

Global Production Networks and Foreign Direct Investment by Small and Medium Enterprises in ASEAN

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This paper examines cross-border investments by small and medium enterprises (SMEs) from member states in the Association of South-East Asian Nations (ASEAN). It explains this relatively under-researched topic from the perspective of SMEs' strategic coupling with or "plugging into" regional production networks coordinated by global lead firms. Facilitated by growing regional integration, these SMEs create and capture significant value added from their involvement in these production networks. The paper first highlights the different drivers of SME-specific FDI activities in ASEAN that contribute to strengthening regional economic integration through intra- and inter-firm activities in the region. The paper then explains the working of their strategic coupling with ASEAN-based production networks through different coupling mechanisms, such as international partnership, industrial specialization and production platforms. The key challenges confronting SME regionalization are highlighted. Finally, the paper considers the policy and practice of promoting SME regionalization so that they can plug into the growth dynamics of different regional production networks.

Key words: small and medium enterprises, regional production networks, strategic coupling, South-East Asia

1. Introduction

Global production has become much more organizationally fragmented and spatially dispersed since the 1990s. In its *World Investment Report 2013: Global Value Chains: Investment and Trade for Development*, UNCTAD (2013) estimates that some 80 per cent of global trade is now organized through global production networks (GPNs) that

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are coordinated by lead firms investing in cross-border productive assets and trading inputs and outputs with partners, suppliers and customers worldwide. Analysed in depth in Coe and Yeung (2015), GPNs and global value chains (GVCs) are now the most critical organizational platforms through which economic production in primary, manufacturing and service sectors is structured on a global basis (see also Neilson et al., 2015). A 2010 World Bank report on the post-2008 world economy further claims that “given that production processes in many industries have been fragmented and moved around on a global scale, GVCs have become the world economy’s backbone and central nervous system” (Cattaneo et al., 2010: 7).

GPNs and GVCs are highly relevant for understanding economic development and industrial change in the member states of the Association of South-East Asian Nations (ASEAN). To date, some of the more advanced ASEAN economies, such as Singapore, Malaysia and Thailand, have played major roles in global trade, producer services and manufacturing, and served as the key locations for the regional operation of GPNs – known as regional production networks (RPNs) – oriented towards the regional and the global market. This in turn creates ample opportunities for small and medium enterprises (SMEs) in various ASEAN countries to be involved or “plugged” into these production networks located in their home countries (UNCTAD, 2010; ASEAN Secretariat, 2013; 2014; Asian Development Bank, 2015a).¹

Facilitated by the regional integration of ASEAN economies, cross-border investment by a growing number of ASEAN SMEs from different member states serves as another important mechanism through which such “plugging in” works. In trade and services, SMEs in leading ASEAN hubs for transport (sea and air), logistical, legal and accounting, and financial services have invested regionally in order to offer value added activities to lead firms and their strategic partners in cross-border production networks. In manufacturing, ASEAN SMEs with greater technological and production capabilities have established operations in the region to provide critical and high-value

¹ The definition of SMEs in ASEAN varies by countries (Asian Development Bank, 2015b: 300–303). In general, most ASEAN countries define SMEs in terms of turnover, capital/fixed assets, or employment. But the thresholds for these characteristics differ significantly. In terms of turnover, it varies from lows of K 1000 million (US\$0.12 million) in the Lao People’s Democratic Republic to Rp 50 billion (US\$3.8 million) in Indonesia to highs of RM50 million (US\$12.7 million) in Malaysia and S\$100 million (US\$74.3 million) in Singapore. In some countries (e.g. Malaysia and Myanmar), the threshold for service SMEs is lower than that for manufacturing SMEs. In terms of assets, the threshold can be K,1200 million (US\$0.1 million) in the Lao People’s Democratic Republic and Ks1,000 million (US\$0.85 million) in Myanmar to B 200 million (US\$5.7 million) in Thailand. Finally, most ASEAN countries define SMEs as providing employment for fewer than 200 people, except Cambodia (fewer than 100) and the Lao People’s Democratic Republic (fewer than 100). In Myanmar, labour-intensive manufacturing SMEs can qualify with up to 600 employees. Exchange rates of ASEAN currencies with US dollars are accurate as of April 2016.

intermediate inputs to lead firms that produce industrial or final goods in multiple ASEAN locations. In so doing, SMEs can create and capture significant value added from their cross-border investment in RPNs (Yeung, 2001; 2009; Kuroiwa and Toh, 2008). These ASEAN SMEs both contribute to and benefit from increasing economic integration in the region and the emergence of RPNs.

This paper describes and explains how the regional dynamics of foreign direct investment (FDI) by ASEAN SMEs can be better understood through the concept of strategic coupling (Yeung, 2015; 2016). In this context, strategic coupling refers to SMEs intentional participation in RPNs controlled and coordinated by global lead firms, such as major brand-name manufacturers and global service providers. For ASEAN SMEs to benefit from evolving opportunities in global industries, their firm-specific assets (cost, capability, market access and so on) must match or be “coupled” with the strategic requirements of lead firms in RPNs (e.g. cost reduction, production efficiency and market development) so that their inter-firm transactions can lead to mutual gains and benefits, such as profits, technology transfer, product development, employment and so on. In general, strategic coupling can take place through four mechanisms:

1. ASEAN SMEs serving as local suppliers in domestic production networks or as exporters in their home countries (e.g. Thanh et al., 2010; Harvie et al., 2015; Wignaraja, 2016)
2. ASEAN SMEs investing in other ASEAN locations to directly support the production or service activity of their lead firm customers
3. ASEAN SMEs following the regionalization of their domestic and larger firms to serve their common global lead firm customers
4. ASEAN SMEs regionalizing to develop their own markets and production networks

Focusing on the FDI activity of ASEAN SMEs, this paper will examine mostly the second and third mechanisms for strategic coupling with RPNs. Although this SME-specific FDI serves as a major mechanism enabling such coupling, it is important to note that this SME-RPN coupling is often mediated through different actors (e.g. global lead firms and state institutions) and supported by broader policy initiatives (e.g. the ASEAN Economic Community starting in 2015; see ASEAN Secretariat, 2016).

The paper is organized in three sections. The next section highlights the drivers and motivations of SME-specific FDI activities in ASEAN. This analysis shows why ASEAN SMEs are contributing to strengthening regional economic integration; that is, connecting firms and national economies through intra- and inter-firm activities in the region. The influence of regional integration initiatives on SME FDI is also discussed. The second section then explains how the strategic coupling of SMEs with ASEAN-based production networks works through different coupling mechanisms,

such as international partnership, industrial specialization and production platforms. The key challenges confronting SME regionalization in production networks are also highlighted. The final section considers the policy and practice of SME regionalization by specifying the kind of RPN-friendly policy that can enable SMEs to plug into the growth dynamics of RPNs. This policy for strategic coupling requires not only reconfiguring existing and conventional policy instruments, but also a significant shift in the mindset of policy makers and practitioners towards a dynamic view of SME development in a world of GPNs.

2. Drivers and motivations of SME-specific FDI activities in ASEAN: who and why?

2.1. FDI activities in ASEAN, 2000–2014

Since 2013, the ASEAN Secretariat, in cooperation with UNCTAD, has produced an annual *ASEAN Investment Report* that documents the nature and distribution of FDI in ASEAN. Table 1 presents the total flows of inward FDI to ASEAN since 2000. Over the 2000–2014 period, inward FDI to ASEAN grew rapidly, from US\$21.8 billion in 2000 to US\$84.9 billion in 2007 and eventually to a record level of US\$136.2 billion in 2014. Despite a short pause in growth in the immediate aftermath of the 2008–2009 global financial crisis, inward FDI to ASEAN surpassed US\$100 billion for the first time in 2010. This rapid growth represents the deeper integration of ASEAN countries into GPNs in major industries, such as consumer, financial, and logistics services; apparel, automotive, and electronics manufacturing; agro-food and forestry; and mining and oil and gas.

Among ASEAN countries, five stand out as the largest recipients of FDI during this period. Between 2000 and 2014, Singapore received some US\$508 billion in inward FDI, accounting for over 51 per cent of the ASEAN total of US\$986 billion. Indonesia and Thailand were the next two largest recipients at US\$121 billion and US\$113 billion. Malaysia and Viet Nam followed closely with US\$95 billion and US\$77 billion. These five ASEAN countries absorbed the lion's share (92.8 per cent) of inward FDI to ASEAN during the 2000–2014 period. Not surprisingly, they have been the major host countries for the GPNs in various industries.

As these ASEAN countries have become more strategically coupled with GPNs since the 2000s, their domestic firms have also accumulated sufficient ownership-specific advantages and developed stronger enough market orientations to benefit from expanding economic opportunities in ASEAN-based RPNs. More ASEAN firms have invested in neighbouring ASEAN countries to take advantage of such regionalization opportunities. The importance of this intra-ASEAN FDI has grown substantially over time (table 1). In 2000, only 5.6 per cent of the US\$21.8 billion total of inward FDI flow to ASEAN came from firms based in other ASEAN countries. But the significance of

Table 1. Total flows of inward direct investment to ASEAN by host country, 2000–2014 (US\$ million and intra-ASEAN share in per cent)

Host ASEAN country	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2000–2014
Brunei	550 (2.0)	289 (6.9)	434 (2.3)	260 (23.8)	330 (0.3)	371 (0.8)	625 (14.4)	1,208 (5.5)	865 (3.6)	725 (-8.0)	568 (24.8)	11,291
Cambodia	149 (0.0)	381 (33.9)	483 (32.3)	867 (31.3)	815 (29.6)	539 (32.3)	783 (44.6)	892 (25.1)	1,557 (33.6)	1,275 (23.5)	1,727 (21.5)	9,977
Indonesia	-4,550 (5.1)	8,336 (10.6)	4,914 (27.6)	6,928 (16.0)	9,318 (36.5)	4,877 (28.3)	13,771 (42.9)	19,242 (43.3)	19,138 (39.6)	18,444 (47.3)	22,276 (60.4)	121,159
Lao People's Democratic Republic	34 (41.2)	28 (25.0)	187 (5.9)	324 (30.9)	228 (21.1)	319 (17.9)	333 (40.5)	467 (16.1)	294 (25.2)	427 (24.6)	913 (15.1)	3,640
Malaysia	3,788 (6.8)	4,064 (17.7)	6,072 (7.6)	8,538 (44.3)	7,248 (22.7)	1,405 (-4.3)	9,156 (5.7)	12,001 (22.2)	9,400 (29.9)	12,297 (17.8)	10,714 (25.9)	95,537
Myanmar	208 (35.6)	236 (16.1)	428 (16.6)	715 (13.1)	976 (10.6)	963 (7.1)	2,249 (1.2)	2,058 (4.1)	1,354 (11.2)	2,621 (45.3)	946 (72.3)	13,679
Philippines	2,240 (5.6)	1,854 (0.2)	2,921 (24.1)	2,916 (-24.2)	1,544 (19.9)	1,963 (-0.3)	1,298 (3.1)	1,816 (-4.1)	2,797 (5.2)	3,860 (-1.1)	6,201 (1.3)	32,326
Singapore	14,752 (2.6)	17,299 (4.0)	36,613 (3.2)	46,338 (4.2)	11,115 (13.4)	25,036 (12.6)	55,035 (10.2)	46,774 (3.7)	60,980 (13.6)	56,138 (6.5)	72,098 (6.3)	508,377
Thailand	3,350 (11.6)	8,048 (18.0)	9,460 (48.4)	11,330 (21.7)	8,539 (5.9)	4,853 (30.1)	9,112 (13.6)	3,861 (-1.3)	10,699 (-3.2)	13,000 (9.7)	11,538 (5.7)	113,283
Viet Nam	1,289 (15.7)	1,954 (7.8)	2,400 (7.6)	6,700 (8.1)	9,579 (28.2)	7,600 (5.6)	8,000 (16.3)	7,519 (20.2)	8,368 (15.1)	8,900 (23.4)	9,200 (16.8)	77,069
Total	21,809 (5.6)	42,489 (9.6)	63,912 (13.6)	84,917 (11.3)	49,693 (21.0)	47,927 (13.9)	100,360 (15.1)	95,838 (15.2)	115,453 (17.8)	117,687 (16.5)	136,181 (17.4)	986,341

Source: ASEAN Secretariat, calculated from data in the ASEAN FDI Database as of 26 May 2015, <http://aseanstats.asean.org>. Data are compiled from submissions of ASEAN central banks and national statistical offices through the ASEAN Working Group on International Investment Statistics.

Note: 2014 data are preliminary. Net FDI = Equity + Net Inter-company Loans + Reinvested Earnings. If intra-ASEAN share exceeds 100%, it means at least one of the three components of FDI is negative and not offset by positive amounts of the remaining components.

such ASEAN-origin FDI varies by host countries. In the Lao People's Republic and Myanmar, intra-ASEAN FDI contributed to 35 and 41 per cent, respectively, of total inward FDI in 2000.

