exporting (importing) are 20 (24) in the PRC and 36 (43) in India (World Bank 2006). In several parts of ASEAN, furthermore, telecommunications remain more costly, while intraregional transport services are generally less adequate and more expensive in terms of frequencies, the required time lapses and costs than those for the extraregional shipment of a comparable cargo. Deservedly, therefore, logistics was selected in 2006 as the 12th priority sector for accelerated integration in the region.

B. Trade-related Constraints

Diverse and exacting tariff packages, rules of origin (RoO), and technical standards and requirements have comprised another set of barriers to trading, increasing trade frictions and lowering the certainty and transparency of trade-related treatment over time (Krishna 2005, Nixson and Wignaraja 2004, Augier et al. 2003, and Brenton and Manchin 2002). Indeed, it remains a formidable challenge to all stakeholders concerned in ensuring in various PTAs and FTAs limited and time-bound product exclusions as well as clear, simple, and consistent implementing regulations as regards RoO, tariff, and technical barriers to trade. All those, and their impact and implications on ASEAN competitiveness and integration, highlight once again the encompassing agenda awaiting further policy research and dissemination of business-related information.

1. Exacting Trade Regulations and Standards

Globally, estimates show that inside-the-border barriers and difficulties in accessing information on, and complying with, technical standards reduce the export shares of developing countries' firms by 18 percent.[14] Mandatory standards and conformity assessments (including testing, certification, labeling and marking, and inspection requirements) lower these firms' export shares by a further 9 percent.[15] Verification for enforcement, and proving origin and

[14] The ability to prove origin and conformity, for example, necessitates not just the use of costly imported inputs, among others. Sophisticated and expensive accounting procedures and machinery and time-consuming paperwork are needed to keep track of diverse inputs from different origins and to prove the compliance and consistency of such inputs with the prevailing RoO, technical rules, and standards. Compliance typically raises both fixed and variable (operational) costs. It may require significant redesign, retooling, recombination of inputs, improvements in sourcing and quality control, personnel training, different packaging and marketing, etc. These costs are much greater in PIS and industries with high certification intensity, such as electrical and electronics machinery and components, automotive engine parts and components, pharmaceuticals, leather processing and finishing, and food and wood processing.

[15] The study sample is based on 619 firms in Eastern Europe, Latin America, Middle East, South and Southeast Asia, and sub-Saharan Africa (Chen et al. 2006).

compliance to standards are both time-consuming and costly on both sides. In fact, compliance has become a complicated and costly issue for ASEAN and other developing-country producers in their major export markets (Francois et al. 2005, Sanchez and Butler 2005, and Evans and Harrigan 2004).

On one hand, there are many time-sensitive and perishable priority goods, a large number of which are also of significant domestic sensitivity in the major import markets. Many PIS firms, on the other hand, rely on lean manufacturing and just-in-time delivery from a large number of local and/or trans-border subcontractors. Those firms are thus facing higher operating costs in ensuring their own compliance to multiple standards on the same goods exported under different trading arrangements or to different countries; not infrequently, several of those standards are of a nontrade nature or come from diverse interest groups. Those same export firms also have to verify compliance with multiple standards of all their local and imported inputs, unless those inputs were already certified in advance or come from certified enterprises.

Indeed, large-scale product recalls and input rejections, the clearest manifestations of supply chain management problems, are not infrequent even for long-established, globally well-known branded goods ranging from automobiles to consumer electronics products and toys. As such, firm-level certification is likely to become a prerequisite for even third-tier subcontractors in both domestic and trans-border value chains and supply networks. Although being a global player for a long time in many traded products, ASEAN enterprises are still building up capabilities in compliance for certification. Take the 9001 (2000 series) certificates of quality management systems from the International Organization for Standardization, for example. Indonesia, Malaysia, Philippines, Singapore, and Thailand had 18,498 certificates, and ASEAN had 20,493 certificates (or 3.1 percent of the global total) as of December 2004 (ISO 2005). The PRC, comparatively a newer comer in production and trade, had a stock of 132,926 certificates (or 19.8 percent).

Exacting tariff packages, RoO, and technical standards and requirements are among the major factors behind the underutilization or even abandonment of the allocated quotas in several sensitive goods sectors in the importing countries. T&C, in particular, are a time-sensitive and economically sensitive product that is universally subject to strict RoO and escalated tariffs (for processed textiles and made-up garments) in most industrial markets. In 2000, for example, 21 out of 43 specific quotas in the US (the largest global consumer of T&C) had a utilization rate below 50 percent, with zero utilization for three quotas. In the EU (Canada), 28 (19) out of 37 (27) T&C quotas had a utilization rate below 50 percent (WTO 2001).

There are other examples as well. EU firms have relied heavily on outward processing trade arrangements (OPTAs) with Central and Eastern European economies. OPTAs are accorded preferential (duty-free) tariffs in the EU.

