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Competitiveness and Technological Upgrading in Global Value Chains: Evidence from the Indonesian Electronics and Garment Sectors

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ABSTRACT *Indonesia is a rapidly growing and internationally competitive economy that is well integrated into globalized production systems. The global value chain (GVC) model has proven to be a popular analytical framework to explain how global lead firms structure and organize global production through dispersed global suppliers. Indonesia's leading export sectors, garments and electronics, are well integrated into GVCs. Engagement in GVCs, often led by leading global brands, is seen as a basis for local producers to become globally competitive and to grow. It also comes with challenges—local producers must meet the demanding pressures from lead firms on prices, on-time delivery, product quality, and social, environmental and labour standards. The possibilities for local producers to learn, acquire new capabilities and upgrade to enhance their competitiveness are often conditioned by the nature of ties that they have with their global lead firms. Yet, this paper argues, the GVC model fails to recognize agency on the part of local firms in this learning process. Moreover, particular forms of governance arrangements within GVC ties can restrict the prospects for local producers to enhance capabilities and upgrade. Drawing on selected case study evidence from the Indonesian garments and electronics sectors, the paper explores the relationship between distinct types of GVC engagements and firm-level learning and upgrading, and considers how some GVC ties may restrict upgrading.*

Introduction

A key feature of globalization is the extensive decentralization of production. Many products are no longer manufactured in a single factory, but instead assembled from raw materials and components sourced from diverse regions of the world. This requires extensive co-ordination. The global value chain (GVC) and global production networks (GPNs)

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frameworks have proven to be useful analytical models to understand the nature and dynamics of such production arrangements and the critical role of global “lead firms” orchestrating such activities (Henderson *et al.*, 2002; Gereffi *et al.*, 2005). Engagement by local suppliers with GVCs headed by leading global brands is often seen as a sign of competitive success. It also comes with challenges—suppliers must meet the demands of lead firms, especially on prices, timely delivery and compliance with quality, social, environmental and labour standards (Kaplinsky, 2005; Nadvi, 2008). To meet these pressures, local producers must constantly upgrade. The possibilities for upgrading are, however, often conditioned by the nature of the ties that suppliers have with their global lead firms (Humphrey & Schmitz, 2002; Gereffi *et al.*, 2005).

This paper uses evidence from the Indonesian garments and electronics sectors to consider what forms of GVC engagements help firms to upgrade and compete, and where GVC ties might restrict local upgrading. Indonesia is an interesting case study. After long periods of political upheaval, it has experienced a degree of democratic political stability and high levels of economic growth. During the decade of 2000–2010, real GDP grew at an average of 6.0% per annum, merchandise exports rose by 14.0% per annum, while manufactured exports grew at an average rate of 16.4% annually. In 2010, manufacturing’s share in GDP was 25.8% while its share in total merchandise export rose to 63.9% (Bank Indonesia, 2011). Indonesia has also become a magnet for global investors, being the most improved country over the period 2005–2010 in the World Economic Forum’s (2011) global competitiveness index. Described as one of the “Next Eleven (N11)” countries, Indonesia is now seen as rapidly following the BRIC states (Brazil, Russia, India and China) in its growth trajectory (Wilson & Stupnytska, 2007; O’Neill, 2011). Like the BRICs, it is a large economy, with a population in excess of 237 million, a growing domestic market and an expanding middle class. In addition to its vast reserves of primary commodities and natural resources, Indonesia is a key location for the manufacture of apparel and electronics and is integrated into the GVCs of the leading global brands and retailers that dominate international trade in garment and electronics.

Given this context, we use the GVC framework to explore how the Indonesian garment and electronics firms engage with global markets; and how this engagement affects their ability to upgrade and enhance their competitiveness. A key argument underlying the GVC model is that the upgrading strategies of local firms are intermediated through their ties with global lead firms. The latter can be a critical source of knowledge and know-how for local producers, thus enhancing their capabilities and upgrading prospects. Yet, the ways in which this comes about is itself governed by the power relationships, or governance, exercised by global lead firms within the GVC. However, as this paper argues, by focusing primarily on ties with global lead firms, the GVC framework provides limited insight into the “agency” of local firms to engage with upgrading processes. In fact, particular forms of governance arrangements within GVC ties may restrict prospects for local producers to enhance capabilities, acquire new forms of knowledge and thus improve their competitive position.

We draw on secondary evidence and extensive primary interviews undertaken with leading global brands and international traders sourcing from Indonesia as well as with electronics and garments manufacturers and key informants in Indonesia. A postal survey was first undertaken targeted at medium- and large-sized enterprises. We focused on these better-endowed firms on the grounds that they were most likely to be integrated into the GVCs of global brands and have the requisite resources and technical

capabilities to engage in upgrading in the face of growing international competition. Using the databases of the respective sector-specific trade associations, a total of 138 Indonesian garment and 64 electronics manufacturers were contacted. Detailed responses were received from 22 garment and 15 electronics producers. Following analysis of the postal survey data, a subset of 13 garment producers and 12 electronics firms were interviewed in-depth and face to face (in many cases this also included detailed factory visits). All interviews took place in 2008 prior to the onset of the global economic crisis.¹ While we do not claim that our primary data provide a representative overview of the Indonesian garments and electronics industry, we can offer indicative insights into the dynamics within the respective sectors. Moreover, our evidence in the garment sector is augmented through interviews undertaken with leading global brands and international traders. In electronics, our detailed case studies covered 12 of the 17 leading consumer electronics firms in Indonesia, including many of the major international consumer electronic manufacturing brands that maintain Indonesian production subsidiaries.

The paper is set out as follows. The following section outlines our conceptual framework. We then go on to briefly review the recent history of Indonesia's electronics and apparel industries. In fourth section, we provide a more detailed analysis, drawing on our primary research, on how firm-level upgrading is brought about. We explore how GVC ties influence and at times impede this process. The paper concludes by considering the consequences of our findings for broader theoretical and policy considerations on firm-level upgrading.