Since the mid-2000s, the share of intra-ASEAN FDI in the much larger flow of total inward FDI to ASEAN has hovered around 13.6 per cent in 2006 to 17.4 per cent in 2014 and 18.5 per cent in 2015 (ASEAN Secretariat, 2016: 5). In 2008, intra-ASEAN FDI contributed to 21 per cent of total inward FDI flows, a reflection of the significant drop in outward FDI from developed countries in the midst of the global financial crisis. During the 2013–2014 period, intra-ASEAN FDI was very significant for Myanmar (45–72 per cent share), Indonesia (47–60 per cent share), Malaysia (18–26 per cent share), and Viet Nam (17–23 per cent share). Whereas Indonesia and Malaysia have been the second and fourth largest recipients of inward FDI (after Singapore and Thailand), Myanmar and Viet Nam have also benefited much from their openness to foreign investments.

In sectoral terms, five industries received the most total inward FDI from all countries in 2014 (table 2a): financial and insurance activities (US\$43.1 billion), manufacturing (US\$22.2 billion), other services (US\$19.3 billion), wholesale and retail trade (US\$17.1 billion), and real estate services (US\$10 billion). These industries accounted for 82 per cent of total FDI inflow. The share of intra-ASEAN FDI in total inward FDI was the highest in agriculture, forestry and fishing (87.5 per cent); real estate services (44.9 per cent), manufacturing (30.4 per cent), and administrative and support services (30.4 per cent). Interestingly, TNCs from non-ASEAN countries dominated inward FDI in major service industries, such as wholesale and retail trade (93.7 per cent), financial and insurance activities (91.9 per cent), and other services (91.9 per cent).

Among all ASEAN countries, Singapore received the lion's share of FDI – in financial and insurance activities (US\$34.3 billion), wholesale and retail trade (US\$12.2 billion), and real estate services (US\$5.2 billion). As shown in table 2b, Singapore was also the largest contributor to intra-ASEAN investment in (a) agriculture, forestry and fishing; (b) manufacturing; (c) wholesale and retail trade and (d) financial and insurance activities. This pattern indicates the significance of Singapore as a regional centre for the control and coordination of production networks in these four diverse industries. Playing host to many of the world's lead firms in these industries, Singapore-based investors have been very active in the development of agriculture, forestry and fishing, manufacturing, wholesale and retail trade, and financial and insurance activities in other ASEAN countries. In real estate services, investors from Indonesia and Malaysia are as significant as those from Singapore. Together, these three ASEAN countries accounted for 98 per cent of total intra-ASEAN FDI in the industry in 2014.

In the CLMV countries (Cambodia, The Lao People's Democratic Republic, Myanmar, and Viet Nam), intra-ASEAN FDI tends to focus on manufacturing in Viet Nam's

industrial estates and on agricultural industries in Cambodia. Meanwhile, FDI from Viet Nam focuses on agriculture and extractive industries in neighbouring countries, such as Cambodia and the Lao People's Democratic Republic. In 2014, for example, Viet Nam was Cambodia's second largest investor, whereas Singapore was the second largest investor in Myanmar and Viet Nam in 2013 (ASEAN Secretariat, 2015: Table 1.4; 10).

2.2. SME-specific FDI activities in ASEAN

Due to the lack of any official statistics on FDI activities by SMEs from ASEAN, existing studies tend to rely on SME surveys, firm interviews and case studies.² The *ASEAN Investment Reports* from 2013 to 2015 included only publicly listed SMEs with a regional presence (e.g. ASEAN Secretariat, 2013: Table 4.7, 60; 2014: Box 1.4, 37-38).³ Mostly from Singapore, Malaysia and Thailand, these selected SMEs often have annual revenues or total assets far greater than the usual definition of SMEs in their home countries.⁴ As table 3 makes clear, SMEs account for the overwhelming majority of business establishments in each ASEAN country, except in Myanmar (87.4 per cent), where large State-owned enterprises are still significant. However, the contribution of SMEs to total employment varies substantially, from 97 per cent in Indonesia to 57.5 per cent in Malaysia and 46.8 per cent in Viet Nam. This variation in employment share reflects the relative dominance of State-owned enterprises, large domestic business groups and, to a certain extent, foreign firms in ASEAN countries. In the manufacturing sector, the share of SMEs in employment remains generally low, ranging from 11.7 per cent in Indonesia to a high of 31.8 per cent in Viet Nam. Their share in total exports also does not exceed 25 per cent (e.g. Thailand). Generally well integrated in production networks, manufacturing industries in ASEAN reflect a very substantial presence of large domestic firms and global lead firms and their international suppliers.

² Even the Singapore Department of Statistics, which has published *Singapore's Investment Abroad* since the early 1990s, does not publish any information on the turnover and employment size of Singapore-based investors (<http://www.singstat.gov.sg/publications/publications-and-papers/investment/singapore's-direct-investment-abroad>). It is therefore impossible to estimate the flow and/or stock of FDI by SMEs from Singapore or any other ASEAN country.

³ The most recent *ASEAN Investment Report 2016*, as an exception, included many more ASEAN SMEs and analysed their diverse involvement in regional production networks.

⁴ For example, Malaysia and Thailand define their SMEs as having annual revenue of less than RM50 million (US\$12.7 million) in Malaysia or total assets of less than B200 million (US\$5.7 million) in Thailand. Even Singapore defines its SMEs as having annual turnover of less than S\$100 million (US\$74.3 million). Only a very few firms from Singapore in the ASEAN Investment Report (2013: Table 4.7, 60; 2014: Box 1.4; 37-38) truly qualify as SMEs.

Table 2a. Total intra-ASEAN flows of inward direct investment by major industries and source ASEAN countries, 2014 (US\$ million and per cent)

Major industry	Total (Intra-ASEAN)	Total inward FDI (all)	Share of intra-ASEAN
Agriculture, forestry and fishing	3,928.9	4,492.6	87.5
Mining and quarrying	1,213.3	7,295.1	16.6
Manufacturing	6,757.6	22,215.4	30.4
Electricity, gas, steam and air conditioning supply	-53.9	460.4	-11.7
Water supply; sewerage, waste management activities	8.9	98.2	9.1
Construction	182.2	1,187.9	15.3
Wholesale and retail trade; repair of motor vehicles and cycles	1,071.3	17,055.2	6.3
Transportation and storage	435.3	2,612.8	16.7
Accommodation and food services	-35.8	158.0	-22.7
Information and communication	435.8	2,546.9	17.1
Financial and insurance activities	3,485.8	43,052.2	8.1
Real estate activities	4,508.8	10,040.0	44.9
Professional, scientific and technical activities	124.8	1,048.3	11.9
Administrative and support service activities	65.9	216.7	30.4
Education	8.7	61.6	14.1
Human health and social work	39.9	210.5	19.0
Arts, entertainment and recreation	-5.0	-47.4	10.5
Other services activities	1,572.4	19,311.3	8.1
Others/unspecified	0.0	4,165.3	0.0
Data suppressed by a Member State for confidential reasons	-72.7	0.0	87.5
Total	23,672	136,181	17.4

Source: ASEAN Secretariat (2015: Table 1.2; 8) and ASEAN Secretariat, calculated from data in the ASEAN FDI Database as of 26 May 2015, <http://aseanstats.asean.org>.

Table 2b. Total intra-ASEAN flows of inward direct investment by major industries and source ASEAN countries, 2014
 (US\$ million and per cent)

Major industry	Source ASEAN country									
	Brunei Darussalam	Cambodia	Indonesia	Lao People's Democratic Republic	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Agriculture, forestry and fishing	0.2	0.0	17.3	0.0	162.7	0	0.1	3,575.4	10.9	162.3
Mining and quarrying	1	0.0	46.6	0.0	467.3	0	3.5	425.5	202.5	66.9
Manufacturing	30.6	0.5	50.5	0.0	352.9	6.6	-25.3	6,062.4	287.1	-7.7
Electricity, gas, steam and air conditioning supply	0.4	0.0	0.2	0.0	-0.1	0	0.1	-59.3	4.3	0.5
Water supply, sewerage, waste management activities	0.1	0.0	0.1	0.0	3.0	0	0.0	5.4	0.3	0.0
Construction	1.8	0.0	-1.4	0.0	129.4	0	0.2	43.9	4.0	4.3
Wholesale and retail trade; repair of motor vehicles and cycles	-1	0.2	236.0	0.0	-416.5	10	1.6	1,448.9	-219.7	11.8
Transportation and storage	0.3	0.0	5.1	-0.1	290.0	0	0.0	42.7	97.3	0.0
Accommodation and food services	-2.1	0.0	0.5	0.0	3.4	0	0.1	-47.9	4.8	5.4
Information and communication	0.1	0.0	2.3	-0.1	679.0	-0.1	0.0	-244.3	-1.4	0.3
Financial and insurance activities	-3.9	19.0	112.3	0.0	-470.5	20.7	22.9	3,530.4	252.4	2.5
Real estate activities	15.2	1.1	1,518.4	1.9	1,434.5	65.2	-43.5	1,463.9	12.8	39.3
Professional, scientific and technical activities	1	0.0	2.2	0.0	3.5	-0.9	0.7	120.8	0.5	-3.0
Administrative and support service activities	0	0.0	0.0	0.0	5.3	0	0.0	59.2	1.4	0.0
Education	0.1	0.0	0.1	0.0	0.6	0	0.0	7.4	0.4	0.1
Human health and social work	0.7	0.0	0.4	0.0	3.2	0	0.1	33.6	1.9	0.0
Arts, entertainment and recreation	-0.1	0.0	-0.1	0.0	-0.6	0	0.0	-3.6	-0.4	-0.2
Other services activities	0.5	0.0	93.3	0.0	1,222.9	7.8	126.6	29.5	78.2	13.6
Others/unspecified	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Data suppressed by a Member State for confidential reasons	0.6	0.0	-183.1	0.0	0.0	0.4	-18.7	33.6	81.2	13.3
Total	45.5	20.8	1,900.7	1.7	3,870.0	109.7	68.4	16,527.5	818.5	309.4

 Source: ASEAN Secretariat (2015: Table 1.2; 8) and ASEAN Secretariat, calculated from data in the ASEAN FDI Database as of 26 May 2015, <http://aseanstats.asean.org>.

Table 3. Significance of SMEs in ASEAN Countries, 2012–2014

ASEAN country	Share of total establishment (%)	Share of total employment (%)	Share of manufacturing employment (%)	Share of GDP (%)	Share of total exports (%)
Brunei Darussalam ^a	98.2	58.0	-	23.0	-
Cambodia (2014)	99.8	71.8	15.2	76.7 ^a	-
Indonesia (2013)	99.9	97.0	11.7	60.3	15.7
Lao People's Democratic Republic (2013)	99.8	82.9	17.4	69.0 ^a	-
Malaysia (2013)	97.3	57.5	18.9	33.1	19.0
Myanmar (2014)	87.4	70.0 ^a	-	-	-
Philippines (2012)	99.6	64.9	16.6	36.0	10.0
Singapore (2014) ^b	99.0	70.0	-	50.0	16.0 ^a
Thailand (2013)	97.2	81.0	23.7	37.4	25.5
Viet Nam (2012)	97.7	46.8	31.8	40.0	20.0

Source: Asian Development Bank (2015b).

^a Data from Tambunan and Chandra (2014: Table 3), though the year of the data is unknown.

^b Data from www.spring.gov.sg.

Taken together, these data indicate that a very high proportion of ASEAN SMEs are primarily oriented towards domestic end-market sectors, such as retail, food and consumer services. Most of them are not well “plugged into” any form of production networks through direct exports and/or FDI.⁵ A modest number of SMEs are involved in the manufacturing sector as local suppliers to other domestic firms or foreign enterprises in the same home country. An earlier study of 85 foreign firms by Giroud and Mirza (2006: 7) found that ASEAN-side regional linkages between global lead firms and different ASEAN suppliers were “less common and patchy”. But they did note the emergence of RPNs to which ASEAN suppliers increasingly have had to adjust. Foreign firms in consumer electronics also tend to develop higher levels of local supply linkages. In another study of the internationalization of 77 SMEs from the northern region of Peninsular Malaysia, Chelliah et al. (2010: 32) found that some 60 per cent of these SMEs had fewer than three subsidiaries or joint ventures abroad. However, SMEs that had internationalized were able to create knowledge

⁵ Even Ando's (2010: Table 3; 474) study of Japanese SMEs in FY2007 found that the percentage of Japanese SMEs with foreign operations ranged only from 2 per cent in general machinery and 2.3 per cent in electrical machinery to 4.7 per cent in ICT equipment. These Japanese SMEs in machinery industries accounted for some 40 per cent of all manufacturing affiliates in Southeast Asia.

and technology skills, diversify resources and stimulate development, growth and success. Other economic studies of the internationalization of ASEAN SMEs tend to focus on their exports rather than on their FDI activities (e.g. Tambunan, 2008; Nguyen et al., 2013; Troilo, 2013; Tambunan and Chandra, 2014).