Nevertheless, most favored nation (MFN) duties were paid on 28 percent of OPTA imports from economies of the European Free Trade Association (EFTA) in the early 2000s. This is because those duties are lower than the cost of proving OPTA origin so as to gain duty-free status. There is, moreover, the risk of rejection of even valid documents at the customs points and the substantial expenses incurred by EFTA exporters and EU importers from the consequent delays, and from additional storage and clearance charges (Brenton and Machin 2002).

Regionally, the RoO in AFTA and ASEAN-related FTAs are comparatively less complicated and restrictive than those in many other FTAs, including the North American Free Trade Agreement (NAFTA) and the series of FTAs between the EU and several Eastern European and Southern Mediterranean countries.[16] Nevertheless, the value of preferential trade under the ASEAN Industrial Complementation (AICO) scheme has been very modest.[17] It was around 10 percent or less of the amount of intra-ASEAN trade in the recent years (ASEAN Secretariat 2005). Meanwhile, intra-regional trade itself has remained largely stagnant at around one quarter of total trade since 1995. Comparatively, these trade levels are much less buoyant than those of other economic groupings.[18]

Among the contributing factors to that trend is the eroded margin of preferences between the AFTA/CEPT rates and the MFN rates (including duty drawbacks on imported inputs used in the exports involved). Similar to the case of OPTA in the EU, there are also various nontrade transaction costs in ASEAN. These include difficulties and delays in proving origin and obtaining AFTA certificates of origin for preferential tariffs (the so-called Form D). As a result,

[16]Indeed, NAFTA-related agreements, and most of the FTAs entered into by the EU, tend to be associated with multiple criteria for determining origin and more restrictive variants of individual criteria. More restrictive RoO, by and large, tend to be found in PTAs and FTAs between countries where there are relatively higher tariff and nontariff barriers and/or where the differences in tariffs are relatively high (Productivity Commission 2004).

[17]AICO aims at fostering regional industrial complementation and integration through the granting of preferential tariff rates (0–5 percent) on qualified manufacturing inputs imported for further processing or final use in ASEAN. Those tariff rates became zero in six ASEAN members from 2005 and in another three from 2006. Myanmar has granted an AICO preferential tariff rate of 0 percent since 1 January 2005. As an additional incentive, the ASEAN national equity requirement, set at a minimum of 30 percent, had been waived for AICO applications up to 31 December 2007.

[18]For example, intraregional trade amounted to 38 and 46 percent of total NAFTA trade between 1990 and 2003, respectively. The corresponding proportions were 39 and 64 percent in the case of the EU-15. Also notably, intraregional trade in total trade went up by 41 percent in the first 10 years of the EU, by 17 percent in the first 7 years after the inception of the NAFTA, and by 67 percent in the first nine years of MERCOSUR, a free-trade zone comprising Argentina, Brazil, Paraguay, and Uruguay (Asian Development Bank 2006, Schwarz Villinger 2004).

AICO trade is most heavily used by transnational corporations in high tariff sectors, automotive especially. Notably in this context, South Asian Association for Regional Cooperation (SAARC) preferential tariffs have not created much intraregional trade for similar reasons (Asian Development Bank 2006, 274; Rajan and Sen 2004, 30–1). The RoO and the related certification procedures under AFTA/CEPT are currently under revision to address the above concerns, among several others (more below).

C. Diverse Trade Packages and Commitments

A compounding factor in the above context is the proliferation of FTAs that are increasingly crisscrossing at the transregional, regional, and bilateral levels. ASEAN as a group or several ASEAN members are partners in 10 current and prospective FTAs with countries both within and outside the region. In addition, an ASEAN–EU FTA and ASEAN–Pakistan FTA are now on the card while other FTAs with the US and Canada are being foreshadowed. Meanwhile, individual ASEAN members are involved in another 34 current and prospective bilateral FTAs with developed and developing economies in Asia and elsewhere. The newer and less developed ASEAN countries, notably, are not a party to any bilateral FTAs, except for one between Lao PDR and Thailand.[19] In comparison, Singapore has entered into more bilateral FTAs than any other regional economy.

Typically, the margins of preferences or reductions on the same groups of manufactures and commodities are not the same in different FTAs. Besides, the categories of manufactures and commodities of major interest to the regional economies are eligible for preferential or reduced tariff packages in some FTAs but not in other FTAs. Pertinent in those contexts is a common feature shared by the Framework Agreement (signed in November 2004 for implementation from August 2005), and the FTAs covering trade in goods between ASEAN and the PRC (signed in November 2004 for implementation from July 2005), and between ASEAN and Republic of Korea (signed in May 2006). Signatory countries have their own exclusion (negative) lists for sensitive and highly sensitive products. The listed products, which are different among the regional countries and their external FTA partners(s), are also subject to various rates, methods, and timetables of protection (or trade liberalization).