Upgrading, Technical Capabilities and GVC Governance

The globalization of production since the 1970s has shown that in many sectors and in most internationally competitive markets, manufacturing is not based solely on national-level linkages but crucially involves complex forms of global ties. Components and raw materials are sourced from distinct and geographically diverse locations and assembled in manufacturing facilities often far from actual markets. The co-ordination of these production relations is often undertaken by global lead firms, frequently well-known brands and retailers, who organize complex arrangements with a diverse array of geographically dispersed suppliers. This framework has been variously described as "global production sharing", "global commodity chains", "GVCs" and "GPNs".² The GVCs and GPNs frameworks provide heuristic models to show how production relations are structured, organized and locally and globally embedded. The concepts are different. The GVC framework emphasizes relational ties within the supply chain, between raw material suppliers, component manufacturers, manufacturing assemblers, designers, distributors, logistics specialists, retailers and even recyclers. It provides a "flowchart" of the horizontal transactions that turn raw materials into finished goods and services that are sold to consumers. It provides a basis for assessing how value is created and appropriated at each point along this flowchart or vertical chain. It also underlines the critical role of lead firms who govern and co-ordinate these flows. Using a transactions costs analysis, Gereffi *et al.* (2005) identify the differentiated nature of power exercised by lead firms in the value chain. The distinct forms of exchange relationships between actors along the chain, and the nature of power asymmetries, influence the possibilities for, and the manner in which, actors along the value chain can upgrade, innovate and take on higher value activities.

The GPN framework parallels much of the analytical agenda of the GVC model. However, it takes the GVC framework beyond analysis of vertical linkages along the value chain. It suggests that equally critical are non-chain actors who also influence the structure and organization of production relationships (Henderson *et al.*, 2002; Coe *et al.*, 2008). These include the state, civil society and trade regimes. Moreover, these non-chain actors operate at various levels of geographical spatiality, from the global to the regional, national and local. The GPN framework provides not only a more complex global production “flowchart”, it is also more influenced by how the arrangements within the flow chart are locally and socially embedded in diverse forms of local social relationships (Hess & Yeung, 2006).

For the purposes of this paper, where our focus is on how firms upgrade (or fail to upgrade) through their global linkages, the concern is with the vertical relationships along the production “flowchart”. We do not address here the role of horizontal, non-chain, actors that may influence how these vertical relationships are constructed or governed, or their implications for upgrading. Nor do we explore the nature of social embeddedness of these vertical ties. Consequently, we utilize the GVC model which, in our view, is better in theorizing the relationship between chain governance and upgrading.

Our understanding of governance within the value chain is best developed in the seminal article by Gereffi *et al.* (2005), which provides a governance taxonomy using transaction costs analysis. The Gereffi *et al.* (2005) framework has been critiqued for both being relatively static and the existence of multiple forms of governance arrangements exist in many sectors (Coe *et al.*, 2008; Gibbon & Ponte, 2008). Nevertheless, it remains a useful tool to consider the nature and basis of power of lead firms within GVCs and its consequences for upgrading.

Gereffi *et al.* (2005) argue that the nature of governance within the value chain is based on three factors: first, the complexity of transactions between lead firms and their suppliers; second, the capabilities of these suppliers and third, the extent to which such transactions can be easily codified into clearly defined rules, norms and standards. This framework generates five distinct forms of governance relationships. At one extreme are market ties, where transactions are simple, suppliers capable and codification easy. As a result, co-ordination does not imply any distinct power asymmetry between lead firms and their suppliers. Transactions are purely governed by market and price considerations. At the other extreme are hierarchical governance arrangements. These imply very high levels of power asymmetry and come about when transactions are complex, cannot be easily codified and supplier capabilities are low. Between these two extremes lie three distinct network governance arrangements: modular, relational and captive. What is common across all three is that the nature of transactions between lead firms is considered to be complex. However, where suppliers have low levels of capabilities, the consequence is that a captive form of governance emerges with power asymmetrically held by lead firms. In contrast, if suppliers have high levels of capabilities and transactions can be easily codified, then modular network governance appears with power more equally distributed between lead firms and suppliers. The third form of network governance is one of “relational” ties where suppliers are capable but transactions not easily codified. This requires more explicit co-ordination and a greater degree of power asymmetry between lead firms and suppliers than seen with modular governance arrangements.

Using this framework, Gereffi *et al.* (2005) described the global garment industry as having undergone a transition from captive to more relational GVC governance

arrangements. As suppliers build their capabilities and move from the simpler functions of garment assembly (often described as “cut–make–trim”) into higher value-added areas (such as fabric sourcing and eventually into “full package” production where suppliers are responsible for all garment production and distribution functions), the extent of power asymmetry declines. Lead firms may still require some forms of co-ordination, especially to ensure that suppliers implement labour and environmental standards and comply with codes of conduct.

In contrast, Gereffi *et al.* (2005) view the global electronics industry as moving from hierarchical to modular value chains once supplier capabilities are high and the levels of codification are also high. As Sturgeon’s (2002, 2003, 2008) work has shown, modularity in the electronics GVCs not only implies a lower degree of power asymmetry between lead firms and their suppliers, but also greater interaction between suppliers and lead firms in areas of product development and process innovation. The rise of original equipment manufacturers as leading first tier suppliers in the electronics industry is now well known (Hobday, 1995, 2001; Ernst, 2000). These, often large and multinational, firms have become brands in their own rights with close and highly interactive arrangements in areas of innovation and upgrading with the global electronics lead brands (Ernst, 2001).

The GVC literature has been especially interested in analysing how upgrading is brought about in the context of specific types of governance relationships. Humphrey and Schmitz (2002) distinguish the following forms of upgrading within a GVC context: process upgrading, product upgrading, functional upgrading and chain upgrading. The ability of local producers within the GVC to engage in these distinct forms of upgrading are, it is argued, conditioned by the ways in which such firms are inserted into the GVC and the power asymmetry between them and their lead firms. Knowledge flows and the transfer of know-how and capabilities are seen to flow vertically through the chain, depending on the nature of governance ties. It is only in more modular forms of GVC governance, where power asymmetries are less sharp, where supplier capabilities are high that knowledge flows can also come from suppliers to lead firms, often through extensive user–producer-based interactions and co-engagement. In contrast, in captive chains patterns of upgrading, learning and knowledge flows primarily originate from the lead firms and move down the chain to their dispersed suppliers.

This understanding of upgrading is, however, relatively weak in its conceptualization of how technological progress, learning and capabilities are acquired. There is little understanding within the framework of the “agency” of individual firms in developing capabilities or the wider institutional context through which firms learn and technologically progress. This point has been noted recently by a number of scholars (Morrison *et al.*, 2008; Sato & Fujita, 2009; Pietrobelli & Rabellotti, 2011; Nadvi, 2011).

There is, of course, a rich literature on technological capabilities (Lall, 1992; Bell & Pavitt, 1993; Ernst & Kim, 2001) and on local and national systems of innovation (Nelson, 1993; Cooke *et al.*, 1997; Edquist, 1997; Mytelka, 2000; Lundvall, 2007). This literature has shown how capabilities are acquired within firms and across regions, and how innovative practices systematically develop, and are socially embedded, in national and regional systems of innovation.