When ASEAN SMEs invest in neighbouring countries, what are their key drivers and motivations? In general, four such drivers can be identified:

1. Enhancing cost-capability ratios
2. Market-seeking
3. Access to local resources and products
4. Reaping benefits of regional integration

These drivers and motivations of ASEAN SMEs differ slightly from those of Japanese SMEs engaging in foreign operations (Ando, 2010: Table 4; 475). They are also quite different from those of larger firms from ASEAN, such as the acquisition of assets in regional and international markets that provide access to brand names, technology and skills, business networks and so on (ASEAN Secretariat, 2013: 84–88; 2016: 107–109).

First, manufacturing SMEs from relatively higher-cost ASEAN countries, such as Singapore and Malaysia, are under pressure to reduce their production costs in order to compete against suppliers from China and other ASEAN countries. SMEs need to calibrate their cost-capability ratios carefully, particularly those competing in highly globalized industries, such as electronics and apparel. To reduce their cost-capability ratios, these SMEs can find ways to reduce production costs and/or innovate to improve their process and product capabilities. Establishing operations in neighbouring countries can often help reduce production costs while the home operations work on improving firm-specific capabilities (e.g. new technologies, organizational routines and market know-how). SMEs from other low-cost ASEAN countries (e.g. Indonesia and Thailand), however, are less motivated to invest in nearby ASEAN countries in order to lower their cost-capability ratios. Most of them are satisfied with serving as low-cost local suppliers embedded in their domestic production networks.

Second, ASEAN SMEs can regionalize to develop new markets and/or to serve existing markets and customers. This driver is particularly strong for SMEs from Singapore and, to a certain extent, Malaysia, as their domestic markets are relatively small and saturated and the opportunities for growth are limited. But for these SMEs to venture abroad, they must possess firm-specific advantages, such as unique technologies, cost competitiveness or market knowhow. In a study by Senik et al. (2010: 294), a panel of 55 experts on Malaysian SMEs has identified domestic conditions and market issues as the most significant influence on their internationalization. As ASEAN is expected to sustain its growth trajectory in the next

5–10 years, some SMEs with larger market ambitions are particularly driven to grow through foreign operations.

According to a report by the Boston Consulting Group (Khanna, 2014), ASEAN's share of global GDP has risen rapidly, from 0.7 per cent in 2003 to 2.4 per cent in 2013, representing a cumulative annual growth rate of 12 per cent. This double-digit growth is certainly comparable with that of the BRIC (Brazil, Russian Federation, India, China) countries during the same period and places ASEAN – if it were a country – as the world's seventh largest economy after the United States, China, Japan, Germany, France, and the United Kingdom. Between 2013 and 2020, the Boston Consulting Group estimates that ASEAN will continue to grow at 12 per cent annually and become the world's fifth largest economy, accounting for 5.1 per cent of global GDP. Interestingly, a very large domestic market will be created by the rapid growth of the middle and affluent classes. By 2020, some 120 million ASEAN nationals will join these classes, mostly in emerging markets of the largest ASEAN countries, such as Indonesia, Viet Nam, the Philippine, Thailand and Myanmar.

Third, ASEAN SMEs can be motivated to invest in specific ASEAN destinations for access to local resources and products, such as natural resources in Indonesia, Viet Nam and Myanmar. In primary industries, this accessibility driver is combined with a relatively low cost of extraction and production that can be exploited by some SMEs from more developed ASEAN economies, such as Singapore, Malaysia and Thailand. In CLMV countries, geographical proximity can also enhance such access to local resources and products in agriculture and extractive industries (e.g. emerging Vietnamese SMEs in Cambodia and the Lao People's Democratic Republic).

Fourth and finally, more than two decades of regional integration initiatives in ASEAN have created a fairly conducive investment environment, characterized by stable political environments and economic liberalization, increases in FDI and better networking with host governments. These initiatives are attractive to ASEAN SMEs that can benefit directly from various regional cooperation initiatives and free trade agreements (FTAs). First conceived in 1992, the ASEAN FTA was signed by six ASEAN members with the eventual goal of removing both tariff and non-tariff barriers and improving the region's competitiveness as a key platform in GPNs. Since then, import tariffs on almost all goods traded among the original six countries have been removed or at least reduced to less than 6 per cent. In 2008, the ASEAN member states agreed to pledge to work toward a full single market and production base within ASEAN by 2015, culminating in the establishment of the ASEAN Economic Community (AEC) (see Chia, 2010; Tambunan and Chandra, 2014; Harvie et al., 2015).

Substantial progress has been made in relation to the AEC Blueprint by 2012 (table 4). According to Lim Hong Hin (2014), deputy-secretary general for the AEC, SMEs in ASEAN have benefited from the ASEAN benchmarks and baselines for SMEs, the

SME credit rating methodology and the SME policy index.⁶ Those ASEAN SMEs that are motivated to invest regionally are also involved in selective initiatives for ASEAN integration, such as technical workshops on trade, finance, FTA negotiations⁷ and trade facilitation, as well as the annual attachment of CLMV officials. In conjunction with the full implementation of the AEC beginning in 2015, ASEAN SMEs now expect a shared market, simplified rules and/or greater access to trade, easier movement of their professionals and expanded access to SME finance.

According to the 2014 ASEAN Economic Integration survey (Boston Consulting Group, 2014: 8–9), some 78 per cent of all 150 responding firms perceived ASEAN integration as an opportunity, whereas 82 per cent thought ASEAN integration would accelerate economic growth as well as increase competition. Some 76 per cent of them intended to expand market share by 2017, and 65 per cent planned to expand their ASEAN-based revenue by 2019.

Table 4. Strategic Schedule, ASEAN Economic Community Blueprint, 2008–2015

ASEAN Economic Community Blueprint			
(67.5% of targets achieved under Phases 1 and II by 2012)			
Pillar 1: Single market and production base (65%)	Pillar 2: Competitive economic region (67.9%)	Pillar 3: Equitable economic development (66.7%)	Pillar 4: Integration into the global economy (85.7%)
<ul style="list-style-type: none"> • Free flow of goods, services, investment and capital • Free flow of skilled labour • Priority integration in 12 sectors • Strengthening security and cooperation in food, agriculture and forestry 	<ul style="list-style-type: none"> • Competition policy • Consumer protection • Intellectual property rights • Infrastructure development • Taxation • E-commerce 	<ul style="list-style-type: none"> • SME development • Initiative for ASEAN integration 	<ul style="list-style-type: none"> • Coherent approach to external economic relations • Enhanced participation in global supply networks
Human resource development		Research and development	

Source: ASEAN Scorecard (2012) and Lim (2014).

⁶ These policy tools are developed under the ASEAN SME Projects (<http://asean.org/asean-economic-community/sectoral-bodies-under-the-purview-of-aem/small-and-medium-enterprises>, accessed on 10 March 2017). On the one hand, SME benchmarks and baselines are meant for establishing a common standard for credit rating and other SME evaluations in order to enhance objectivity and transparency among stakeholders (e.g. lenders and government offices) and to facilitate SMEs' access to credit. On the other hand, the ASEAN SME policy index is used to evaluate government policy designs and implementation across ASEAN countries with the view of adopting a common SME policy platform.

⁷ With China in 2005, the Republic of Korea in 2007, Japan in 2008, Australia in 2010 and India in 2010; negotiations with Hong Kong (China) started in July 2014.

3. Strategic coupling of SMEs with ASEAN production networks: How does it work?

3.1. Strategic coupling with GPNs: Some conceptual issues

In their essence, GPNs are organizational configurations of intra-firm coordination of economic activity and inter-firm transactional relationships that take place in two or more national economies (Coe and Yeung, 2015; Neilson et al., 2015). Intra-firm coordination of economic activity involves equity investment and is therefore expressed in the organizational form of a transnational corporation (TNC). Inter-firm transactional relationships across economies do not necessarily include TNCs since each transactional firm can be active only within their home economies and engage with each other through international trade. When firms from different national economies fulfil production functions that lead to final goods or services, a GPN is deemed to exist. In international economics, this vertical specialization by firms at different stages of global production is commonly known as “production fragmentation” and “task trading”. Using input-output tables and international trade data, economic analyses of GVC and GPN activity focus on the international outsourcing of economic functions in order to understand the efficiency gains by national economies that specialize in different value added activities. This approach in international economics is often couched at the *national* scale, as if countries were inserted into GVCs and became economic actors in their own right (e.g. Elms and Low, 2013; Milberg and Winkler, 2013; Wignaraja, 2016).

This paper focuses on diverse firm actors and their interests and strategies in the different functional segments associated with GVCs and global industries. A GPN comprises a wide range of firm types, ranging from lead firms and strategic partners to specialized suppliers (industry-specific or multi-industrial), as well as generic suppliers and customers. Taking the initial step of differentiating firms on the basis of their roles and functions in a GPN, table 5 identifies a broad range of participating firm types. This approach to defining diverse firm-specific roles in the same or different networks and industries overcomes one of the shortcomings in the existing GVC model of industrial governance, namely, that it often fails to explain how a model of dyadic inter-firm exchange can translate beyond the inter-firm nexus or even within the same value chain.⁸

⁸ For example, the reformulated theory of GVC governance (Gereffi et al., 2005) places analytical emphasis on characterizing the governance of the entire value chain on the basis of discrete and dyadic (network) coordination of relations between lead firms and their immediate (first-tier) suppliers. The transactional characteristics and firm capabilities shaping these discrete governance relations are also assumed to be applicable to the entire value chain and, by inference, the entire global industry. As pointed out critically by Bair (2008: 354) and others (Yeung and Coe, 2015; Neilson et al., 2015), what characterizes this

Table 5. Firms as actors in a global production network

GPN actors	Role	Value activity	Examples in manufacturing	Examples in service industries
Lead firms	Coordination and control	Product and market definition	Apple and Samsung (ICT), Toyota (automobiles)	HSBC (banking), Singapore Airlines (transport)
Strategic partners	Partial or complete solutions to lead firms	Co-design and development in manufacturing or advanced services	Hon Hai or Flextronics (ICT), ZF (automobiles)	IBM Banking (banking), Boeing or Airbus (transport)
Specialized suppliers (industry-specific)	Dedicated supplies to support lead firms and/or their partners	High value modules, components or products	Intel (ICT), Delphi and Denso (automobiles)	Microsoft (ICT), Fidelity or Schroders (banking), Amadeus (transport)
Specialized suppliers (multi-industrial)	Critical supplies to lead firms or partners	Cross-industrial intermediate goods or services	DHL (ICT), Panasonic Automotive (automobiles)	DHL (banking), Panasonic Avionics (transport)
Generic suppliers	Arm's length providers of supplies	Standardized and low-value products or services	Plastics in ICT and automobile manufacturing	Cleaning in banking and transport services
Key customers	Transfer of value to lead firms	Intermediate or final consumption	Other lead firms or consumers	Other lead firms or consumers

Source: Yeung and Coe (2015: Table 3, 45).

This firm-specific approach offers some possible configurations of a stylized GPN and shows how such multiple networks can intersect both to form an industry and to bridge different industries and sectors. Figure 1 illustrates two common configurations, each having a distinctive lead firm and encompassing a wide range of other firm and non-firm actors. In the first configuration, known as a strategic partnership model, a global lead firm directly engages another firm as a strategic partner to provide partial or complete solutions for its product or service delivery to key customers. This inter-firm partnership is underpinned by interactive relations among the three entities, from joint product development between the lead firm and its strategic partner to product delivery and fulfilment by the strategic partner to customers and provision of post-sale services to customers by the lead firm. These interactive relations also intersect with tangible and intangible inputs (indicated in dotted lines in figure 1) from specialized suppliers and intersect with broader structural initiatives intermediated

dyadic coordination relation in one part of the value chain (e.g. "relational governance" between a lead firm and its first-tier supplier in the automobile industry) may not necessarily be applicable to other inter-firm relations further down the same chain (e.g. "captive governance" between the first-tier supplier and other tiers of suppliers).

by industrial associations, such as standardization and modularization. Within a specific production network, these inputs are necessary but not the most direct and constitutive relationships among the lead firm, its strategic partner and its customers.

In contrast, the second configuration of a GPN shown in figure 1 does not provide for the role of a strategic partner. Instead, this is a lead firm-centric model of organizing a GPN in which the lead firm dominates and drives the entire network. It is positioned centrally within the network of interactive relations involving its specialized suppliers and its diverse customers. This model is often observed in such industries as automobiles, information and communication technology (ICT) and banking. In each of these industries, lead firms take charge of a significant proportion of the production of goods or services. In the automobile and ICT industries, a lead firm may bring together material inputs from specialized suppliers (e.g. key modules and core components) and generic suppliers (e.g. plastic parts) to produce finished or intermediate goods (e.g. semiconductors). Similar to the first configuration, the dotted lines in this model refer to the involvement of other actors and institutions.