There are then two other related issues. One, the RoO (and for that matter, product and process standards and other conformance requirements on specific products) have yet to be harmonized among different FTAs involving different

[19]All those FTAs involving ASEAN originated from the early 2000s except for three—namely the Asia-Pacific Trade Agreement of 1975 (formerly known as the Bangkok Agreement until the name was changed in November 2005); the Global System of Tariff Preferences of 1989 (which is a PTA among developing countries, and not an FTA); and the AFTA of 1992 (Asian Development Bank 2006).

trade partners and/or in different years. Currently, the RoO under AFTA/CEPT are under revision to ensure greater consistency of RoO in ASEAN FTAs with its dialogue partners. It is recognized that the AFTA/CEPT RoO could serve as the benchmark for RoO in ASEAN FTAs more generally and as such they should be as, if not more, liberal than the RoO in ASEAN FTAs with its dialogue partners. For example, if the product-specific rules in the RoO of those FTAs are less restrictive, then those rules should be adopted under the AFTA/CEPT, and vice versa.

The second issue is the great complexity of RoO from several developed countries. This can be seen from the large chunk of text, for example, some 200 pages in the case of NAFTA (1994) and of the Agreement to establish the European Economic Area signed in 1992 between the then European Community and the EFTA economies. Virtually the same RoO are attached by the EU and the US to many of their FTAs; those in the FTA between the US and Singapore, in particular, are product-specific and cover some 280 pages. There are currently no reasons to expect that ASEAN would be presented with substantially different sets of RoO in the prospective FTA negotiations with the EU and the US.[20]

The net result of diverse trade packages and commitments is a daunting challenge to regional producers and exporters of priority and other goods, and to their local or transborder supply chain partners too. They all have to figure out which products or inputs qualify for what margins of tariff concession, under what standards and regulations, at what stage and level of (RoO-required) processing, in what markets, and during what timeframes. Trade-offs have also to be factored in because taking advantage of a particular FTA may require changing long-established value chains and supply networks (e.g., because of diverse RoO and standards requirements). This can lead to costly disruptions to production arrangements and compliance certification, and to the possible loss of existing market access and shares as well (Batson 2006, Asian Development Bank 2006). All these embody yet another important and extensive area for in-depth research on the net impact and outcomes of the multiplying PTAs and FTAs a few years down the road.

[20]A complicating factor is the pan-European system of RoO. This system, which came into force in 1997, has provisions for diagonal cumulation. It applies to the trade agreements between the EU and the four EFTA economies and some 10 economies in Central and Eastern Europe plus Turkey (from 1999). The EU has also signed Association Agreements with at least another 10 Southern Mediterranean economies (with provisions for only bilateral cumulation in most cases). These Southern Mediterranean economies have agreed in principle to adopt the pan-European system. However, in order to avail of the same RoO provisions (including those for diagonal cumulation), each of these Southern Mediterranean partners would have to sign FTAs with all other pan European economies and adopt identical RoO (Augier et al. 2003).

D. Cumulation Levers for Supply Chain Formation

Intra-ASEAN exports of T&C have remained at a low level, averaging around US$2 billion (or just over 9 percent of total T&C exports) over 2000–2004. What is more, the absolute amount and relative share of intraregional trade in T&C has changed little, for example, since 1997 (Austria 2003). There is thus much scope for increased trade and supply linkages for greater collective efficiency and competitiveness among the T&C sectors in the region and in the neighboring non-regional countries as well.

1. Transregional Supply Chains

The Generalized System of Preferences (GSP) tariffs are considerably lower than the corresponding MFN rates on (qualified) exports from developing countries. On their own, however, several countries in ASEAN and elsewhere are not able to meet the cumulation provisions and/or to prove origin for GSP tariffs. In this connection, the preference schemes administered by Canada and the EU can serve to encourage regional T&C integration by permitting the use of lower-value (or higher-value) fabrics in combination with more complex (or simpler) made up garments.[21]

During 2004–2005, for example, Canada imported on average US$4.5 (US$5) billion of textiles (clothing) a year, with some 94 percent coming from developing Asia and 12 percent from ASEAN. Canada's RoO requirements for duty- and quota-free access by the least developed countries (LDCs) are relatively liberal: a minimum of 25 percent of import content from Canada, from LDCs, or from developing countries eligible for Canada's preferential tariffs such as those in ASEAN (except Myanmar) and East Asia (except Taipei,China).

Imported T&C into the EU averaged US$82 billion annually in the same period, with 55 percent being sourced from Asian developing economies and another 27 percent from Turkey and countries in Central and Eastern Europe and North Africa (Whalley 2006). Imports from ASEAN members (except Myanmar) and from the SAARC economies are qualified for regional cumulation and for derogation to the EU–GSP rules on T&C in the case of the regional LDCs (except Myanmar). Specifically, EU preferential tariffs are given to T&C imports with

[21]The T&C imports are largely excluded from the US GSP schemes so that just over one-half of dutiable imports from developing countries are eligible for preferences in the US (Brentton and Manchin 2002). Besides, the RoO under NAFTA involve a relatively stringent "triple transformation" requirement (covering yarn production; grey fabric finishing, cutting, and sewing). There is, however, some recent flexibility: the RoO under United States-Central American Free Trade Agreement (CAFTA) allows cumulation between NAFTA and CAFTA partners (Asian Development Bank 2006).

double transformations (or double jumps) from yarns to fabrics and from fabrics to garments. Single transformation is acceptable under certain circumstances but the import contents (e.g., imported yarns or imported woven fabrics for knitted or woven garments) must be less than or equal to 40 percent of the ex-factory prices of the products concerned (Mekong Capital 2003, 11).[22]

Thus, through suitable procurement and production mixes, the EU and Canadian markets offer great opportunities for supply chain linkages involving ASEAN, East Asian, and/or the SAARC economies. In this context, India can play a complementary role in an ASEAN-SAARC supply network. Textiles account for almost 50 percent of India's global T&C exports, compared to 8 percent or less in the case of ASEAN (Wattanapruttipaisan 2005b). Such a marked difference in trade production and specialization means that, for now, the potential complementarities between ASEAN and India in supply chain formation are more important than the potential competition from India in home and world markets of ASEAN (more below).