Understanding the capabilities of suppliers is central to considering how governance operates within a GVC. But capabilities are also dynamic and influenced by both intra-firm, intra-chain and extra-chain factors. As Morrison *et al.* (2008, p. 41) have argued, in interrogating the relationship between technological capabilities and the GVC governance framework, it is

critical to first challenge the “rather fuzzy” understanding of upgrading provided by the GVC literature. As they state, upgrading is fundamentally about enhancing capabilities, and this requires purposive action by firms. With a primary focus on the role of the lead firms and their governance structure as the key transmitters of knowledge, know-how and capabilities within GVCs, the GVC framework tends to underplay the importance of the capabilities of suppliers along the chain and their absorptive capacities to acquire and build on incremental and new knowledge. This implies a need for greater awareness of how learning takes place and how suppliers within the chain move from what Bell and Albu (1999) refer to as “knowledge using” to “knowledge changing” capabilities. The former points to capabilities that allow firms to efficiently appropriate and use technologies, especially in process functions. The latter points to knowledge and capabilities that allow firms to innovate and develop the capacity to generate change (Bell & Albu, 1999; Nadvi & Halder, 2005).

In sum, while GVC governance ties clearly impact on the potential for distinct forms of upgrading by local firms, local agency also matters. This includes the nature of technological capabilities residing within local supplier firms, the efforts undertaken by such firms to acquire new know-how and new forms of skills and also the presence of local skills, technological institutions and policy interventions. As this paper suggests, a more holistic view of the basis on which firm capabilities are built and upgrading brought about is required. We attempt to illustrate this through evidence from Indonesia.

Indonesia’s Garments and Electronics Sector: An Overview

Following an earlier period of import substitution industrialization (from 1969 through to 1985), Indonesia’s economic strategy has over nearly three decades been based on export-led growth (Hill, 1991; Thee & Pangestu, 1998; Dhanani, 2000; William *et al.*, 2002; Aswicahyono & Mairid, 2003; Ishida, 2003; Thee, 2009). To achieve this, the Government of Indonesia (GOI) has undertaken various policies to liberalize trade and investment. This has included abolishing non-tariff barriers, establishing export processing zones and improving conditions for foreign direct investment.³ Access to state financing for foreign joint ventures has been improved and all direct investments have been exempted from VAT on imported capital goods (Prawiro, 1998; Thee & Pangestu, 1998). To create a more favourable investment climate, administration of investment has been simplified while firms classified as export-oriented have been given preferential treatment including export processing “entrepot” (EPE) status⁴ (Pangestu, 1997). Thus, between 1990 and 1996, total manufactured goods export grew at a startling average annual rate of 25.9% (ICSEAD, 2007). Following the Asian financial crisis in the late 1990s (when Indonesia’s real GDP contracted by 13% and manufacturing shrunk by 11%), the GOI introduced a new strategy focused on promoting value chain growth in key industries (including textiles and garments as well as electronics). This sought to improve productivity, strengthen value chain linkages with supporting industries and raise value added by building core competencies (Ministry of Industry of Indonesia, 2005, p. 60).

These developments have had a major impact on Indonesia’s two leading manufacturing export sectors: garments and electronics. In 2010, the garment sector contributed approximately 11% of industrial employment and 7.3% of total merchandise exports (Bank Indonesia, 2011). It also accounted for 1.9% of total global garment exports (UN Comtrade, 2011). Electronics (including electrical machinery) was the second largest contributor to Indonesia’s manufactured exports, accounting for 6.9% of total

merchandise exports in 2010 (Bank Indonesia, 2011). We briefly outline the developments and challenges for these two sectors in Indonesia.

Indonesia's Garment Sector

The textile and garment sector is one of Indonesia's oldest industries, but rapid growth only came about in the late 1980s as a result of rising domestic demand and new export opportunities. The domestic market expanded with the emergence of modern department stores and their growing role in garment retailing (Aswicahyono & Maidir, 2003; Hassler, 2004). Meanwhile, greater export opportunities arose with the export-oriented strategy (Hill, 1991; Thee & Pangestu, 1998). The growth in Indonesia's garment exports during the 1980s and 1990s was rooted in the country's relatively low labour costs and its unutilized quotas under the multi-fibre arrangement (MFA). These conditions were exploited by East Asian garment manufacturers who set up production facilities in Indonesia (Thee, 2009). By the mid-1990s, Indonesia's garment industry had been fully inserted into the global garment value chains of leading global brands with exports to major and demanding global markets. Export garment production from Indonesia was co-ordinated by leading global branded marketers and retailers, especially from the US and the European Union, as well as international traders who managed triangular manufacturing arrangements for such brands (Gereffi, 1999; Gereffi & Memedovic, 2003). International buyers supplied designs, specifications, fabrics and accessories to garment factories in Indonesia, and then marketed and retailed the finished garments under their own brand names. While global branded marketers and retailers rely heavily on corporate images, these can be vulnerable to negative publicity (Jenkins, 2001; Hughes, 2005; Nadvi 2008). To protect the value of their brand image, global buyers required Indonesian garment suppliers to be competitive in terms of price, quality and time-to-market, and comply with codes of conduct and international social and labour standards.

The 2005 MFA phase out posed a particular challenge for Indonesia. MFA quotas were essential to the early development of its export garment industry, safeguarding Indonesian producers from direct competition with more established garment exporters (Thee & Pangestu, 1998). As Table 1 shows, the MFA quota-constrained markets, particularly the US and the European Union, have been the most important markets for Indonesian garment exports since the 1990s.

Indonesia has seen its competitive position in the global garment trade improve following the MFA phase out. Export volumes in 2010 were significantly higher than the peak

Table 1. Share of major export markets of Indonesian garment

Export market	1996	2000	2005	2010
Quota-constrained markets	61.0	80.5	87.7	82.8
US	32.4	42.0	55.4	59.6
European Union	23.1	36.7	30.4	21.1
Canada	5.5	1.8	1.9	2.1
Non-quota markets	39.0	19.5	12.3	17.2
World (million US\$)	3453.9	4561.8	4899.6	6500.9

Source: UN Comtrade (comtrade.un.org).

under the MFA era, and the US accounted for a larger share of Indonesia's export markets. The abolition of the MFA appears to have increased the importance of global branded marketers and retailers within the global garment value chains. Since international restrictions no longer determine their production sources, global buyers have begun to consolidate sourcing. While China remains the world's biggest garment supplier, many leading global brands have also opted to expand sourcing from China as well as a smaller handful of other garment exporting countries, including Indonesia. Moreover, within Indonesia, orders tend to be placed with a smaller number of competitive garment suppliers that can meet the quality, price, time-to-market, and labour and social compliance objectives of leading global buyers.