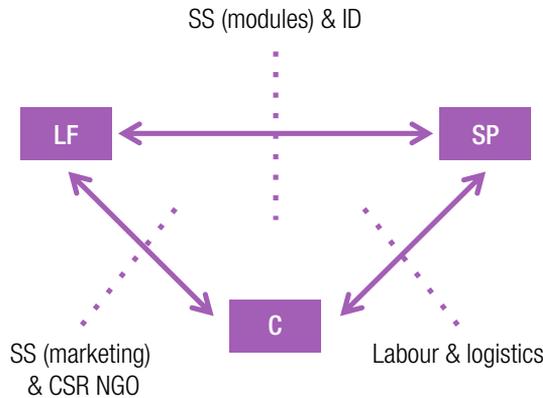
Most ASEAN SMEs tend to be involved in RPNs as generic or specialized local suppliers in their home countries. In each global industry (e.g. apparel, agro-food, electronics, automotive), we can identify such production networks involving a significant number of large and small firms that are responsible for different functional segments of global production, ranging from initial resource extraction to the entire manufacturing process and, equally important, service inputs. In fact, OECD-WTO-UNCTAD (2013: 16) estimates that as intermediate inputs to global production, service inputs contribute directly and indirectly to over 30 per cent of the total value added in manufactured goods. In turn, several of these service activities are themselves organized and delivered through GPNs, as evident, for example, in finance, advertising, logistics and retailing.

Understanding how SMEs can couple with lead firms in RPNs and GPNs requires an analytical perspective that connects two critical and yet relatively independent sets of economic dynamics – territorial dynamics at the local or regional scale and network dynamics at the global scale (Coe and Yeung, 2015). Territorial dynamics refer to the pre-existing political and social institutions and economically productive assets that give rise to the unique character and composition of a local economy in which SMEs are located. They provide the home environment for the nurturing and growth of these SMEs (Henderson et al., 2002; Coe et al., 2004). Network dynamics are much less governed by pre-existing institutions at the local and regional or even the national level. Instead, they are primarily driven by economic actors, such as global lead firms, strategic partners, specialized suppliers, industrial and final customers, and the like. Some of these are large TNCs, whereas others are national or local firms.

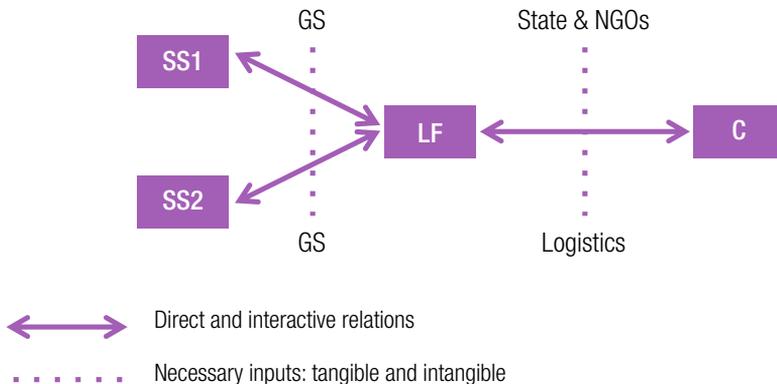
Although these economic actors are embedded in specific national or regional economies, they are mostly driven by the competitive logics of seeking cost efficiency,

Figure 1. Two organizational configurations of a global production network

(a) Strategic partnership model: e.g. apparel, ICT, transport and retail



(b) Lead firm-centric model: e.g. automobiles, ICT, aerospace, banking, and oil and gas



Source: Adapted from Coe and Yeung (2015: Figure 2.2, 60).

Note: LF = lead firm; SP = strategic partner; C = customer; SS = specialized supplier; GS = generic supplier; ID = industry association; NGO = non-government organization.

market access and development, financial market pressures and capital gain, and risk minimization through GPN organization (Yeung and Coe, 2015). The logic behind these GPNs is therefore firm- and industry-specific, and does not necessarily align with the logic behind the political and policy moves of actors in their home economies. In short, GPN dynamics are qualitatively different from territorial dynamics. The lead firm or firms in a GPN define its products and/or control its markets. Such

capability in product specification or market definition, often at the global scale, is fundamental to the corporate power of lead firms in coordinating GPNs that span multiple industries (e.g. electronics and automobiles) and macro-regional economies (e.g. ASEAN, Northeast Asia, Western Europe and North America).

Although territorial dynamics (e.g. industrial estates and business clusters) are necessary for SME development to take place, their cumulative effects on SMEs can be greatly enhanced and sustained if they interact positively with broader network dynamics at the regional and global scales. Most important, the positive outcome of these twin “engines” for economic development hinges on their mutual complementarity and dynamic articulation. This is where the concept of strategic coupling becomes useful, by bringing together territorial dynamics and GPN dynamics to account for economic development outcomes, such as SME growth and industrial transformation (Yeung, 2015; 2016). This mutual articulation provides the underlying strategic platform that enables SME development to occur. Strategic coupling is a mutually dependent and constitutive mechanism involving shared interests and cooperation between two or more groups of actors who otherwise might not act in tandem for a common strategic objective. This interaction involves both material flows in transactional terms (e.g. equity investment and movement of intermediate or final goods) and non-material flows (e.g. information, intelligence and practices). As argued by Buckley and Prashantham (2016: 42), strategic coupling works best when an SME “plays a crucial role in reducing imperfections in information markets – about local supply conditions, labor availability, employment law, and all the other types of tacit knowledge a local entrepreneur possesses”. With their better local know-how and market access, ASEAN SMEs can become strategically coupled with lead firms in RPNs.

3.2. ASEAN SMEs in RPNs

This section analyses in detail how ASEAN SMEs have become increasingly integrated with RPNs through their domestic and foreign operations. Three ASEAN economies – Singapore, Malaysia, and Thailand – have developed a significant role in GPNs because of their growing share in world trade in intermediate manufactured goods between 1988 and 2006 (table 6). This substantial share of the three ASEAN economies in the global trade in intermediate manufactured goods validates that they play a fairly important role in the global automotive, electronics, apparel and agro-food industries (see also ASEAN Secretariat, 2014: Chapter 5).

Since the late 2000s, academic and policy interest has been increasingly focused on the role of ASEAN SMEs in RPNs. Nevertheless, most studies tend to focus on the participation of ASEAN SMEs in domestic production networks within their home countries and/or through the import of intermediate inputs or export of their products (e.g. Harvie et al., 2010a; 2015; Lim and Kimura, 2010; Thanh et al., 2010; Wignaraja,

Table 6. The role of ASEAN in global production networks measured by value of total trade in intermediate manufactured goods, 1988–2006 (US\$ billion and per cent)

Economy	World rank	Total trade in intermediated manufactured goods, 2006	Share of world total, 2006	Cumulative average growth rate, 1988–2006
Tiger economies				
Republic of Korea	12	286.4	3.0	10.6
Taiwan Province of China	14	246.2	2.6	14.3
Singapore	11	289.6	3.0	17.2
Hong Kong (China)	6	372.3	3.9	17.7
Total	-	1,194.7	-	14.9
China	3	807.9	8.5	24.0
Mexico	15	228.8	2.4	23.3
Malaysia	17	162.3	1.7	12.5
Thailand	18	121.1	1.3	13.2
India	21	114.1	1.2	11.7
Japan and North America	-	1,928.4	-	6.9
Western Europe	-	3,377.1	-	6.7
Top 50 economies	-	9,110.9	-	12.4

Source: Based on UN COMPTRADE data presented in Whittaker et al. (2010: Table 1, 449).

2012; 2013). Based a 2012 survey of 234 exporters and importers in Malaysia, the recent study by Arudchelvan and Wignaraja (2016) continues to use trade in domestic production networks as a proxy for understanding the internationalization of SMEs. In many ways, these studies do not differ fundamentally from earlier studies of industrial linkages between foreign firms and domestic SMEs in ASEAN (e.g. Giroud and Mirza, 2006). Even when some of these studies consider the role of foreign ownership in enhancing the participation of ASEAN SMEs in domestic production networks, the mere presence of foreign lead firms in these domestic industrial clusters cannot indicate the size and extent of international operations by ASEAN SMEs in these networks.

On average, only 37.3 per cent of all firms in ASEAN countries participate in some form of domestic production network (table 7). Not surprisingly, this participation ratio is higher in ASEAN countries that are more involved in the RPNs of manufacturing industries, such as Malaysia (59.7 per cent), Thailand (59.3 per cent), and Viet Nam (36.4 per cent). In general, however, the proportion of SMEs (22 per cent) integrated into these domestic production networks is far smaller than that of large domestic firms (72 per cent). But in the more industrialized ASEAN countries (e.g. Malaysia and Thailand), a greater proportion of their SMEs are plugged into domestic production

networks. In many cases, this integration is stimulated by the presence of foreign lead firms and their international suppliers.

In Singapore, for example, global lead firms have established a direct presence through inward FDI. This linkage effect, either through transactional relationships with foreign firms or the direct presence of foreign firms, brings significant growth potential to local SMEs that eventually grow into regional players. An earlier study of over 50 SMEs in Singapore by Chew and Yeung (2001) found that local SMEs were more capable than their foreign TNC customers in such aspects as local knowledge and soft technology. Through various government-led programmes, the productivity of Singapore's SMEs has been improving over time (Lee et al., 2013; Bhullar et al., 2014). As shown in Table 8, local knowledge included local technical specifications, standards, management styles, and local culture. The presence of expertise in soft technology, such as process and product technologies, also led local SME suppliers to participate more in customers' product designs. This proactive role of SME suppliers was developmental rather than dependent. The growth of such developmental linkages was deemed vital in pushing local supporting industries towards the status of technological graduation when local SMEs served as not only suppliers to foreign and local large firms, but also innovative suppliers capable of creating new ideas and solutions (see also Wee and Chua, 2013).

Still, very few studies specifically examine how ASEAN SMEs regionalize through FDI and/or joint ventures in order to develop or sustain their strategic coupling with lead firms in RPNs. Using a case study approach, this section explains the different mechanisms through which ASEAN SMEs can venture abroad within the region. Previous studies have pointed to three component mechanisms of strategic

Table 7. Role of ASEAN SMEs and large firms in domestic production networks

	All countries	Malaysia	Thailand	Philippines	Indonesia	Viet Nam
Number of firms in domestic production networks	2,203	646	619	352	206	380
Share of such firms as a percentage of all firms (%)	37.3	59.7	59.3	26.9	14.5	36.4
SMEs in domestic production networks as a percentage of all SMEs (%)	22.0	46.2	29.6	20.1	6.3	21.4
Large firms in domestic production networks as a percentage of all large firms (%)	72.1	82.4	91.1	51.1	52.0	64.6

Source: Wignaraja (2012; Table 3; 2013: 290), based on World Bank's Enterprise Surveys in 2006 (Malaysia and Thailand) and 2008 (the rest).

Note: SMEs defined as 1–99 employees.

Table 8. Rationales for SMEs to couple with lead firms in production networks

Reasons for SMEs to supply lead firms	Reasons for lead firms to buy from SMEs
1. To access regional and global markets	1. Reasonable pricing
2. To gain technological exposure and technical assistance	2. Quality of products
3. To offer local adaptation of products	3. Good personal relations
4. To enhance the company's image	4. Long-term customers
5. To add features to customers' products	5. Good product design
6. To gain assistance from state agency and other intermediaries	6. Introduction by state agency or other intermediaries
7. To leverage access to financing	

Source: Based on Chew and Yeung (2001).

coupling that enable SMEs in some East Asian economies to plug into the growth opportunities in RPNs (Yeung, 2010; 2016). Examining several case studies of SMEs from Thailand, Singapore, Malaysia and the Philippines (see also ASEAN Secretariat, 2016: 173–179), this section shows that their FDI and development trajectories are fairly variegated, and some have experimented with one or more component mechanisms of strategic coupling with RPNs: international partnership, industrial specialization and production platforms.

1. *International partnership*: This first component mechanism of strategic coupling represents the deliberate and mutually beneficial linkages developed between external actors in RPNs and local SMEs. These industrial linkages are often functional in nature because of well-defined divisions of labour among different firms within each RPN (e.g. marketing and R&D, manufacturing, logistics and distribution, post-sale services). It is particularly prevalent among SMEs from more developed ASEAN countries, such as Singapore, Malaysia and Thailand. In these cases, SME regionalization takes place through international partnership with lead firms in different RPNs. This coupling mechanism supports the strategic partnership model in figure 1.