E. ASEAN–PRC Supply Network

Another possible linkage stems from the PRC's substantial imports of textiles, almost US$22 billion in value (with another US$1.4 billion spent on imported garments**)** a year during 2004–2005. An integrated ASEAN or ASEAN–PRC supply chain would enable ASEAN not only to meet part of the PRC's massive import of textiles and fabrics. It would also help to lower ASEAN's own dependence on imported upstream products, which totaled US$10.4 billion (with another US$2.7 billion for imported garments**)** per year during 2004–2005. Another by-product of such a supply chain partnership is the reduced competitive pressures on ASEAN from the PRC; the setbacks in T&C exports from ASEAN to the US and the EU in the recent years were indicated earlier.

A number of downsides in T&C relocation and supply chain development must now be noted. To begin with, the major prerequisites to pull in and anchor such development and relocation are not yet operational and will take much time and resources to set up in many parts of ASEAN, the less developed regions in particular. These prerequisites include a skilled and technologically experienced workforce, affordable and adequate power and water supplies, an efficient and interlinked transport and communications infrastructure, and speedy and

[22]Those RoO requirements account for a lower proportion of Cambodian garments (27.4 percent or 107.5 million euros in 2001) entering duty-free in the EU, compared to 57.6 percent (equivalent to 73.5 million euros) for Lao PDR. Many inputs for Laotian garments are linked to sources from Thailand, thus qualifying for regional cumulation. However, Cambodia relies more heavily on imported inputs from East Asian economies that do not qualify for such regional cumulation or for regional derogation under the RoO requirements in the EU (Mekong Capital 2003, 14).

inexpensive transborder clearance within the region. All these factors partly explain the persistence so far of the limited levels of intra-ASEAN trade and linkages in T&C, and of the high nontrade costs in several parts of the region as previously mentioned.

Meanwhile, India's formidable strength in textiles production and sizable and expanding domestic market can be a decided advantage over ASEAN in the bidding for, and the hosting of, textiles-related upstream activities to be relocated from the developed and the East Asian economies. Also notably, the PRC has been developing its own upstream textiles industries through, among other means, the formation of joint investment ventures with overseas partners. The Republic of Korea, in particular, has shifted textiles production facilities, with the PRC being the host for one third of the offshore investment of US$2.6 billion (Thomas 2005, 42). As a result of such relocation-driven improvements, the proportion of imported textiles in total T&C trade of the PRC has fallen from 31 percent in 1990, to 28 percent in 1995, and further to just below 17 percent in 2005. This rapid decline, which can be expected to continue, will limit the local needs for imports of upstream textiles goods and hence the opportunities for ASEAN in supply chain formation in the long run.[23]

F. Limited Research and Innovation

In contrast to the T&C sector, intra-ASEAN exports of ICT and electronics products are much higher, averaging 24 percent of annual exports of the same goods during 2000–2004. This represents the market-driven establishment of ASEAN as a major player in the global and regional value chains and supply networks. ICT and electronics products are characterized by fast-paced, disruptive changes in technology and design that highlight, in turn, the critical importance of product and process invention and innovation. Such technological creativity is indispensable as a bridgehead for further integration and linkages, especially in higher value-adding and sophisticated activities and services such as design, branding, and marketing.

Generally, most regional producers (both large firms and SMEs) are still engaged in ICT and electronics segments and components that are labor-intensive and standard (instead of top-of-the line), have limited value-added and high import content, and rely on mature and widely available technologies. Within ASEAN, Malaysia's ICT and electronics industries (with 57 percent of merchandise export earnings in 2004) are the largest in terms of employment. Local value added, however, was less than one percent in computers, 7 percent in consumer electronics, and 21 percent in semiconductors testing and calibration.

[23]Reportedly, a meter of polyester fabric costs Rp7,000 (about US$0.70) to make in Indonesia compared to Rp2,300 for the same material made and woven in the PRC (Ng 2005).