Indonesia's Electronics Sector

The Indonesian electronics industry began as part of Indonesia's import substitution agenda in the early 1970s (Prawiro, 1998). The GOI applied tariff and non-tariff barriers prohibiting the imports of radios and televisions as finished goods (Thee & Pangestu, 1998). Foreign electronics firms were encouraged to invest in Indonesia through joint ventures and technical cooperation with domestic partners to cater to domestic demand. Export growth from Indonesia's electronics industry only came about in the mid-1980s. The new investment policies encouraged inflows of export-oriented foreign investment particularly from South Korea, Singapore and Taiwan. Exports rose to US\$865.5 million in 1992 (accounting for 55% of total electronics' production). At the time, the Indonesian electronics industry was dominated by consumer electronics (which contributed 49% of electronics' production), while industrial electronics and components accounted for 29% and 22%, respectively (Thee & Pangestu, 1998). Consumer electronics still plays a key role in Indonesia's electronics industry where the sector is dominated by few large firms that were established in the 1970s and 1980s.

Global electronics production activities are now split into discrete fragments performed by different firms. Furthermore, the fragmentation applies not only to production processes but also to the whole chain of value-added activities. Global lead firms focus on particular value chain activities and outsource the rest to other independent firms (Sturgeon, 2003; Ernst, 2005). The fragmentation in global electronics value chains is driven by several factors. First, modularization of electronics production allows the application of standardized components and systems. Second, there is growing capability among global electronics suppliers to perform not only assembly operations but also take on other

Table 2. Share of major export markets of Indonesian electronics (%), 1996–2010

Export market	1996	2000	2005	2010
Singapore	30.2	27.9	32.5	21.2
US	26.9	17.3	15.5	13.2
Japan	8.8	16.6	13.0	11.9
Hong Kong	3.3	4.0	4.0	5.1
Others	30.8	34.2	35.0	48.6
World (million US\$)	3273.6	6464.1	7328.4	10,432.5

Source: UN Comtrade (comtrade.un.org).

value-added activities (such as design and input sourcing). Third, the intense competition within the global electronics industry requires firms to be both flexible and specialized (Sturgeon, 2003; Lüthje, 2004; Ernst, 2005).

Singapore has been the main export destination of Indonesia's electronics over the past 15 years. Singapore, however, is largely an "entrepot" re-exporting to third countries with or without further processing (Thee & Pangestu, 1998). In consumer electronics, Indonesia's domestic market plays a more important role than exports. In 2010, the value of the domestic market of consumer electronics reached US\$9.03 billion. However, only 40% of total domestic market value was accounted for by local production (Table 2) (Keet, 2011).

It is evident that Indonesia's garment and electronics sectors are engaged in highly demanding GVCs. The rise in the export share of Indonesia's garments and electronics may indicate successful forms of upgrading by local suppliers and sustained competitiveness of Indonesian garment and electronics firms. Indonesia's engagement in global markets is driven by specific ways in which buyer-driven value chains have allowed Indonesia's garment suppliers to work with leading global brands, and producer-driven value chains have resulted in Indonesia emerging as a leading export platform for foreign direct investment (FDI) by global electronics firms. To get a better understanding of how GVC ties might impact on upgrading the next section explores our evidence from Indonesia's garment and electronics firms on the link between GVC governance and firm-level learning processes.

GVC Governance and Firm-Level Learning

We use firm case studies to observe how Indonesian garment and electronic firms insert themselves into GVCs, and the implications of this for firm learning and upgrading. We begin with a brief overview of our descriptive findings. We then draw on a handful of case studies to consider patterns of GVC engagement and governance, and the relationship between GVC governance and firm-level upgrading and learning processes.

We obtained evidence from 22 garment and 15 electronics firms through our postal survey. Tables 3 and 4 detail our sample. All electronics firms were large enterprises (employing well over 1000 workers) but differentiated by ownership. Eight were Indonesian-owned firms, four were subsidiaries of leading foreign (Japanese and South Korean) manufacturers and three were joint ventures. All garment producers were Indonesian owned, but differentiated by size with a dozen medium-sized firms (employing less than 500 workers) and 10 large firms (with average employment levels of over 2800 workers).

A number of points emerge. First, firms in both sectors (with the partial exception of domestically owned electronics firms) reported high levels of annual sales growth. Second, the nature of markets varied. Most electronics firms supplied both export and domestic markets, although three-quarters of solely Indonesian-owned electronics firms catered only for the local market. In the garment sample export markets were dominant, with 9 of 10 large producers and just under half the medium-sized firms solely engaged in exports. Third, there were distinctions across functional activities within and between sectors. All garment firms interviewed carried out assembly (cut, make and trim), quality control and finishing tasks. Yet, functional activities differed according to firm size and end markets. Two thirds of medium-sized garment firms (including most of those who sold in domestic markets) did their own input sourcing. In contrast, global buyers provided inputs, such as fabrics, buttons and trim, for 70% of the large firms interviewed. Similarly, 10 of the 12 medium-sized firms had design activities and half of all

Table 3. Garment manufacturers sample profile ($n = 22$)

Size of manufacturers	Medium-sized	Large-sized
<i>Descriptive</i>		
No. of manufacturers	12	10
Age of manufacturers (years, average)	20	20
No. of employment (people, average)	278	2855
No. of manufacturers supplying 100% domestic market	2	0
No. of manufacturers supplying domestic and export markets	5	1
No. of manufacturers supplying 100% export market	5	9
<i>Dynamics</i>		
Annual sales growth (% , average)	12	14
<i>Value-added activities</i>		
Design (no. of manufacturers)	10	5
Input sourcing (no. of manufacturers)	8	3
Cutting and sewing (no. of manufacturers)	12	10
Quality control (no. of manufacturers)	12	10
Packing (no. of manufacturers)	12	10
Own branding (no. of manufacturers)	6	1
<i>GVCs</i>		
Export share (% , average)	53	92
No. of foreign buyers (average)	6	9
Foreign buyers from advanced countries (no. of manufacturers)	3	9

Source: Authors' own survey 2008.

medium-sized garment producers sold under their own brands. Among the large garment firms, only half had their own design departments, and only one had its own brand label (and that too solely for its domestic sales). In contrast, in electronics most firms, irrespective of ownership status or end-markets, undertook all functional activities from design to after-sales. Fourth, there were distinct patterns of ownership. All garment manufacturers had Indonesian-owned capital, whereas a significant share of electronics firms were based on FDI or joint ventures.