Thailand's Cool Group exemplifies this successful international partnership in its regionalization drive. Founded in Bangkok in 2001, the Cool Company Ltd. (formerly AHT Asia Company) has won six times the SMEs National Awards launched by the Office of Small and Medium Enterprises Promotion (OSMEP) of the Thai Government (<http://smesnationalawards.com>). The Cool Group is a Thai manufacturer, distributor and service provider of commercial freezers, coolers and cold-chain products for the food and beverages and retail industries in ASEAN (www.coolinspired.com). As a specialist equipment provider, it partners with and serves leading global and regional customers (e.g. Unilever, Nestle, F&N, Cremo, Haagen Dazs, the CP group, S&P restaurant, PFP) and leading supermarket and convenience store chains

(e.g. Giant, Citimart Mini Shop, Lotte), as well as beverage companies, restaurants, and bakery and coffee shops around the region. By partnering with these leading brand-name retailers and manufacturers in ASEAN, the Cool Group expands its market presence in Malaysia, Indonesia, Viet Nam and the Philippines. Although locating its manufacturing base in Thailand can sustain its competitive production costs, the Cool Group's regional presence has greatly improved its customization and service capabilities for its key partners. This regional organization of the production network reduces the firm's cost-capability ratio and improves its competitiveness. Through its partnership with a well-known European OEM in commercial freezers and coolers, the Cool Group also benefits from the OEM's strong R&D support and brand name. In return, the Cool Group offers firm-specific market know-how and broader customer reach within ASEAN to its OEM partner.

2. Industrial specialization: In some ASEAN economies, the presence of strong government assistance and favourable policies has created the possibility for the strategic coupling of domestic SMEs with global lead firms through industrial specialization, by engaging in indigenous innovation and developing new product and process technologies for the niche segments of different production networks. These technologically capable SMEs emerge from long-standing industrial promotion policies that work in tandem with the return of technological and business elites from advanced economies. Such ASEAN SMEs often accumulate substantial technological capabilities and managerial expertise in their home bases before they venture abroad to serve existing or new markets in other ASEAN countries. Their specialized expertise in niche segments, rather than end markets or finished products, means that these SMEs are likely to be plugged into the regional expansion of their key lead firm customers. It resembles the lead firm-centric model in figure 1.

In the cases of both ATC and Eftech, industrial specialization in cutting-edge surface-coating technologies and process and pipeline technologies in oil and gas has enabled them to develop niche markets in their respective home bases in Singapore and Malaysia. Founded in Singapore in 2004 as Applied Total Control Treatment, ATC is an SME specializing in a wide range of advanced surface treatments for high-end equipment parts in the aerospace, oil and gas, medical and electronics industries (www.atc-treatment.com). As a leading player in the metal finishing industry, ATC benefited first from the rapid growth of electronics and then from oil and gas and aerospace RPNs in Singapore and other ASEAN countries. Specializing in secondary processes in these major industries, ATC works very closely with its lead firm customers to fulfil their sophisticated needs and special requirements.

By 2009, ATC had realized that some of its lead firm customers in Singapore, particularly those in the semiconductor industry, were either withdrawing or relocating their operations to elsewhere in Southeast Asia or China. To maintain its growth and to diversify from its reliance on semiconductor customers, its founder

Marcus Sia decided to look for expansion opportunities in Southeast Asia. With the help of International Enterprise (IE) Singapore, the focal government agency promoting the internationalization of Singaporean firms, ATC participated in IE Singapore's investment mission in Malaysia and found Penang to be the most suitable site for locating the first overseas investment (Goh, 2014). Penang hosts one of Southeast Asia's largest clusters of electronics production networks and has a long history of SME development (Chik et al., 2013). Malaysia's aerospace and defence industries are also growing. IE Singapore supported ATC through its Global Company Partnership (GCP) programme. ATC received help with the entry tariffs and market information and through the cost subsidization of its Penang factory and two business development employees there.

Established in Johor Bahru, Malaysia, in 2001, Efficient Technology (Eftech) originally specialized in providing mechanical services to the Malaysian energy markets (www.eftech.com.my). As an SME, it partnered with Hedley Purvis (United Kingdom) and BJ Process and Pipeline Services (United States) in 2001 and 2002 to bring their process and pipeline technologies to the oil and gas industry in Malaysia. It grew rapidly with the domestic market and, in 2005, became an authorized local supplier of bolted-joint integrity and nitrogen-helium leak testing services to Petronas, the national oil and gas company, under the latter's vendor development programme. Since then, Eftech has developed other technical partnerships with Hydratight (United States) and Sparrows (United Kingdom). As the oil and gas industry became more regionalized in the 2010s, Eftech began to go international by incorporating Eftech International in Singapore in 2013 to bring its expertise in engineering services to global lead firms in Singapore and the broader ASEAN region. Eftech International not only provides technical and operational expertise to support its expanding work in the ASEAN region and beyond, but also builds important relations with lead-firm customers in Singapore and in other operational facilities in Indonesia, Myanmar, Thailand and the Republic of Korea. To fulfil its first major services contract for liquified natural gas in Australia, Eftech invested in a A\$5 million new facility in Perth in 2015.

Industrial specialization has provided both ATC and Eftech with stronger firm-specific advantages when they establish foreign operations and develop new markets. Both SMEs have benefited from strong institutional support from their home governments. The role of IE Singapore in ATC's successful venture in Penang, Malaysia, was crucial. By moving its more technologically mature coating operation to Penang, ATC Singapore could specialize further by developing more cutting-edge and proprietary surface-coating technology in its parent operation. Through this industrial specialization, ATC can serve its expanding regional base of lead firm customers in the aerospace, oil and gas, and electronics industries. Similarly, Malaysia's Eftech has benefited from Petronas' vendor development programme and acquired highly specialized and sophisticated industrial knowhow in providing engineering solutions and services to lead firms in the oil and gas RPNs in ASEAN.

3. *Production platforms*: This mechanism has a long history in labour-intensive global industries and is particularly associated with the emergence of the new international divisions of labour (Lane and Probert, 2009; Pickles and Smith, 2015). But it has a tendency to create structural dependency by local SMEs on lead firms and those firms' access to markets in advanced industrialized economies. To engage foreign lead firms in this coupling mechanism, the host state has often developed proactive policies and strategies at both national and regional levels to attract labour-intensive production that might otherwise go elsewhere. This coupling, while fragile and unequal, results from conscious efforts by policy makers and SMEs to connect to relevant players in RPNs.

Since the early 1980s, SMEs in developing regions in ASEAN, such as Malaysia's Penang, Thailand's Greater Bangkok region and Viet Nam's new industrial parks, have been strategically coupled with RPNs through the huge demand for cost-competitive production platforms by lead firms (Yeung, 2009; 2010). As production platforms, these regions provide very competitive cost structures, abundant labour supply, stable policy environment, fiscal and other financial incentives, and so on. Their institutional set-up is geared not so much towards developing indigenous capability as in the case of industrial districts in the Republic of Korea and Taiwan Province of China. Rather, these developing-country regions are actively coupled with evolving regional divisions of labour spearheaded by brand-name lead firms and their key suppliers from Japan, North America and Western Europe. To a certain extent, large firms from Singapore and Malaysia also play a strong role in mediating between global lead firms and local SMEs.

KLT Fruits is a Filipino SME, which has taken advantage of the opportunities created by the production platform mechanism. Established in 1984, it specializes in the processing of tropical fruit purees, concentrates and jams for international markets (www.kltfruits.com). As an agro-food processing firm with its then state-of-the-art manufacturing plant, completed in 1993, in the First Cavite Industrial Estate, KLT has developed over three decades of partnership with small and large fruit traders and growers throughout the Philippines (e.g. Cavite, Batangas, Quezon and Tarlac). It employs about 200 staff members, with 10–20 of them being R&D personnel. KLT has benefited from the State-sponsored industrial development zone in Cavite, where its only food processing plant is located. KLT has also benefited from the Philippines' FTAs with the Republic of Korea, China, Japan, Australia and New Zealand where tropical fruit purees enjoy zero or reduced tariffs. Although it enjoys lower production costs and domestic access to key raw material, KLT does not want to be locked into the limited business segment of food processing in the global agro-food production network. Taking advantage of the AEC since 2015, KLT plans to expand into the regional market by developing its own brand of consumer products. By establishing its marketing offices in Singapore and elsewhere, KLT will build on its manufacturing competence and cost advantage to diversify into the growing ASEAN

regional market. In doing so, it will upgrade from its earlier position as a fruit processor embedded in the production platform mechanism to become a specialized lead firm in its own right.

3.3. Key challenges for the coupling of ASEAN SMEs with RPNs

The preceding analysis showcases the possible gains and benefits that ASEAN SMEs can reap through their regionalization efforts and their strategic coupling with RPNs. But the reality is that such successful cases of SME regionalization are rather limited. With the exception of SMEs from Singapore,⁹ most ASEAN SMEs are first and foremost domestically oriented and do not have any ambition of venturing abroad. A much smaller number of these ASEAN SMEs have participated in domestic production networks as local suppliers or exporters. In short, the challenges are very immense for those ASEAN SMEs seeking to couple with lead firms in RPNs by establishing operations in other ASEAN countries.

A comprehensive survey by the Organization for Economic Cooperation and Development (OECD) (2008: 23) of 978 SMEs in the economies of the OECD and the Asia-Pacific Economic Cooperation group has identified a wide range of obstacles to SME internationalization; in rank order:

1. Obtaining reliable foreign representation
2. Adjusting export promotional activities to the target market
3. Slow collection of payments from abroad
4. Complexity of foreign distribution channels
5. Difficulty in matching competitors' prices
6. Unfavourable foreign rules and regulations
7. Inadequate quantity of and/or untrained personnel for internationalisation
8. Shortage of working capital to finance exports
9. Lack of managerial time to deal with internationalisation
10. Granting credit facilities to foreign customers
11. Unreliable data on the international market
12. Difficulties in enforcing contracts and resolving disputes
13. Accessing export distribution channels

⁹ Singapore's definition of SMEs as having annual turnover of less than S\$100 million (US\$74.3 million) is highly generous. This higher-threshold definition allows for many more successful cases of Singapore-based firms to be classified as SMEs. Combined with the highly limited domestic market – the singular most important “push” factor – it is not surprising that many SMEs from Singapore have ventured abroad and regionalized their operations.

14. Offering satisfactory prices to customers
15. Lack of home government assistance and/or incentives
16. Keen competition in overseas markets
17. Inability to contact potential overseas customers
18. Maintaining control over foreign middlemen
19. Limited information to locate and/or analyse markets

The following key issues are particularly challenging to the regionalization efforts of ASEAN SMEs: (a) firm-specific challenges; (b) network-specific issues; (c) national and regional challenges (see also Asian Development Bank, 2015a).

First, firm-specific capabilities are fundamental to SMEs' propensity to go regional and invest in other ASEAN countries. These capabilities broadly include capital, labour, technology and expertise, and markets. The lack of adequate working capital and of access to formal finance remain two of the most critical barriers to SME regionalization. In a study of seven ASEAN countries, Harvie et al. (2010b; 2010c) argue that access to finance is among the most critical success factors of SME internationalization. Shinozaki's (2012: Table 3) study shows that Indonesia (0.7 per cent) has the lowest value of outstanding SME loans as a percentage of GDP; Singapore (15 per cent) and Malaysia (17.4 per cent) are fairly low. At 30.7 per cent, only Thailand's share is close to those of Japan (35.9 per cent) and the Republic of Korea (37.4 per cent). And yet Thai SMEs are not much more active in regionalization than SMEs from Singapore and Malaysia. In short, access to finance and loans is a serious challenge that must be overcome. But resolving this challenge is not sufficient to ensure the successful regionalization of SMEs.

Equally important are the challenges of labour, technology and expertise, and markets for ASEAN SMEs. Labour issues are particularly difficult for SMEs because of the general scarcity of local and skilled talent. Constrained by size, SMEs often find it hard to compete against large domestic firms and foreign firms in recruiting and retaining skilled labour. Charoenrat and Harvie's (2013) econometric study of manufacturing SMEs in the north-eastern area of Thailand identified the lack of skilled labour as the main firm-specific factor leading to their low technical efficiency. This area hosted some 28.1 per cent of all SMEs between 1994 and 2008, and was the second largest area outside the Bangkok metropolitan area (30.5 per cent). In the case of Singapore's ATC, its founder faced significant difficulty with human resource management in its Penang operation in the initial years (Chia, 2016). It had very high turnover in its Malaysian workforce. This challenge was resolved only after the introduction of flexible working and transport arrangements.

Overcoming the challenges of capital and labour might enable some ASEAN SMEs to develop and sustain cost advantages. But without firm-specific capabilities in technology and expertise and in markets, these SMEs are unlikely to be able to

support and sustain their international operations. As was evident in the case studies of ATC and Eftech, the technical expertise of these SMEs is vital to their competitive advantage. Although this specialized expertise is developed primarily in their home bases, it can be transferred to new locations in other ASEAN countries. In short, developing firm-specific capabilities that can be transferred geographically and applied in different ASEAN locations is a critical challenge to SMEs' regionalization. In this sense, political and social connections in the home markets are less transferrable than firm-specific technological and product expertise. SMEs that are not coupled yet with domestic production networks are therefore less likely to develop such transferrable firm-specific capabilities.