Such limited value addition was also rising slowly, by 10 percent or less, between 1994 and 2000 except in consumer electronics due to the initially low base of value addition in this subsector (Yusuf et al. 2003, 272). Subdued productivity and value addition are characteristic, too, of the electronics industries in Thailand (36 percent of merchandise exports), Philippines (66 percent), and Indonesia (14 percent).[24]

Exceptionally, Singapore has developed an integrated base of microelectronics production (with 55 percent of gross exports) embodying high capital and skilled-labor intensities, and high value addition (Lam and Watttanapruttipaisan 2005b). Locally owned Chartered Semiconductor Manufacturing is notably the largest single owner of invention patents granted by the United States Patent and Trademark Office (USPTO) to ASEAN inventors. That helped Singapore to become the source of 77 percent (or 2,299) of all USPTO patent grants to ASEAN countries in the decade 1995–2004. USPTO invention patents in microelectronics secured by firms in other regional economies are negligible for all practical purposes.[25]

Among other stimuli, public spending on research and development (R&D) has risen to 1.8 percent of GDP in Singapore since the mid-1990s, compared generally to less than 0.4 percent of GDP in other ASEAN countries. For a perspective, R&D outlays were in the range of 2.5–3 percent in Japan and the Republic of Korea, and 1.2 percent in the PRC in the early 2000s. Meanwhile, R&D by private enterprises are insignificant in ASEAN, except again in Singapore, while the interactions between the research institutions and the business sector leave much to be desired in the region, with the possible exception of those in Singapore from the late 1990s (UNCTAD 2005; Lam and Wattanapruttipaisan 2004, 77–9).

Low levels of R&D spending have led to a narrower scope and smaller base of science and technology (S&T) and R&D. In turn, this has contributed to bottlenecks in job creation in the S&T and R&D sectors; to low enrolment rates in the hard sciences; and to grossly limited supply of scientists, engineers, research technologists and technicians, and knowledge managers and workers in

[24]For a more detailed discussion on these matters, see Tham (2004); Tangkivanich, Nikomborirak and Krairiksk (2004), Lall (2003), UNCTAD (2003), Dodgson (2000), and Linden (2000). Lam and Wattanaprutipaisan (2005a and b) examine at some length the new electronics-based specialization in production and trade in ASEAN, and the related opportunity costs in terms of defensive and positive industrial restructuring plus the heightened vulnerability to cyclical external demand.

[25]For context, Taiwan Semiconductor Manufacturing Company (TSMC) and United Microelectronics Corporation (UMC) in Taipei,China is respectively the world's largest and second largest dedicated chip foundry. Both are highly profitable businesses with significant local addition of high-premium design contents. TSMC was the recipient of 2,239 USPTO invention patents and UMC, 1,526 patents during 2000–2004 (Lam and Wattanapruttipaisan 2005b).

many critical manufacturing sectors of most ASEAN economies.[26] In particular, the proportion of knowledge professionals and workers in the labor force was only 12 percent in the Philippines and Thailand, and 25 percent in Malaysia in the early 2000s. For Singapore, it was 36 percent, a ratio slightly higher than the Organization for OECD countries' average of 31 percent (Lam and Wattanapruttipaisan 2004).

Moreover, what matters is the availability of professionals not only with formal qualifications but also with the requisite practical experiences (Amsden, Tschang, and Goto 2001, 11–2). Essential in this connection are the tried and tested periods of apprenticeship, understudy, and multitasking for the necessary enriching of the quality, skills, experience, perceptions, and versatility of the existing but highly limited pool of qualified human resources. Expatriate professionals and the returning engineers and business managers are particularly valuable in that regard. They have helped to bridge the knowledge gap among enterprises and industries in Republic of Korea; Singapore; Taipei,China; and increasingly, the PRC (see below). However, this is not a solution or option equally feasible in other ASEAN economies in the foreseeable future.

Another matter for consideration by both government and business is that major companies in the PRC are spending significantly more on R&D than the international norm of R&D expenditure of about 5 percent of sales revenue.[27] This reflects their preparation for business internationalization through product and process innovations, outward foreign direct investment (FDI), and mergers and acquisitions overseas. Meanwhile, R&D activities are also much facilitated by the high quality of engineering schools in the PRC and their large pool of engineering graduates. In 2004, for example, two schools were ranked among the world's top 15, while another six appeared in the global top 100. In contrast, no engineering school from Indonesia, Philippines, or Thailand made the list. Another facilitating factor is the very large number of graduates of engineering schools in the US from the PRC. Among the foreign-born engineers and scientists who have no plans to stay in the US, 25 percent are from the PRC, compared to one percent from Indonesia, Philippines, and Thailand combined (Puga and Trefler 2005, 21).

[26]The pertinent causes and effects, and their implications on human and institutional capacity building, are examined at length in Lam and Wattanapruttipaisan (2004), Best and Rasiah (2003), Lall (2003), UNIDO (2002), Ernst (2000), and Hobday (2000).

[27]Huawei Technologies Company, a major ICT player, has already allocated more than 10 percent of revenue on R&D relating to ICTs. Other budding transnational companies in the PRC with R&D outlays of 4–6 percent of sales revenue include the Haier Group (maker of household appliances with sales revenue of US$9.7 billion in 2003); TCL and Lenovo (both belonging to the ICT sector with sales revenue of US$3.4 and US$3 billion, respectively); and the SVA and Galanz Groups (consumer electronics and home appliances maker, respectively).