Patterns of GVC Engagement

To assess the nature of value chain governance, we undertook in-depth firm interviews with 13 garment and 12 electronics producers. We present here a detailed analysis of five case studies of garment producers, three medium and two large firms, and six case studies in electronics (one joint venture, one FDI subsidiary and four domestically owned enterprises). These case studies are selected not as representative examples of particular types of firms, but as indicative cases that underline different patterns of value chain governance and firm-level learning and upgrading.

Gereffi *et al.* (2005, p. 91) describe governance in the global garment industry as moving from captive to relational linkages as suppliers upgrade from standard cut–make–trim functions to take on full package production. Similarly, in the electronics sector, they suggest there is a shift from hierarchical to more modular chains as suppliers improve capabilities. In the Indonesian context we see evidence of captive (garments) and hierarchical (electronics) GVC ties. Indonesian firms inserted in such ties abide by the

Table 4. Consumer electronics manufacturers sample profile ($n = 15$)

Ownership of manufacturers	100% FDI	Joint venture	100% Domestic
<i>Descriptive</i>			
No. of manufacturers	4	3	8
Age of manufacturers (years, average)	27	35	21
No. of employment (people, average)	1605	1883	1288
No. of manufacturers supplying 100% domestic market	0	0	6
No. of manufacturers supplying domestic and export markets	4	3	2
No. of manufacturers supplying 100% export market	0	0	0
<i>Dynamics</i>			
Annual sales growth (%)	11–20	11–20	≤10
<i>Value-added activities</i>			
Design (no. of manufacturers)	2	3	6
Input sourcing (no. of manufacturers)	4	3	8
Assembly (no. of manufacturers)	4	3	8
Quality control (no. of manufacturers)	4	3	8
Packing (no. of manufacturers)	4	3	8
After-sales service (no. of manufacturers)	4	3	8
Own branding (no. of manufacturers)	4	3	4
<i>GVCs</i>			
Export share (% , average)	55	37	3
Principals from advanced countries (no. of manufacturers)	4	3	1

Source: Authors' own survey 2008.

product and process specifications determined by the GVC lead firms. Lead firms provide detailed designs and product samples as well as supply materials, components and parts to be used by their Indonesian suppliers (Table 5).

In the garment sector, the case study of medium-sized “Busana Garmenindo” (BG) points to captive GVC ties. BG supplies to global buyers via local trade agents. The agent acts as an intermediary between the buyers and the firm. The global buyer supplies detailed garment patterns and garment construction manuals, fabrics and accessories. The trade agent also provides technical assistance on sample making, production and quality control procedures to BG. To assist and monitor production within BG, the trade agent has placed its own sample makers and production and quality controllers within BG's premises. In return for this level of technical assistance, BG must commit two-thirds of its production capacity to the global buyer.

“Tunggal Garmenindo” (TG) is an example of moving from captive to relational ties. This large, wholly export-oriented firm supplies jackets and sportswear for a leading global branded marketer. Through close technical interactions the lead firm has transferred knowledge on production management (including on lean manufacture), sourcing decisions and compliance assessment (both on quality and social standards). As TG moves towards full package production, GVC ties with the global brand are markedly more relational.

The cases of “Pusaka Elektrindo” (PE) and “Suara Electroindo” demonstrated a classic hierarchical structure of a Japanese electronics joint venture and a South Korean FDI subsidiary. In these relationships, the Japanese and South Korean lead firms (both amongst the

Table 5. Forms of GVC governance for selected Indonesian garment and electronics case studies

Firm case studies	Size and ownership status	Markets	Market ties	Modular ties	Relational ties	Captive ties	Hierarchical ties
Tunggal Garment	4500 workers	Advanced market (100%)			X		
Busana Garment	150 workers	Advanced market (100%)				X	
Jaya Garment	2000 workers	Advanced market (5%)				X	
		Emerging export market (35%)	X				
Lestari Garment	350 workers	Domestic market (60%)	X				
		Emerging export market (65%)		X			
Cipta Garment	300 workers	Domestic market (35%)	X				
Pusaka Electronics	2000 workers joint venture	Domestic market (100%)		X			
		Emerging export market (30%)					
Suara Electronics	2500 workers 100% FDI	Domestic market (70%)			X		
		Advanced market (65%)					
Berdikari Electronics	2000 workers 100% domestic	Domestic market (35%)			X		
		Domestic market (100%)				X	
Buana Electronics	1400 workers 100% domestic	Domestic market (100%)	No GVC linkages				
Cahaya Electronics	500 workers 100% domestic	Domestic market (100%)				X	
Harapan Electronics	3500 workers 100% domestic	Emerging export market (15%)	No GVC linkages				
		Domestic market (85%)					

most well-known global electronics manufacturers) have direct control, providing capital, production technology, as well as running operations and management using their own business model and management style. In the case of PE, for example, it was a designated centre for producing particular consumer electronics (in this case refrigerators) to be sold in domestic and export markets. PE focused on mass production of small refrigerators for sales in domestic and export markets, while it imported large refrigerators produced by the Japanese lead firm's affiliate in Thailand. The export activities of PE were directed by the Japanese lead firm. The Japanese lead firm set product and process specifications to be followed by PE in order to achieve similar technical standards (e.g. quality, safety, reliability and durability) globally. For production system and management as well as product development management, PE had to adopt the system and management of the Japanese lead firm. Thus, PE, while ostensibly a joint venture with significant Indonesian ownership, was in effect a satellite assembly platform for the Japanese lead firm.

Captive and hierarchical value chains are, however, not the whole story in Indonesia's garment and electronics industries. In contrast to the argument put forward by Gereffi *et al.* (2005), we observed cases of Indonesian garment and electronics firms selling to global and domestic markets through both modular and market-based ties with global and domestic buyers. In such cases, these firms did not have product and process specifications dictated by the buyers, and instead the buyer-supplier relationship focused on quality, price and time to delivery. Buyers did not intervene in the firms' product development (e.g. design, input sourcing), production operations and management (including production outsourcing).