This points to the final challenge of developing firm-specific capabilities in serving different markets. Changing their market orientation from domestic end users and consumers to customers embedded in RPNs is a major obstacle for most ASEAN SMEs. In ASEAN countries with large domestic markets, most SMEs are contented with serving their home markets. Their weaker firm-specific managerial and marketing capabilities also reduce their incentives to engage in new market development beyond their existing markets. Even for SMEs that have developed specific technologies (e.g. ATC and Eftech) and/or products (e.g. the Cool Group and KLT Fruits), capturing markets beyond their home bases represents a fundamentally new challenge. Singapore's ATC, for example, was fairly happy with its growing domestic market in the semiconductor industry during the 2000s. It ventured to Penang in 2012 only after its domestic business had stagnated. Still, its first two years in Penang were difficult and unprofitable, as the firm had few customers there and had to build its customer base slowly in a wider range of industries. In the case of Thailand's Cool Group, its successful regionalization is premised on its firm-specific capability in offering highly customized cooling products and services across ASEAN countries.

Second, network-specific issues represent both significant barriers to entry and opportunities for growth for ASEAN SMEs. Table 9 summarizes some influential factors shaping SME coupling with GPNs that have been identified by five international organizations. For global lead firms and their strategic partners (often large firms) that are coordinating RPNs, their key considerations in picking SMEs as suppliers are defined in terms of cost, delivery, quality, compliance ability and expertise in meeting the standards and specifications of products or services. Implemented by each lead firm across its entire RPN, these parameters for SME suppliers are clearly much more demanding than those of local customers and end users. Not surprisingly, a large majority of ASEAN SMEs are unable to meet the demanding requirements of serving lead firms or their strategic partners in RPNs.

More specifically, the challenges to SMEs aspiring to participate in these RPNs are related to information asymmetry, capability development, and credit and financing.

Table 9. Key factors influencing SME coupling with global production networks: a global comparative perspective

Factors	UNCTAD	OECD	WTO	APEC	ASEAN
Product quality	✗	✓	✗	✓	✗
Product price	✓	✗	✓	✓	✓
Product delivery	✗	✓	✓	✓	✗
Use of e-mail communication	✗	✓	✓	✓	✗
Internationally recognized quality certification	✗	✓	✗	✓	✗
Global standards	✗	✓	✗	✗	✗
ICT technologies	✗	✓	✓	✓	✗
Electronic marketplaces	✗	✓	✓	✓	✗
Financial stability	✗	✓	✗	✓	✗
Changing business practices	✗	✓	✗	✓	✗
Human capital (human resources)	✗	✓	✗	✓	✗
Fragmentation of production	✗	✓	✓	✓	✗
Buyer-supplier relations	✗	✓	✓	✓	✗
Cooperation within GVCs	✗	✓	✓	✓	✓
Cooperation with MNCs and large firms	✗	✓	✗	✓	✓
Structural and policy characteristics	✗	✓	✓	✓	✗
Business environment	✗	✓	✓	✓	✗
Productive capacity	✗	✓	✗	✓	✗
Physical and informational infrastructure	✗	✓	✓	✓	✗
Flexibility and adaptability	✗	✓	✗	✓	✗
Geographic location	✓	✓	✓	✓	✓
Innovative capacity	✗	✓	✗	✓	✗

Source: Asian Development Bank (2015a: Table 1.1, 14).

For SMEs new to participation in RPNs, it is fairly challenging to find more information about the kind of product and/or service expectations and the availability of customers in these networks. These SMEs often do not have access to information on vendor selection and development. Those SMEs already involved in domestic production networks, however, face a different challenge of information asymmetry as their key lead firm customers may not share sufficient information about future business expansion plans within ASEAN. These SMEs also may not have sufficient managerial capabilities and resources to plan for new operations in other ASEAN countries.

Finally, the challenge of avoiding captive relationships with lead firms is significant for SMEs that have already participated in domestic production networks. Most global lead firms tend to control their own products and technologies through strictly enforced patents, product specifications and industrial standards. Their SME suppliers in ASEAN can become “locked” into the specific demands of these lead firms (e.g. standards, pricing and cost reduction). The tendency towards a “race to the bottom” is also high among low-cost SME suppliers. They may lose out badly when their key customers switch orders to other suppliers and/or relocate completely out of the country. This significant risk of excessive dependency on a few key customers tends to reduce the appetite of SMEs to venture abroad in other ASEAN countries.

Third, national and regional challenges can be significant for the regionalization of ASEAN SMEs. These challenges are related to the ease of doing business in individual ASEAN countries and the perceived uneven outcomes of regional integration initiatives. At the national level, the complexity of setting up new ventures or acquiring existing entities varies significantly among ASEAN countries (see table 9). Some of these countries are still characterized by widespread corruption or by changing or opaque regulations. Highly concentrated domestic business ownership and currency restrictions in some ASEAN countries further increase business costs to SMEs from others. In some ASEAN countries, the legal, infrastructure, and banking and financing systems are not yet ready to facilitate investment by other ASEAN SMEs. Given the very limited managerial resources of most ASEAN SMEs, these high barriers to entry pose a serious challenge to establishing competitive advantage.

At the regional level, whereas ASEAN economic integration has received a lot of policy attention, its implementation and outcomes are perceived as highly uneven. According to the 2014 ASEAN Economic Integration survey by the Boston Consulting Group (Khanna, 2014), the overwhelming majority of responding firms thought ASEAN regional champions and global lead firms would emerge as winners in an integrated ASEAN. However, only 41 per cent of them believed that mid-sized firms could be winners and less than 19 per cent of respondents saw domestic SMEs in ASEAN as possible winners of regional integration. More than two thirds of responding firms were not convinced that ASEAN governments would actively push regional integration forward. These firms perceived protectionism and a general lack of will as common among ASEAN countries. For example, a financial firm in Malaysia noted that “government policies are heavily influenced by strong indigenous corporate groups that could dictate the speed of opening of markets and subsequent integration” (Khanna, 2014: 5). Still, another survey by the ASEAN Secretariat (Martono, 2014: 7) showed that 75 per cent of the 93 ASEAN SMEs surveyed thought the AEC will positively affect their business. The case of KLT Fruits from the Philippines showcases the potential and actual benefits of such regional economic integration for ASEAN SMEs.

4. Promoting SME regionalization in ASEAN production networks: Towards more targeted policies and new practices

This section engages critically with the policy recommendations by various international organizations in relation to increasing participation of domestic firms in GVCs and GPNs (Cattaneo et al., 2010; Elms and Low, 2013; UNCTAD, 2013; ASEAN Secretariat, 2014; Asian Development Bank, 2015a).¹⁰ UNCTAD's *World Investment Report 2013* contains the most comprehensive policy framework for promoting the strategic coupling of domestic firms with GPNs. UNCTAD (2013: 175–176) has identified the following key policy challenges for SME development in a world economy organized through the extensive presence of GPNs and GVCs:

1. How to gain access and connect local SMEs to GPNs
2. How to maximize the development benefits from GPN participation
3. How to ensure that opportunities for industrial and social upgrading in GPNs are realized for SMEs
4. How to mitigate the risks associated with GPN participation
5. How to align and synergize trade and investment policies in a world in which the two are inextricably intertwined

As one might imagine, these challenges are presented mostly at the national level, as if the entire country could be plugged into GPNs, and existing development policies could be reworked to stimulate such national strategic coupling. To attain this policy effect, UNCTAD (2013: 175) recommends that “[a]ctive promotion of GVCs and GVC-led development strategies imply the encouragement and provision of support to economic activities aimed at generating exports in fragmented and geographically dispersed industry value chains, based on a narrower set of endowments and competitive advantages. And they imply active policies to encourage learning from GVC activities in which a country is present, to support the process of upgrading towards higher value added activities and diversifying into higher value added chains”.

This national approach to promoting the strategic coupling of SMEs with GPNs, as recommended in most reports by major international organizations, is problematical at two levels, particularly for ASEAN countries. First, it does not take into account sectoral differentiation within and between ASEAN economies. Variations in

¹⁰ This policy discussion draws upon my experience in conducting GPN-GVC conceptual training and capacity-building sessions for government policy makers and regional regulatory practitioners from East and Southeast Asian economies. These seminars and workshops were organized by national governments (e.g. the Malaysian Investment Development Authority), regional development organizations (e.g. the Asian Development Bank, the ASEAN Secretariat, the Asia-Pacific Economic Cooperation-Pacific Economic Cooperation Council), or international organizations (e.g. the World Free Zone Organization).

resource endowments and institutional repertoires can make a very significant difference in ensuring successful and positive outcomes of strategic coupling with GPNs in different sectors. This in turn explains why different regions in the same ASEAN economy can experience very different strategic coupling and outcomes. We can witness these differences in newly industrializing ASEAN economies (e.g. ICT in new industrial estates versus traditional agricultural industries in Viet Nam) and more industrialized ASEAN economies (e.g. ICT in Malaysia's Penang versus extractive industries in Terengganu; automotive in Thailand's Rayong Province versus agricultural industries in other provinces in southern Thailand). Policies targeting the coupling of SMEs with RPNs should be explicitly constructed to take advantage of the appropriate combination of sector-specific assets and institutions in different ASEAN economies.

Second, there is a tendency for these GPN-oriented policy recommendations to eschew industrial policy in favour of generic pro-GPN policies. This is because industrial policy is often misconstrued as "an industrial development strategy aimed at building domestic productive capacity, including for exports, in *all* stages of production (extending to the substitution of imported content of exports) to develop a *vertically integrated industry* that remains relatively independent from the key actors of GVCs for its learning and upgrading processes" (UNCTAD, 2013: 175; emphasis added). While it is indeed much harder for almost any national economy to develop fully vertically integrated industries that are competitive in today's globalized world economy, there remains significant room for industrial policy that taps into the developmental opportunities inherent in the sectoral specificity of most GPNs (Cimoli et al., 2009; Lin, 2012; Yeung, 2016). As argued rightly by Gereffi and Sturgeon (2013: 330), "Companies, localities and entire countries have come to occupy specialized niches within GVCs. For these reasons, today's industrial policies have a different character and generate different outcomes from before. Intentionally or not, governments currently engage in GVC-oriented industrialization when targeting key sectors for growth".

Drawing on a 2014 survey by the Asian Development Bank (2015a), table 10 summarizes the critical elements of policy interventions that can facilitate SME participation in GPNs in different global industries. Some policy interventions (e.g. infrastructural improvement) are more effective in the primary and service sectors, whereas others (e.g. technological upgrading) are particularly necessary for manufacturing SMEs. In the ASEAN context, there is no doubt that the strategic coupling of SMEs with automotive RPNs can be much more challenging than with apparel or agro-food production networks. Interestingly, there is also substantial intra-sectoral differentiation. In the global ICT industry, integrating SMEs into RPNs in the labour-intensive assembly segment of consumer electronics is relatively more actionable in policy terms than is strategic coupling of SMEs with GPNs in such segments as advanced semiconductors or high-end electronics equipment

(e.g. medical devices or computing servers). Developing industrial policy oriented towards promoting niches in a particular sector or intra-sectoral segments can therefore make good sense for SME development. Recognizing such sectoral differences in any GPN-oriented policy recommendations can provide a more appropriate and nuanced understanding of SME policy and practice.

On the basis of this paper's analysis of the regionalization of ASEAN SMEs (see also Habaradas, 2009; Aldaba, 2012; APEC Policy Support Unit, 2014), policies for GPN-led development and regionalization of SMEs should incorporate the following key considerations:

1. *Moving from developing vertically integrated industries to creating specialized niches for SMEs to participate in RPNs*: This includes improving their technological capabilities and technical standards and strengthening their supply chains, which in turn enable them to develop new or enhance existing linkages with lead firms in production networks. As SMEs develop more capabilities through government-assisted programmes and firm-specific upgrading initiatives, they can start as local suppliers in domestic production networks. As they gain more experience, know-how, and customer trust, these domestic SMEs can consider venturing into neighbouring ASEAN countries where their key customers are located and/or where new markets can be developed. This policy approach requires focused attention on industrial sectors that have greater potential for integrated RPNs, e.g. the electronics, automotive, apparel, agro-food, and oil and gas industries.

2. *Recognizing the need for detailed knowledge and analysis of SME prospects in different RPNs*: This need requires raising awareness of the potential of participation in RPNs and creating a fuller understanding of the advantages and the potential of subcontracting and regionalization. Obtaining and analysing reliable information on foreign markets and investment locations can be daunting to most domestic SMEs, given their limited human resources. Identifying relevant value chain segments for potential market entry represents another major step forward for most SMEs. IE Singapore, as an example, offers quite useful "market readiness assistance" in the form of market knowledge resources, learning and networking seminars, and co-funding for SMEs venturing abroad for the first time. Singapore's ATC benefited much from such assistance when it set up its first overseas venture in Penang. SME Corp Malaysia also offers specific programmes of market access and outreach to help SMEs.