The PRC is now regarded as competitive in many advanced technologies. Indeed, the consensus among industry observers is that the PRC had overtaken the US as the center for handset technology from the mid-2000s.[28] Meanwhile, there has recently been a steep rise in invention patents owned by US entities but with various contributions from the PRC (or, for that matter, Indian) inventors.[29] For example, the number of such patents in the technologically mature automotive sector, which had averaged less than 65 a year during 1999–2000, jumped to over 200 annually in 2003–2004. In contrast, joint inventions and patenting activities in the same sector have been low or have declined (from low peaks) in many other popular destinations of automotive-related FDI—including Eastern Europe, Latin America such as Mexico, and Southeast Asia including Thailand (Pugo and Trefler 2005, 1–3).

V. CONCLUSION

The priority sectors for integration are of strategic importance in ASEAN as a major source of employment, foreign exchange earnings through external trade and inward FDI, skills formation and deepening, and enhanced social status and independence of women though their greater participation in the labor force. The accelerated integration of priority sectors starting from August 2005 will certainly help to underpin the AEC building process in the region. For many stakeholders, nevertheless, the timely and sustained implementation of many PIS roadmap measures is likely to remain a matter for concerted efforts in follow-up and coordination at both the national and regional levels. The multifaceted gap in development within ASEAN, moreover, is an overarching issue that will likely condition both the extent and pace of sector-level integration and AEC building.

Another matter for focused attention from both government and business, meanwhile, is the need for ongoing improvements in PIS supply side in ASEAN. Nontrade costs remain significant in many parts of the region, the less developed

[28]Nokia's mobile handset 6108 was first produced in the PRC with significant local design content. Despite competing bids from heavyweights, 3Com of the US purchased in November 2004 the first high-end series 8800 electronic switching system for data and telecommunications largely designed and manufactured in the PRC. The networking gear involved claims twice the performance of a comparable switch from Cisco Systems Incorporation, a giant in the field also from the US. Yet it is 25 percent less expensive.

[29]According to USPTO practices, the assigned nationality or location of a patent is determined by the address of the first inventor listed in the patent application. Increasingly with the internationalization of R&D and transborder networking among S&T institutions (UNCTAD 2005), an invention patent is likely to be the composite product of research personnel and corporate entities resident in different countries. This raises further issues as regards the main sources of intellectual property creativity and the distribution of relative benefits from the inventions among the stakeholders and, by implication, the effectiveness of domestic frameworks and systems to foster invention and innovation, and technological capabilities themselves (Lam and Wattanapruttipaisan 2005b).

and newer ASEAN members in particular. This can be a constraint on sourcing strategies and dissipate some of the hard-earned gains from integration. Meanwhile, the adverse impact on priority-goods trade and integration from exacting trade rules and technical regulations and requirements is compounded by diverse packages of trade liberalization and RoO under the proliferating FTAs with ASEAN as a group or a bilateral partner. Again, it remains a formidable challenge to all regional and nonregional stakeholders to ensure in various trade arrangements limited and time-bound product exclusions as well as clear, simple, and consistent implementing regulations as regards RoO, tariff, and technical barriers to trade.

ASEAN has experienced setbacks in T&C exports in the recent years. In this regard, significant opportunities exist for enhanced collective efficiency and competitiveness through supply chain formation involving ASEAN economies, or between these economies and those in SAARC and/or the PRC. Such supply linkages are facilitated by the available preferential tariffs, particularly those in EU and Canada. Meanwhile, market-driven intra-regional linkages are much denser in the case of ICT equipment and electronics. A major issue for supply-side strengthening in ASEAN is the need for higher levels of local value addition through product and process inventions and innovations. Technological creativity has been an Achilles heel of regional businesses, with the partial exception of those in Singapore. This issue has become more pressing against the backdrop of the PRC's rapid progress in competence building, technology catch-up, and competitiveness and dynamism in manufacturing industries. All these highlight once again the rich agenda awaiting further research, information dissemination, and human and institutional capacity building in ASEAN.

REFERENCES

Agrawal, R., and M. Gort. 2001. "First-mover Advantage and the Speed of Competitive Entry, 1887-1986." *Journal of Law and Economics* 44(April): 161–78.

Amsden, A. H., T. Tschang, and A. Goto. 2001. Do Foreign Companies Conduct R&D in Developing Countries? ADBI Working Paper 14, Asian Development Bank Institute, Tokyo.

Anderson, J. E., and E. v Wincoop. 2004. Trade Costs. Working Paper No. 10480, National Bureau of Economic Research, Cambridge, Massachusetts. Subsequently published in 2004 as "Trade Costs." *Journal of Economic Literature* 42(September): 691–751.

ASEAN Secretariat. 2005. *Annual Report 2004-2005*. Jakarta.

Asian Development Bank. 2005. *Key Indicators 2005*. Manila.

_____. 2006. *Asian Development Outlook 2006*. Manila.

Augier, P., M. Gasiorek, and C. Lai-Tong. 2003. "The Impact of Rules of Origin on Trade Flows." Available: http://www.intra.fr/internet/Departments/ESR/UR/lea/actualites/ROO2003/articles/gasiorek.doc.