The case studies of "Lestari Garmenindo" (LG) and "Jaya Garmenindo" (JG) represent examples of garment firms that were engaged in captive, modular and market-based GVC ties. Both firms supplied to domestic and emerging export markets. LG, for example, was engaged in modular GVC ties in its sales to emerging export market and market ties in the domestic market. JG (Figure 1), a large firm employing 2200 workers in three production facilities in West Java, had market-based relationships in domestic and export markets as well as captive ties with buyers in advanced markets. The domestic market accounted for 60% of sales where JG sold under its own brand.

In the export market, LG makes garments for a retailer from United Arab Emirates which operates its chain stores throughout the Middle East. Despite owning the brand, the retailer does not provide explicit product and process specifications for LG to follow. Instead, LG proposes design and garment development to be selected by the retailer and takes full responsibility for production. Social and environmental compliance is also not an essential pressure from this buyer. Similarly, "JG" also exports garments to the Middle East and to other emerging markets in the Africa and Eastern Europe. However, JG produces garments not only under its own specifications but also its own brand. In the Middle East, JG claims that its own brand of denim jeans has gained widespread consumer recognition and is easily found in many department stores. The firm makes its own decisions on design and product development, production operations and management, including subcontracting production activities to other local garment producers. In the domestic market, JG retails its own branded products through the Matahari department store chain and via independent retailers operating through market-based transactions. JG also has sales to branded marketers in the US (quick silver) and Germany (Tom tailor). In its GVC relationships with buyers in these advanced markets, JG operates under captive governance ties. It follows the detailed specifications of the buyers through their Indonesia-based trade agents, is provided fabrics and

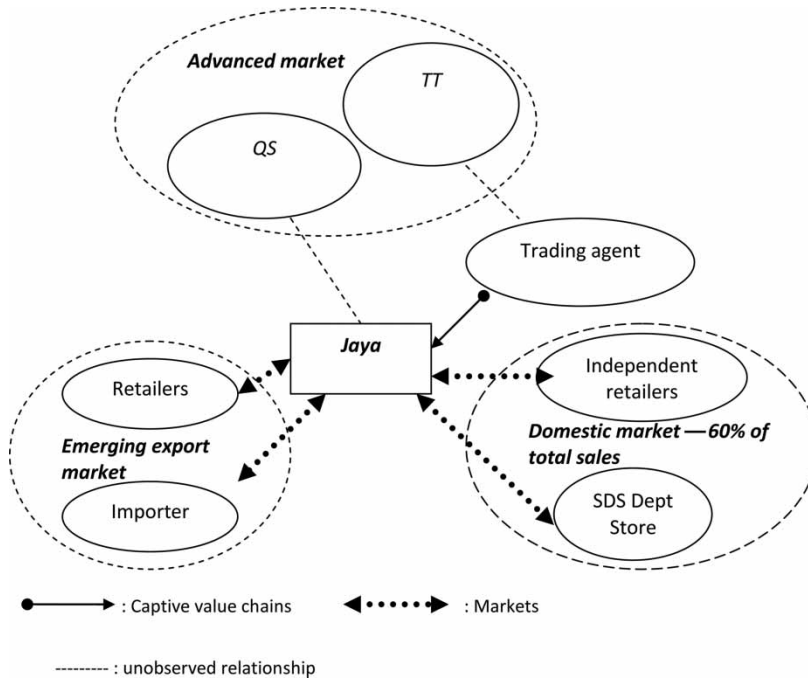


Figure 1. GVC governance relationships of “JG”.

inputs from the buyer and is regularly inspected on quality and compliance issues by the buyers’ representatives.

“Harapan Elektrindo” (HE) is a large electronics firm employing around 3500 workers in two factories in Indonesia and manufacturing audio systems, TVs, DVD players and home appliances (including refrigerators, washing machines and air conditioners). What distinguishes it from other leading electronics manufacturers in Indonesia is that HE has no ties or GVC linkages with global lead firms. HE’s primary focus is the domestic market, but it also exports directly to emerging markets (in the Middle East and ASEAN region) as well as outsourcing production to local producers in Pakistan and Sri Lanka with whom it has close technical assistance relationships. HE has developed its own products and brand and undertakes all functional activities in-house. Because HE does not have any ties with GVC lead electronics firms, the firm has the flexibility to develop original electronic products which meet domestic and emerging export market needs. Buyers purchase electronic products of HE as long as their design, functionality and quality are competitive.

Thus, our evidence indicates that while many Indonesian garments and electronics firms are engaged in GVCs through captive (garments) and hierarchical (electronics) arrangements, these are not the sole forms of GVC governance. Where local producers are not linked to global lead firms, especially where their sales are geared to local and emerging markets, there is the possibility of engaging in modular and market-based relationships and taking on “lead” roles within the chain, including in design and own brand manufacturing. We now move to considering the link between GVC governance and firm-level learning and capability acquisition.

Firm-Level Learning and Capability Development

The nature of governance structures affects the knowledge flows and learning processes within the value chains. Within captive value chains, knowledge flows from global lead firms in terms of, *inter alia*, detailed product and process specifications. To effectively engage in such ties, Indonesian firms must learn how to make quality products in a timely and cost-effective manner. The case of “BG” clearly demonstrates how the firm acquired production capability know-how from its global buyer through its trade agent in Indonesia. The firm adopted a serial assembly process (i.e. a conveyor belt system), in which working processes were broken down into short cycle tasks producing particular components of a garment (e.g. pocket, sleeves, cuffs, collars). In order to improve productivity along its production line, BG learnt how to calculate cycle time, balance the production line and manage inventory. This allowed the firm to control work flow within the production line and allocate the required number and skill of operators, as well as sufficient machinery, to minimize production bottlenecks. In addition, the firm uses cycle time to obtain information about standard sewing time plus allowances. Inventory management is required by BG to handle incoming materials and finished garments. The firm also learnt how to improve the quality of garments through the implementation of quality control during and after production. The firm acquired these product and process capabilities through its direct contact with sample makers and quality controllers from the trade agents who were placed within BG’s factory. While BG acquired a great deal of know-how on process upgrading, neither the global buyer nor the trade agent transferred any design capabilities. Because the global buyer supplies detailed garment patterns alongside its construction manual, fabrics and other materials, BG has not acquired the tacit knowledge needed to engage in design (fashion intelligence, design creativity) and product development and logistics (e.g. inputs sourcing) or market development (e.g. branding, promotion, segmentation).