3. *Promoting new domestic capacity and/or foreign investment in value-adding segments of RPNs in specific local and regional economies*: This means developing a national supply base through the targeted matching of capable local SMEs with global lead firms and their strategic partners. Sector-specific industrial linkage programmes are likely to be more effective in this targeted form of intervention. For example, SME Corporation Malaysia tries to motivate domestic SMEs to venture into

Table 10. Critical elements of policy interventions facilitating SME coupling with global production networks

Ranking	Critical elements of public interventions	Effectiveness by sectors and firm categories
1	Tax incentives for small suppliers	No significant difference
2	Trade facilitation measures	Primary and services sectors; GVC players Medium to large firms and small firms
3	Simple procedures for trade	Primary sector; medium to large firms
4	Improving domestic infrastructure	Firms in the Philippines and Sri Lanka; primary and manufacturing sectors; GVC players; small firms
5	Reform of transport, telecommunication and ICT	All three sectors (primary, manufacturing, services); medium to large firms
6	Education and training for skill development	No difference
7	Access to trade finance	No difference
8	Access to growth capital through innovative financing	Primary sector; firms intend to expand globally
9	Access to nonbank financing (e.g. factoring and leasing)	Firms in Kazakhstan and Sri Lanka; firms intend to expand globally
10	Development of trade corridors	No significant difference
11	Innovation policies and incentives (i.e. R&D)	Firms in the Philippines and Sri Lanka; all three sectors (primary, manufacturing, services); medium to large firms
12	Development of e-commerce	Firms intend to expand globally
13	Promotion of quality standards and certificates	All three sectors (i.e. primary, manufacturing, and services)
14	Intellectual property protection	Firms intend to expand globally
15	Development of special economic zones (SEZs)	Firms in the Philippines, Sri Lanka and Kazakhstan; all three sectors (primary, manufacturing, services); firms intend to expand globally
16	Competition law and enforcement	GVC players; small firms and medium to large firms
17	Creation of clusters	No significant difference
18	Revision of labor regulations	Medium to large firms and small firms
19	Removing restrictions and barriers to foreign investment	Firms in Sri Lanka and the Philippines; small firms and medium to large firms; firms intend to expand globally

Source: Asian Development Bank (2015a: Table 2.7, 58).

Note: Data from the 2014 ADB survey of 194 SMEs in Kazakhstan (n = 98), Papua New Guinea (n = 19), the Philippines (n = 63) and Sri Lanka (n = 14).

high-tech and innovation-driven sectors by sponsoring annual events to showcase their products and technologies to global customers. Etech has accumulated crucial engineering capabilities through Petronas' vendor development programme. The Malaysian Investment Development Authority (MIDA) also has a funding scheme for subsidizing 20 per cent of the cost within five years of a Malaysian firm acquiring a foreign high-tech firm. The extent to which this scheme is applicable to Malaysian SMEs, however, remains limited. In Singapore, SPRING Singapore and IE Singapore, both of them government agencies charged with helping domestic SMEs, offer financial support and trade missions to help over 1,500 enterprises to go regional (Boston Consulting Group, 2014: 6; Ramly, 2014: 18–28).

4. Facilitating trade and investment in production inputs and intermediate goods and services: This requires ASEAN governments to continue to work with each other to implement fully the ASEAN Single Window initiative (signed in 2005)¹¹ and to protect the achievements of the AEC (since 2015). As ASEAN economies become more liberalized and integrated through these trade and investment facilitation initiatives, global lead firms in different industries can take better advantage of cross-border cost reduction and market opportunities in order to expand and deepen their RPNs in ASEAN. This in turn will create more opportunities for different ASEAN SMEs to couple with the production and market development activities of global lead firms.

5. Leveraging RPNs for international market access by and capability development in domestic SMEs: ASEAN governments can fund more programmes that strengthen SMEs' branding and marketing expertise, improve their understanding of regional markets, facilitate their joint ventures with foreign firms, and increase their productivity and access to talent through closer partnerships with training and educational institutions. In particular, SME promotion agencies in ASEAN countries can consider setting up dedicated overseas investment centres to assist domestic SMEs in their regionalization efforts. Currently, some ASEAN countries have established such outward FDI promotion centres, but they are embedded only within the main investment promotion agencies (e.g. the Board of Investment in Thailand). It might be more effective for SMEs if such centres were institutionally located within SME promotion agencies.

6. Providing basic prerequisites for promoting SME activity, such as finance, skills, infrastructure, logistics, tax regimes and so on: Addressing financing issues including inadequate working capital, insufficient equity, difficulties in finding credit and high

¹¹ This regional initiative was launched to support the electronic exchange of export declaration information and data so that cargo clearance through customs across borders in participating ASEAN Member States can be expedited (<http://asw.asean.org>).

costs of credit, Talib (2014) proposes the establishment of an ASEAN SMEs Bank, the obligation for ASEAN-based banks operating in other ASEAN countries to provide facilities to SMEs, and a deepening of the liberalization of financial services in ASEAN. ASEAN governments should also expand talent pools through investment in higher education and vocational training and should upgrade infrastructure through direct investment or public-private partnership. SME agencies in ASEAN countries can develop specific human resource development programmes that enable SMEs to recruit and retain a skilled workforce. These programmes can include SME-university partnerships in training, foreign market attachments, and international human resource strategy development.

To operationalize these recommendations for promoting SMEs in RPNs, three policy practices are both necessary and vital: (a) engagement with transnational communities, (b) policy credibility and institutional consistency, and (c) pragmatic choices and flexible pathways. The critical role of transnational communities in SME development is now well recognized. One such transnational community refers to the business and technology professionals who originate from any ASEAN economy and shuttle constantly around the globe. This transnational community has rewritten the concept of international knowledge formation from one of “brain drain” to a two-way process of “brain circulation”. Through their constant movements between different world regions, these technologists and entrepreneurs originating from ASEAN have formed a transnational community of informal brain networks forged by certain common social identity and, sometimes, regional sentiments. In some Asian high-growth regions, these transnational business practices have contributed to the formal coupling of SMEs in regional economies with lead firms in GPNs through a variety of organizational arrangements (Wang and Lin, 2013; Lin and Rasiah, 2014; Yeung, 2016).

For these coupling policies to work, a more systematic engagement with these transnational communities matters. Policy makers should make conscious efforts to identify such actors who have established themselves in different global industries. Because of their international perspectives, these transnational actors are more likely to identify and take advantage of the opportunities arising from vertical specialization in GPNs. Tapping into their knowledge and network repertoires can allow economic planners and policymakers in ASEAN countries to develop a more thorough understanding of the relevance to GPNs of their capabilities and positions in different value chain segments. This understanding is crucial to embedding their SME development strategy in evolving RPNs. In more practical terms, engaging these transnational communities can enable a more direct participation in RPNs through new SME formation and the capability development of SMEs. The classic cases of this successful engagement are between Silicon Valley and Taipei-Hsinchu (Taiwan Province of China), Bangalore (India) and Beijing and Shanghai (China) in the global ICT industry (Saxenian, 2006; Lüthje et al., 2013).

In more traditional industries, such as agro-food processing and consumer goods manufacturing, the key intermediaries in GPNs are quite different from high-tech industries. Engaging with transnational communities that hold important positions in these intermediaries (e.g. international trading companies, and sourcing and supply chain firms) can be equally critical to the successful coupling of local SMEs with RPNs in ASEAN. This practice of building strong bonds with transnational communities from ASEAN can be very helpful to the upgrading of skills and knowledge – ranging from industrial to services to managerial – that might be lacking among domestic SMEs and policy actors.

Moreover, the promotion of SMEs' strategic coupling with production networks through regionalization should not occur in an institutional vacuum. Industrial initiatives formulated and implemented by state and non-state institutions matter for establishing successful strategic coupling of SMEs with lead firms in RPNs. Apart from the successful examples in East Asia, it is also evident in the incorporation of SMEs from Tunisia (North Africa) and Slovakia (Eastern Europe) into apparel GPNs coordinated by lead firms from the European Union (Pickles and Smith, 2015). But all these successful cases point to similar institutional practice – the need for policy credibility and institutional consistency. In many ASEAN economies, it is one thing for policymakers to develop a set of GPN-led promotional policies. It is quite another for these policies to be bold enough and consistently implemented.

Finally, promoting SME coupling through industrial policy necessitates a fundamental shift in practice towards the recognition of greater pragmatic choices and flexible pathways. Two of the greatest dangers exhibited in the “dark side” of SME development through strategic coupling with RPNs are external path dependency and industrial lock-ins. This dependency is particularly troubling if SMEs are locked into a “race to the bottom” pathway to industrial development and upgrading. Unlocking this path dependency becomes very difficult once sector-specific endowments (e.g. land) and assets (e.g. labour) are committed. Recent studies of such decoupling and disarticulations have shown the severe consequences of this kind of lock-in in the global apparel and agro-food industries (Bair and Werner, 2011; Folds, 2014; Zhu and Pickles, 2014).

To anticipate and prevent this debilitating effect, policymakers and practitioners must remain pragmatic in their policy choices and developmental pathways. More precisely, they must adopt a dynamic view of SME development and avoid following a one-size-fits-all approach. Although a pragmatic approach to policy is useful in coupling SMEs with the most immediately available global industry (e.g. agro-food, apparel, or electronics), policy makers and practitioners must be constantly looking out for new opportunities *beyond* these industries to upgrade SMEs' industrial and social capabilities and to prepare them for another pathway towards a higher value-captured mechanism for strategic coupling with RPNs. This pragmatism and flexibility in SME policy and practice may appear to contradict the earlier point about

policy credibility and consistency. But the two are not mutually exclusive. It is entirely conceivable for policymakers to achieve policy credibility and yet remain pragmatic in their choices of pathways for development over time. In several ASEAN regions (e.g. Singapore's "growth triangle", Malaysia's Penang, and Thailand's Rayong), such policy successes are evident in the adoption of a more dynamic approach to practising SME promotion strategies in a world economy dominated by GPNs.

References

- Abe, Masato (2013), Expansion of global value chains in Asian developing countries: Automotive case study in the Mekong subregion, in Elms, Deborah K. and Low, Patrick (eds.), *Global value chains in a changing world*, Geneva: World Trade Organization, 385–409.
- Aldaba, Rafaelita M. (2012), SME development: narrowing the development gap in the ASEAN Economic Community, *Philippine Journal of Development*, 39(1–2), 143–69.
- APEC Policy Support Unit (2014), Integrating SMEs into global value chains: Policy principles and best practices, Issues Paper No.6, APEC Secretariat, Singapore.
- Ando, Mitsuyo (2010), Japanese SMEs and international production/distribution networks in East Asia, in Thanh, Vo Tri, Narjoko, Dionisius and Oum, Sothea (eds.), *Integrating small and medium enterprises (SMEs) into the more integrated East Asia*, ERIA Research Project Report No. 8, Jakarta: ERIA, 462–99.
- Arudchelvan, Menaka and Wignaraja, Ganeshan (2016), SME internationalization through global value chains and free trade agreements: evidence from Malaysia, in Ganeshan Wignaraja (ed.), *Production networks and enterprises in East Asia: Industry and firm-level analysis*, ADB Institute Series on Development Economics, Tokyo: ADBI and Springer, 207–27.
- ASEAN Secretariat (2013), *ASEAN investment report 2012: FDI development and regional value chains*, Jakarta: ASEAN Secretariat.
- ASEAN Secretariat (2014), *ASEAN investment report 2013-2014: FDI development and regional value chains*, Jakarta: ASEAN Secretariat.
- ASEAN Secretariat (2015), *ASEAN investment report 2015: Infrastructure investment and connectivity*, Jakarta: ASEAN Secretariat.
- ASEAN Secretariat (2016), *ASEAN investment report 2016: Foreign direct investment and MSME linkages*, Jakarta: ASEAN Secretariat.
- Asian Development Bank (2015a), *Integrating SMEs into global value chains: Challenges and policy actions in Asia*, Manila: ADB.
- Asian Development Bank (2015b), *Asia SME Finance Monitor 2014*, Manila: ADB.
- Bair, Jennifer (2008), Analysing global economic organization: embedded networks and global chains compared, *Economy and Society*, 37(3), 339–64.
- Bair, Jennifer and Werner, Marion (2011), Commodity chains and the uneven geographies of global capitalism: a disarticulations perspective, *Environment and Planning A*, 43(5), 988–97.