Austria, M. S. 2004. "The Patterns of Intra-ASEAN Trade in the Priority Goods Sectors." Report prepared for the ASEAN Secretariat under the AADCP-Regional Economic Policy Support Facility, ASEAN Secretariat, Jakarta.

Batson, A. 2006, "Asian Firms Shrug at Trade Pacts." *The Wall Street Journal–Asia.* 7 April, page 3.

Best, M., and R. Rasiah, 2003. Malaysian Electronics at the Crossroads. Small and Medium Enterprises Branch Technical Working Paper Series No. 12, United Nations Industrial Development Organization, Vienna.

Brenton, P., and M. Manchin. 2002. Making Trade Agreements Work—The Role of Rules of Origin. Centre for European Policy Studies Working Document No. 183, Centre for European Policy Studies, Brussels.

Chen, M. X., T. Otsuki, and J. Wilson. 2006. Do Standards Matter for Export Success? Policy Research Working Paper WPS 3809, World Bank, Washington, DC.

Djankov, S., C. Freund, and C. S. Pham. 2006. Trading on Time. Policy Research Working Paper WPS 3909, World Bank, Washington, DC.

Dobberstein, N., C. S. Neuman, and M. Zils. 2005. "Logistics in Emerging Markets." *The McKinsey Quarterly* 1. Available: www.mckinseyquarterly.com/article_abstract.aspx?ar=1557&L2=23&l3=81.

Dodgson, M. 2000. "Policies for Science, Technology, and Innovation in Asian Newly Industrializing Economies." In L. Kim and R. R. Nelson, eds., *Technology, Learning, and Innovation–Experiences of Newly Industrializing Economies*. Cambridge: Cambridge University Press.

Ernst, D. 2000. "What Permits David to Grow in the Shadow of Goliath? The Taiwanese Model in the Computer Industry." In M. Borrus, D. Ernst, and S. Haggard, eds., *International Production Networks in Asia—Rivalry or Riches?* London: Routledge.

Evans, C., and J. Harrigan. 2004. Tight Clothing: How the MFA Affects Asian Apparel Exports. Working Paper No. 10250, National Bureau of Economic Research, Cambridge, Massachusetts.

Francois, J. F., M. McQueen, and G. Wignaraja. 2005. EU-Developing Country FTAs: Overview and Analysis. Yale Center for the Study of Globalization, Global Trade and Financial Architecture Research Papers. Available: http://www.ycsg.yale.edu/focus/researchPapers.hml.

Hanson, G. H., and R. C. Feenstra. 2001. Intermediaries in Entrepot Trade: Hong Kong Re-exports of Chinese Goods. Working Paper 8088, National Bureau of Economic Research, Cambridge, Massachusetts.

Hausman, W. H., H. L. Lee, and U. Subramanian. 2005. Global Logistics Indicators, Supply Chain Metrics, and Bilateral Trade Patterns. Policy Research Working Paper WPS 3773, World Bank, Washington, DC.

Hobday, M. 2000. "East versus Southeast Asian Innovation Systems: Comparing OEM- and TNC-led Growth in Electronics." In L. Kim and R. R. Nelson, eds., *Technology, Learning, and Innovation–Experiences of Newly Industrializing Economies.* Cambridge: Cambridge University Press.

International Monetary Fund. 2004. "Re-exports and Goods in Transit." Paper prepared for the 17th Meeting of the IMF Committee on Balance of Payments Statistics, 26–29 October, Pretoria, South Africa.

ISO. 2005. *The ISO Survey 2004*. International Organization for Standardization, Geneva.

Krishna, K. 2005. Understanding Rules of Origin. Working Paper 11150, National Bureau of Economic Research, Cambridge, Massachusetts.

Lall, S. 2003. Indicators of the Relative Importance of IPRs in Developing Countries. Issue Paper No. 3, UNCTAD/ICTSD Capacity Building Project on Intellectual Property Rights and Sustainable Development, UNCTAD and ICTSD, Geneva.

Lall, S., and M. Albaladejo. 2004. "China's Competitive Performance: A Threat to East Asian Manufacturing Exports." *World Development* 32(September):1441–66.

Lam, N. V., and T. Wattanapruttipaisan. 2004. "Intellectual Property Rights and Enterprise Development in ASEAN." *The Journal of World Intellectual Property* 7(January):53–97.

———. 2005a. "From Grain-sized Innovations to Triple-test Patents in ASEAN: Patterns, Issues and Implications in Development and Competitiveness." *ASEAN Economic Bulletin* 22(August):117–43.

———. 2005b. "Intellectual Property Creation as Invention Patents for Development and Competitiveness in ASEAN." *The Journal of World Intellectual Property* 8(September):625–61.

Levinson, M. 2006. "The Box that Changed Asia and the World." *Forbes Asia*. 13 March. Pages 31–40.

Linden, G. 2000. "Japan and the United States in the Malaysian Electronics Sector." In M. Borrus, D. Ernst, and S. Haggard, eds., *International Production Networks in Asia–Rivalry or Riches?* London: Routledge.