Within the hierarchical structure in which global lead firms within electronics have direct ownership of foreign affiliates (or control joint ventures) in Indonesia, knowledge and capabilities come from the global lead firms. “PE” replicates a cell production system that was adopted by its Japanese lead firm to achieve quality standards (e.g. safety, reliability, durability) globally. Within the cell production system, a small team of operators or work cells perform multiple assembly tasks in a shorter production line. It is claimed that the cell production system enables PE not only to improve production efficiency and productivity but also to improve its production flexibility by adjusting to market uncertainties by changing the layout of assembly lines rapidly and utilizing fewer, but multi-skilled, workers. In addition, the firm adopts an iterative plan-do-check-action four-step problem-solving process for continuous improvement in productivity and quality (i.e. “Kaizen”). For particular mature electronic products (e.g. small refrigerators) PE is designated not only as the production centre of the Japanese lead firm in Indonesia, but also as a product development centre. The firm is authorized by the Japanese lead firm to conduct design and product engineering of these particular electronic products. PE develops original small refrigerators particularly for the domestic market. Consequently, PE has a learning opportunity in design and product development from its Japanese lead firm. PE has invested in a computer-aided design (CAD) system that connects to the system of the Japanese lead firm to ease data sharing. Furthermore, the firm incorporates its design, production development and manufacturing activities into one by integrating

CAD—computer-aided engineering—computer-aided manufacturing, to reduce the product development cycle, improve productivity and shorten time to market. PE’s managers and technical staff are formally trained by the Japanese lead firm at the training and production facilities in Japan to learn the system and management applied by the lead firm. The local workforce also learn directly from skilled expatriates placed by the Japanese lead firm in key management posts within PE.

In modular or market-based governance relationships Indonesian garment and electronics firms do not have ties with GVC lead firms. Instead, Indonesian firms control their own functional activities. Consequently, knowledge flows from sources beyond the chains. Indonesia’s garment firms such as “LG” and “JG” obtain technical knowledge of production operations from equipment and input suppliers (e.g. Groz-Beckert’s industrial sewing machine needles, Freudenberg Vilene’s interlining). By purchasing equipment and inputs, the firms obtain the best practices and technical support from suppliers. In order to improve its cost competitiveness, JG applies flexible human resources management in addition to efficient production management system. The firm optimizes use of its line operators by classifying them into permanent, seasonal temporary and seasonal temporary outsourced operators to adjust to the production season. Permanent operators are used in the low season, while in the high season JG recruits additional temporary operators and subcontracts some production activities. To acquire design and product development capabilities, JG hires a foreign designer to gain from her knowledge and market expertise. Moreover, senior staff at LG and JG travel abroad to assess recent fashion trends in the global market and obtain design ideas. The firms visit department stores and purchase garment samples to which their designs can be adapted for the domestic and emerging export markets. In addition, these firms interact closely with domestic textile producers to gain information on the latest fabrics development.

We have a market and product development [division which] consists of personnel who hold functional expertise in reading market trends and competitors, as well as our market positioning . . . They are looking for new information including arrange a meeting with textile producers. We produce garments with use of special fabrics in which the ideas come from them. We develop garments that apply special fabrics which we purchase mostly locally since Indonesia is a very respectable textile player in Asia Pacific . . . for instance, we make garments using Teflon fabrics protection. . . , or apply Easy Care fabrics that need no ironing . . . or Cotton Rich fabrics . . . or perfumed fabrics. . . (JG, 6 March 2008)

Similar accounts emerge from “HE” which operates its own value chains. HE acquires manufacturing know-how by purchasing equipment and electronic components, and through visits to international exhibitions.

We get information from two sources. First, there are regular exhibition of electronic components in Indonesia in which global component makers introduce their new components or technologies. They will offer components or technologies which may be required by us. Second, we visit exhibitions abroad to meet with component makers. We visits the exhibitions abroad mostly in order to update with recent technology development and obtain new [product] inspiration . . . We usually send our art work [designer] staffs to international exhibitions in Japan, China, Hong

Kong, Korea or Taiwan since the best exhibitions of electronic products are held in Asia. By sending the staffs abroad, our main goal is to make their eyes used to see a good design. ... (HE, 23 January 2008)

To achieve high product quality, the firm complies with international quality management standards (including ISO 9001–2000), using consultants to assist in quality management and attaining ISO accreditation. Meanwhile, to acquire its design and product development capability, HE has its own research and development (R&D) facilities and recruits design and engineering graduates. The firm developed its in-house R&D by regularly sending its designers and engineers to domestic and foreign electronics exhibitions to assess new product and process advances. The firm also purchases product samples to be dismantled to learn of their design and technological advantages as well as drawbacks. HE is able to develop original product design and functionality by reverse engineering and improving such products and adapting them to the local market. As a consequence, HE has been awarded the GOI's "Indonesian Good Design" label for various product designs (including audio products, DVD players and water dispenser). Furthermore, the firm is able to generate not only innovative designs but also innovative technologies. HE has patented original technologies such as its audio sound system technology in Indonesia, Canada and the US. Moreover, because of its own efforts in technological development, HE has obtained an award for the "Company Contributing Most to Technology Development" from the GOI.

Our firm case studies are not meant to be representative of the Indonesian electronics and garment sectors, but to provide indicative evidence on how local firms learn and acquire capabilities. We have shown that in many cases, Indonesian suppliers are engaged into GVCs through classic forms of chain governance, including hierarchical arrangements in electronics where FDI and joint venture plants are governed by their principals and through captive ties in garments where local firms operate under close supervision and direction of lead firms and their agents. In both such cases, the primary conduit of learning comes from the lead firms. In garments, such forms of learning tend to be restricted to process activities, leading to upgrading that results in production efficiencies. Thus acquisition of production knowledge and capability is a by-product of governance of Indonesia's suppliers with GVC lead firms. There is, however, little capability acquisition in the areas of product design, development and marketing. In electronics, hierarchical ties imply that all forms of local upgrading are determined by the overall strategy of the lead firms. Within the classic GVC framework, there is little understanding of the agency of local suppliers in the learning process.

Our findings also indicate that there are examples of garment and electronics firms that have functionally upgraded taking on new tasks in product design, marketing and branding. However, in such cases it appears that firms either operate solely in domestic markets or in emerging export markets. Learning comes from the efforts of firms themselves, in developing human capital, in building technical ties with suppliers and component manufacturers and through market intelligence acquired through exhibitions, trade fairs and market research undertaken both home and abroad. Critically, in such cases, learning and capacity acquisition do not come from GVC ties with global lead firms and their agents.