- Bhullar, A.S., Gan, C.W., Ang, A.J., Ma, B., Lim, R.Y. and Toh, M.H. (2014), Operational excellence frameworks – case studies and applicability to SMEs in Singapore, *Proceedings of the 2014 IEEE International Conference on Industrial Engineering and Engineering Management*, Bandar Sunway, 9–12 December, 667–671.
- Boston Consulting Group (2014), *Winning in ASEAN: How Companies Are Preparing for Economic Integration*, by Chin, Vincent, Meyer, Michael, Tan, Evelyn and Bernd Waltermann, October 2014. <https://www.bcgperspectives.com>.
- Buckley, Peter J. and Prashantham, Shameen (2016), Global interfirm networks: the division of entrepreneurial labor between MNEs and SMEs, *Academy of Management Perspectives*, 30(1), 40–58.
- Cattaneo, Olivier, Gereffi, Gary and Staritz, Cornelia (2010), Global value chains in a postcrisis world: Resilience, consolidation, and shifting end markets, in Cattaneo, Olivier, Gereffi, Gary and Staritz, Cornelia (eds.), *Global value chains in a postcrisis world: A development perspective*, Washington, DC: World Bank, 3–20.
- Charoenrat, Teerawat and Harvie, Charles (2013), Technical efficiency of Thai manufacturing SMEs: A stochastic frontier analysis, *Australasian Accounting Business & Finance Journal*, 7(1), 99–121.
- Chelliah, Shankar, Sulaiman, Mohamed, and Yusoff, Yusliza Mohamed (2010), Internationalization and performance: small and medium enterprises (SMEs) in Malaysia, *International Journal of Business and Management*, 5(6), 27–37.
- Chew, Yoke-Tong and Yeung, Henry Wai-chung (2001), The SME advantage: Adding local touch to foreign transnational corporations in Singapore, *Regional Studies*, 35(5), 431–48.
- Chia, Siow Yue (2010), Trade and investment policies and regional economic integration in East Asia, ADBI Working Paper Series, No. 210, Asian Development Bank Institute, Tokyo.
- Chia, Yan Min (2016), Being flexible helped firm spread its wings, *The Straits Times*, 6 January 2016. www.straitstimes.com/business/companies-markets/being-flexible-helped-firm-spread-its-wings.
- Chik, Wan Fairuz Wan, Selvadurai, S., and Er, A. C. (2013), History of industrial development strategies in Penang since independence: a study of the SMEs, *Asian Social Science*, 9(6), 74–83.
- Cimoli, Mario, Dosi, Giovanni and Stiglitz, Joseph E. (eds.) (2009), *Industrial policy and development: The political economy of capabilities accumulation*, Oxford: Oxford University Press.
- Coe, Neil, Hess, Martin, Yeung, Henry Wai-chung, Dicken, Peter and Henderson, Jeffrey (2004), “Globalizing” regional development: A global production networks perspective, *Transactions of the Institute of British Geographers*, New Series, 29(4), 468–84.
- Coe, Neil M. and Yeung, Henry Wai-chung (2015), *Global production networks: Theorizing economic development in an interconnected world*, Oxford: Oxford University Press.
- Elms, Deborah K. and Low, Patrick (eds.) (2013), *Global value chains in a changing world*, Geneva: World Trade Organization.
- Fold, Niels (2014), Value chain dynamics, settlement trajectories and regional development, *Regional Studies*, 48(5), 778–90.

- Gereffi, Gary, Humphrey, John and Sturgeon, Timothy (2005), The governance of global value chains, *Review of International Political Economy*, 12(1), 78–104.
- Gereffi, Gary and Sturgeon, Timothy (2013), Global value chain-oriented industrial policy: the role of emerging economies, in Elms, Deborah K. and Low, Patrick (eds.), *Global value chains in a changing world*, Geneva: World Trade Organization, 329–360.
- Giroud, Axèle and Mirza, Hafiz (2006), Factors determining supply linkages between transnational corporations and local suppliers in ASEAN, *Transnational Corporations*, 15(3), 1–34.
- Goh, Jaime (2014), Head abroad when local customer base dries up, *The Straits Times*, 5 November. www.iesingapore.gov.sg/Venture-Overseas/SgGoesGlobal/ATC.
- Habaradas, Raymund B. (2009), The challenges of SME innovation and technology upgrading in developing economies: insights from Malaysia, Thailand, and the Philippines, *Journal of International Business Research*, 8(1), 69–89.
- Harvie, Charles, Oum, Sothea and Narjoko, Dionisius (eds.) (2010a), *Small and medium enterprises (SMEs) access to finance in selected East Asian economies*, ERIA Research Project Report No. 14, ERIA, Jakarta.
- Harvie, Charles, Narjoko, Dionisius and Oum, Sothea (2010b), *Firm characteristic determinants of SME participation in production networks*, ERIA Discussion Paper Series No. 2010-11, ERIA, Jakarta.
- Harvie, Charles, Narjoko, Dionisius and Oum, Sothea (2010c), Constraints to growth and firm characteristic determinants of SME participation in production networks, in Thanh, Vo Tri, Narjoko, Dionisius and Oum, Sothea (eds.), *Integrating small and medium enterprises (SMEs) into the more integrated East Asia*, ERIA Research Project Report No. 8, Jakarta: ERIA, 68–133.
- Harvie, Charles, Narjoko, Dionisius and Oum, Sothea (2015), *Economic integration in East Asia: Production networks and small and medium enterprises*, London: Routledge.
- Henderson, Jeffrey, Dicken, Peter, Hess, Martin, Coe, Neil and Yeung, Henry Wai-chung (2002), Global production networks and the analysis of economic development, *Review of International Political Economy*, 9(3), 436–64.
- Khanna, Dinesh (2014), Winning in ASEAN: New realities & challenges, Presentation at the ASEAN Economic Community Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Kimura, Fukunari (2013), How have production networks changed development strategies in East Asia?, in Elms, Deborah K. and Low, Patrick (eds.), *Global value chains in a changing world*, Geneva: World Trade Organization, 361–383.
- Kuroiwa, Ikuo and Toh, Mun Heng (eds.) (2008), *Production networks and industrial clusters: Integrating economies in Southeast Asia*, Singapore: Institute of Southeast Asian Studies.
- Lane, Christel and Probert, Jocelyn (2009), *National capitalisms, global production networks: Fashioning the value chain in the UK, US, and Germany*, Oxford: Oxford University Press.
- Lee, A.J., Lim, R.Y., Ma, B., Xu, L.X. (2013), Improving productivity of the SMEs in Singapore – case studies, *Proceedings of the 2013 IEEE International Conference on Industrial Engineering and Engineering Management*, 10–13 December, Bangkok, Thailand, 73–77.

- Lim, Hank and Kimura, Fukunari (2010), The internationalization of small and medium enterprises in regional and global value chains, ADBI Working Paper No. 231, Asian Development Bank Institute, Tokyo.
- Lim, Hong Hin (2014), *ASEAN Economic Community 2015: Thinking globally, prospering regionally*, presentation at the AEC Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Lin, Justin Yifu (2012), *The quest for prosperity: How developing economies can take off*, Princeton, NJ: Princeton University Press.
- Lin, Yeo and Rasiah, Rajah (2014), Human capital flows in Taiwan's technological catch up in integrated circuit manufacturing, *Journal of Contemporary Asia*, 44(1), 64–83.
- Lüthje, Boy, Hürtgen, Stefanie, Pawlicki, Peter and Sproll, Martina (2013), *From Silicon Valley to Shenzhen: Global production and work in the IT industry*, Lanham, MD: Rowman & Littlefield.
- Marasigan, Victor S. (2014), Is AEC 2015 good for business?, presentation at the AEC Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Martono, Sri F.X. (2014), *Bright lights, bright futures: YDBA sharing on SMEs resilience*, presentation at the AEC Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Milberg, William and Winkler, Deborah (2013), *Outsourcing economics: Global value chains in capitalist development*, Cambridge: Cambridge University Press.
- Neilson, Jeffrey, Pritchard, Bill and Yeung, Henry Wai-chung (eds.) (2015), *Global value chains and global production networks: Changes in the international political economy*, London: Routledge.
- Nguyen, Thang V., Le, Ngoc T.B. and Bryant, Scott E. (2013), Sub-national institutions, firm strategies, and firm performance: A multilevel study of private manufacturing firms in Viet Nam, *Journal of World Business*, 48(1), 68–76.
- OECD (2008), *Enhancing the role of SMEs in global value chains*, Paris: Organisation for Economic Co-operation and Development.
- OECD-WTO-UNCTAD (2013), Implications of global value chains for trade, investment, development and jobs, report prepared for the G-20 Leaders Summit, September, http://unctad.org/en/PublicationsLibrary/unctad_oecd_wto_2013d1_en.pdf.
- Pickles, John and Smith, Adrian (2015), *Articulations of Capital: Global production networks and regional transformations*, Oxford: Wiley-Blackwell.
- Ramly, Rohana (2014), What constitutes good policy environment for SMEs?, presentation at the AEC Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Saxenian, AnnaLee (2006), *The new Argonauts: Regional advantage in a global economy*, Cambridge, MA: Harvard University Press.
- Senik, Zizah Che, Isa, Rosmah Mat, Scott-Ladd, Brenda and Entekin, Lanny (2010), Influential factors for SME internationalization: evidence from Malaysia, *International Journal of Economics and Management*, 4(2), 285–304.

- Shinozaki, Shigehiro (2012), A new regime of SME finance in emerging Asia: Empowering growth-oriented SMEs to build resilient national economies, ADB Working Paper Series on Regional Economic Integration, No. 104, ADB, Manila, <http://hdl.handle.net/11540/1260>.
- Talib, Fauziah (2014), SMEs – Good policy environment, presentation at the AEC Symposium on Creating Opportunities for Businesses Including SMEs in ASEAN, Yangon, Myanmar, 13 October.
- Tambunan, Tulus (2008), Trade liberalization effects on the development of small and medium-sized enterprises in Indonesia, *Asia-Pacific Development Journal*, 15(2), 35–59.
- Tambunan, Tulus and Chandra, Alexander C. (2014), Utilisation rate of free trade agreements (FTAs) by local micro-, small-and medium-sized enterprises: A story of ASEAN, *Journal of International Business and Economics*, 2(2), 133–63.
- Thanh, Vo Tri, Narjoko, Dionisius and Oum, Sothea (eds.) (2010), Integrating small and medium enterprises (SMEs) into the more integrated East Asia, ERIA Research Project Report No. 8, ERIA, Jakarta.
- Troilo, Michael L. (2013), Market orientation of SMEs in Southeast Asia: an empirical analysis, *Copenhagen Journal of Asian Studies*, 30(1), 53–79.
- UNCTAD (2010), *Integrating developing countries' SMEs into global value chains*, New York: United Nations.
- UNCTAD (2013), *World investment report 2013: Global value chains: Investment and trade for development*, New York: United Nations.
- Wang, Cassandra C. and Lin, George C. S. (2013), Dynamics of innovation in a globalizing China: regional environment, inter-firm relations and firm attributes, *Journal of Economic Geography*, 13(3), 397–418.
- Wee, C.N. Janet and Chua, Y.K. Alton (2013), The peculiarities of knowledge management processes in SMEs: the case of Singapore, *Journal of Knowledge Management*, 17(6), 958–72.
- Whittaker, D. Hugh, Zhu, Tianbiao, Sturgeon, Timothy, Tsai, Mon Han and Okita, Toshie (2010), Compressed development, *Studies in Comparative International Development*, 45(4), 439–67.
- Wignaraja, Ganeshan (2012), *Engaging small and medium enterprises in production networks: Firm-level analysis of five ASEAN economies*, ADBI Working Paper Series, No. 361, Asian Development Bank Institute, Tokyo.
- Wignaraja, Ganeshan (2013), Can SMEs participate in global production networks? Evidence from ASEAN firms, in Elms, Deborah K. and Low, Patrick (eds.), *Global value chains in a changing world*, Geneva: World Trade Organization, 279–312.
- Wignaraja, Ganeshan (ed.) (2016), *Production networks and enterprises in East Asia: industry and firm-level analysis*, ADB Institute Series on Development Economics, Tokyo: ADBI and Springer.
- Yeung, Henry Wai-chung (2001), Organising regional production networks in Southeast Asia: Implications for production fragmentation, trade and rules of origin, *Journal of Economic Geography*, 1(3), 299–321.
- Yeung, Henry Wai-chung (2009), Regional development and the competitive dynamics of global production networks: An East Asian perspective, *Regional Studies*, 43(3), 325–51.

- Yeung, Henry Wai-chung (ed.) (2010), *Globalizing regional development in East Asia: Production networks, clusters, and entrepreneurship*, London: Routledge.
- Yeung, Henry Wai-chung (2015), Regional development in the global economy: A dynamic perspective of strategic coupling in global production networks, *Regional Science Policy & Practice*, 7(1), 1–23.
- Yeung, Henry Wai-chung (2016), *Strategic coupling: East Asian industrial transformation in the new global economy*, Cornell Studies in Political Economy Series, Ithaca, NY: Cornell University Press.
- Yeung, Henry Wai-chung and Coe, Neil M. (2015), Toward a dynamic theory of global production networks, *Economic Geography*, 91(1), 29–58.
- Zhu, Shengjun and Pickles, John (2014), Bring in, go up, go west, go out: Upgrading, regionalisation and delocalisation in China's apparel production networks, *Journal of Contemporary Asia*, 44(1), 36–63.