Mayer, J. 2004. Not Totally Naked: Textiles and Clothing Trade in a Quota Free Environment. UNCTAD Discussion Papers No. 176, United Nations Conference on Trade and Development, Geneva.

Mekong Capital. 2003. *WTO Agreement on Textiles and Clothing (ATC): Impact on Garment Manufacturing in Cambodia, Laos and Vietnam.* Ho Chi Minh City.

Meredith, R. 2006. "Commercial Crossroads." *Forbes Asia* 9 January. Pages 37–41.

Ng, B. Y. 2005. "Dragon Breathes down the Tigers' Neck in Textiles." *Asia Times.* 20 July. Page 9.

Nixson, F., and G. Wignaraja. 2004. Non-Tariff Measures, Technological Capability Building and Exports in India's Pharmaceutical Firms. INTECH Discussion Paper Series 2004-6, United Nations University Institute for New Technology, Maastricht.

Nordas, H. K. 2004a. The Global Textile and Clothing Industry Post the Agreement on Textiles and Clothing. World Trade Organization Discussion Paper No. 5, Geneva.

———. 2004b. Infrastructure and Trade. World Trade Organization Staff Working Paper No. ERSD 2004-04, Geneva.

Productivity Commission. 2004. "Rules of Origin under the Australia-New Zealand Closer Economic Relations Trade Agreement: Restrictiveness Index for Preferential Rules of Origin." Supplement to the Productivity Commission Research Report, Commonwealth of Australia, Canberra.

Puga, D., and D. Trefler. 2005. Wake Up and Smell the Ginseng: The Rise of Incremental Innovation in Low-wage Countries. Working Paper No. 11571, National Bureau of Economic Research, Cambridge, Massachusetts.

Rajan, R. S., and R. Sen. 2004. "The New Wave of FTAs in Asia: With Particular Reference to ASEAN, China and India." Paper presented at a High-level Conference on Asia's Economic Cooperation and Integration at the Asian Development Bank, 1–2 July, Manila.

Sanchez, G., and I. Butler. 2005. Measuring the Demand of Trade-related Technological Public Goods in Argentina. UNIDO Industrial Development Report 2005 Background Paper Series, United Nations Industrial Development Organization, Vienna.

Schwarz, A., and R. Villinger. 2004. "Integrating Southeast Asia's Economies." *The McKinsey Quarterly* 1. Available: http://www.mckinseyquarterly.com/article_abstract.aspx?ar=1392&L2=7&L3=8.

Tangkitvanich, S., D. Nikomborirak, and B. Krairiksh. 2004. "Country Studies on Foreign Direct Investment–Thailand." In D. H. Brooks and H. Hill, eds., *Managing FDI in a Globalizing Economy: Asian Experiences*. London: Palgrave Macmillan.

Tham, S. Y. 2004. "Country Studies on Foreign Direct Investment–Malaysia." In D. H. Brooks and H. Hill, eds., *Managing FDI in a Globalizing Economy: Asian Experiences*. London: Palgrave Macmillan.

Thomas, D. 2005. "Picking up the Pieces." *Newsweek.* 10 January, page 42.

UNCTAD. 2003. *Trade and Development Report 2003*. United Nations Conference on Trade and Development, New York.

———. 2005. *World Investment Report 2005—Transnational Corporations and the Internationalization of R&D*. United Nations Conference on Trade and Development, New York.

———. 2007. *Trade and Development Report 2007*. United Nations Conference on Trade and Development, New York.

UNIDO. 2002. *Industrial Development Report 2002/03–Competing through Innovation and Learning*. United Nations Industrial Development Organization, Vienna.

Wattanapruttipaisan, T. 2004. "Intellectual Property Rights and Enterprise Development: Some Policy Issues and Options in ASEAN." *Asia-Pacific Development Journal* 11(June):73–89.

———. 2005a. Background Note on China and ASEAN—Part Two: Risks and Opportunities to ASEAN. Studies Unit Paper 06/2005, Bureau for Economic Integration, ASEAN Secretariat, Jakarta.

———. 2005b. "Quota-Free Trade in Textiles and Clothing: Policy Issues and Options for ASEAN." *Asian Development Review* 22(1):71–96.

Wattanapruttipaisan, T., and N. V. Lam. 2006, "Trade and Investment in the Knowledge-based and Innovation-driven Global Economy." *The Journal of World Investment and Trade* 7(April):301–25.

Whalley, J. 2006. The Post MFA Performance of Developing Asia. Working Paper No. 12178, National Bureau of Economic Research, Cambridge, Massachusetts.

World Bank. 2006. *Doing Business 2006: Creating Jobs*. The World Bank and International Finance Corporation, Washington, DC.

World Trade Organization. 2001. Comprehensive Report of the Textiles Monitoring Body to the Council of Trade in Goods on the Implementation of the Agreement on Textiles and Clothing during the Second Stage of the Integration Process. Document No. G/L/459, Geneva.

Yusuf, S. et al. 2003. *Innovative East Asia–The Future of Growth*. New York: Oxford University Press.