Within captive value chains, GVC lead firms are unlikely to share and transfer knowledge in design and product development to Indonesia's suppliers. They keep the

knowledge and capability for themselves because those are their core competencies and the activities provide the highest rents. Moreover, design and product development are more tacit in nature than production knowledge. Production knowledge may be embedded in production equipment and operation manuals, while design and product development are mostly embedded in firms and systems. Therefore design and product development are more difficult to diffuse and transfer among firms and require conscious efforts in terms of the learning process and investment. Consequently, those Indonesian garment and electronics firms engaging in captive value chains are able to acquire “production system” but not the “knowledge system”, which is required to generate and manage innovative functions as suggested by Bell and Albu (1999).

Conclusion

Indonesia’s rapid economic growth over the past decade, second only in the region to its dominant neighbour China, has made it a “darling” for international investors and economic development scholars. Key to this growth experience has been the central role played by its leading export manufacturing sectors, garments and electronics. Indonesia has become a major international player in these industries and a key manufacturing hub for many leading global apparel retailers and branded marketers as well as for many of the dominant international consumer electronics brands. This engagement in global markets, brought about with support from a sustained trade and investment liberalization policy over three decades, has been articulated through GVC linkages. Despite the global downturn, and new challenges within specific sectors (such as the 2005 MFA phase out), Indonesia’s competitive position in the international apparel and electronics sectors has continued to improve. This would imply that Indonesian electronics and apparel firms are managing to upgrade to enhance their competitiveness. The key question for this paper has been to consider how value chain ties, and the power relationships exercised by the global lead firms within these value chains, influenced the ability of local producers to learn, acquire new capabilities and effectively upgrade. Our contention has been that in emphasizing the central position of global lead firms, the GVC framework fails to recognize the potentially key role of local agency. Moreover, GVC ties may restrict the prospect for certain forms of functional upgrading by local producers where it directly challenges the core competencies of the global lead firms.

Our findings suggest that export garment and electronics firms from Indonesia are often inserted into captive (garments) and hierarchical (electronics) governance relationships with their global lead firms. This implies that the scope for learning, capability enhancement and upgrading is determined by the global lead firms. In some cases, there are indications that lead firms have encouraged suppliers to enhance their functional abilities (with some firms, for example, moving towards full package production in garments and shifting from captive to relational governance ties). Yet, the evidence that emerges from the micro firm-level analysis also demonstrates that the insertion into captive and hierarchical GVC can often limit the ability of Indonesia’s garment and electronics firms to learn and acquire new innovative capabilities. This questions the extent to which learning opportunities and upgrading potentials are available within the GVC, especially where it challenges the core functions of the lead firms. Indonesian firms that do manage to enhance their competitive edge through functional upgrading into areas of own design and own brand manufacturing are those that, in both sectors, have chosen not to insert themselves into the GVC of

leading global brands. Instead, these firms engage domestic and emerging export markets. Within those relationships, Indonesia's garment and electronics have a greater opportunity to acquire and to exploit innovative capabilities towards high-skilled and complex functions. Such cases suggest that can be competitive in both domestic and emerging export markets.

Within modular and market-based structures, Indonesia's garment and electronics firms acquire capability from sources other than GVC lead firms. They access the greater learning opportunity through the interaction with firms and organizations other than GVC lead buyers and firms, including domestic and global equipment and input suppliers. Compliance with the technical and quality standards is also an important learning mechanism within these governance structures. Indonesia's firms hire consultancy agencies to assist them in achieving these standards. For design and product development, Indonesia's firms actively seek knowledge by travelling abroad. Products and technologies are imitated and adapted to the domestic needs through reverse engineering. By acquiring design, product development and production capabilities, Indonesia's garment and electronics firms are able to bring original products from the conception to market and gain competitiveness. Competitiveness is not based on low-cost activities but on innovative product and functions through the generation of originality. Therefore, within modular and market-based structures, learning processes and capability acquisition are highly dependent on conscious efforts of Indonesia's firms.

Within Indonesia, the garment and electronics firms inserted in modular and market-based structures specifically with buyers from domestic and emerging export markets. The firms provide innovative products to those markets by putting their capabilities into practice and improving the capabilities continuously. Therefore, the domestic and emerging export market provides a greater learning opportunity for Indonesia's garment and electronics firms to progress towards design, product development and market development functions.

These conclusions parallel recent work by Navas-Aleman (2011) and Bazan and Navas-Aleman (2004), whose studies of the Brazilian furniture and footwear industries emphasizes the importance of domestic value chains as well as the earlier writings of Kaplinsky (2000, 2005) and Knorringa (1999) and Tewari (1999) on the importance of learning through competing in domestic markets. But the analysis here also takes us further in that we show the need to incorporate a discussion on firm-level learning processes and capabilities acquisition as being central to understanding how upgrading comes about within GVCs and its consequences for competitiveness. Evidence across Indonesia's garment and electronics firms shows that acquisition of greater capabilities also has a significant effect on upgrading and competitiveness of Indonesia's firms. Thus this paper sheds light on linkages between governance and capability acquisition in effort to gain a better understanding of upgrading processes and competitiveness at the firm-level analysis. This has significant implications for theory. The GVC model of upgrading needs to recognize the role of local agency, at both firm and systemic levels, and more carefully integrate with the distinct literatures on firms capabilities and on local, regional and national innovation systems. In terms of policy, liberalization strategies geared solely to attract global lead firms to source from local suppliers cannot guarantee a long-term strategy for upgrading and competitiveness. That requires greater policy efforts which strengthen the capabilities of local firms, and link local firms into a wider and systemic perspective on local innovation.

Notes

1. For more details on the primary survey, see Kadarusman (2010).
2. See Bair (2005) for an excellent overview of the use of the GCC, GVC and GPN concepts. On global production sharing, see Feenstra (1998).
3. Initially the investment policy allowed 95% foreign ownership for export-oriented firms exporting at least 85% of their products. In 1992, full foreign ownership was allowed for investments greater than US\$50 million and for those located in Eastern Indonesia and in bonded zones. In addition, to encourage small- and medium-sized foreign investments in electronic components and parts, full foreign ownership was extended to investments with a minimum investment of US\$2 million in 1993. Finally, in 1994, full foreign ownership was allowed for most sectors and the divestment requirements were abolished (Pangestu, 1997).
4. EPE status exempts firms from customs or pay tariffs on imported inputs. Moreover, a firm can obtain this status without being located in existing bonded zones. The firm can also sell up to 25% of its products to the domestic market after paying tariffs on the inputs and the value-added tax on the product (Pangestu, 1997).

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