

The Market Makers

How Retailers are Reshaping
the Global Economy

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Making the Global Supply Base

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Introduction

As the preceding chapters have discussed at length, the structure of production and trade in the world economy has changed dramatically since the 1960s, when relatively self-contained national economies interacted through arm's-length trade in finished goods and raw materials. Retailers and branded merchandisers in the United States wrested power from manufacturers in consumer markets in the 1970s and 1980s, in part by establishing their own low-cost sources of supply in East Asia. Thus, a significant step was taken toward the creation of a more deeply integrated global economy, where the various stages of production and consumption are dispersed within increasingly elaborate and spatially extensive global value chains (GVCs). The GVC perspective directs our attention away from the opposing theoretical poles of production and consumption toward the integrated, meso-level analytics of market making; specifically, the making of supplier markets. Intermediate markets account for about two-thirds of all market transactions (Tingga 1992) and intermediate goods trade for about 60 percent of world trade (see Figure 8.2 below). Evidence for the rise of GVCs can be found in these statistics as well; developing countries increased their share of intermediate goods trade from less than 5 percent in 1988 to more than 30 percent in 2008 (Sturgeon and Memedovic forthcoming). Trade in intermediate goods is indicative of GVCs because fragmented production processes require that parts, components, and partially manufactured products pass across borders—sometimes more than once—before finished goods are shipped to final markets (Feenstra 1998).

In our view, the making of supplier markets in East Asia by retailers has been just one facet of GVC formation. The goal of this chapter is to broaden this

story of global buying, global production, and economic development, and deepen it by grounding it in a series of company and industry case studies. Our main point is that the emergence of supplier markets in East Asia has been driven, not only by retailers and the consumer product manufacturers that supplied them, but also by manufacturers of brand, technology, and capital-intensive goods such as computers, communications equipment, white goods, and motor vehicles seeking new markets and low-cost sources of supply worldwide. In short, purchasing by global retailers has been part of a broader pattern of outsourcing and offshoring that has helped to “make” supplier markets in the East Asia region and elsewhere.

For traditional technology-intensive companies, including multinational corporations (MNCs) with offshore affiliates handling the chores of foreign production, domestic outsourcing was often a first step. However, in a very short time, the largest US-based suppliers had set up global operations and were producing shoulder to shoulder with local suppliers in developing countries. Through a process that mirrored the retail consolidation outlined in Chapter 3, the most successful US-based suppliers quickly became huge global players, with facilities in scores of locations around the world. A handful of elite East Asian suppliers also grew rapidly, in part by taking on more tasks for MNC affiliates, expanding production not only in China, but also in other Asian countries and, in a few cases, in Africa, East Europe, and Latin America as well. These two trends, by the end of the 1990s, dovetailed to create a single dynamic: the rise of a *global supply base* populated by large, international, highly capable suppliers, contract manufacturers, intermediaries, and service providers, something unique in the history of the world economy (Sturgeon and Lester 2004). Thus, our second main point is that the concept of market making in East Asia is not incompatible with industry concentration and consolidation. The geographic and organizational fragmentation that occurred in the 1980s was followed by concentration in specific places (for example, China) and industry consolidation as lead firms and suppliers scaled up in an attempt to meet the challenges of global production and competition.

As Gereffi (1994a, 1999) has argued, the role of “lead firm” in GVCs—the company that defines product characteristics and takes the financial risk of placing orders and putting products up for sale—has tended to vary significantly by industry. In the apparel, footwear, household goods, and agro-food industries, GVCs have traditionally been “buyer-driven.” As they have acquired more power in the chain, retailers, in particular, have assumed this lead firm role (see Chapters 1, 3, 4, and 5). In the “producer-driven” chains in the electronics, white goods, and motor vehicle industries, retailers have accumulated less power and are more passive actors in GVCs. Because of product complexity and high-quality requirements, lead firms in producer-driven

chains tend to exercise more control in GVCs even as they focus less on in-house production and more on design, marketing, and value-added services. Because goods in producer-driven chains are technology intensive and, early on, domestic suppliers lacked technical competence to make the required inputs, production in East Asia was largely accomplished by MNC affiliates—a fact examined in great detail in the literature on the MNC (Vernon 1971; Zanfei 2000; Yamin and Sinkovics 2009).

Although firms have been operating internationally since the days of the British East India Company, suppliers and supply bases tended to be domestic and beyond the reach of retailers and buyers without international operations. Foreign affiliates of MNCs, often motivated by local content rules, gradually increased their use of local suppliers, but were forced by these same rules to develop redundant supply relationships in each of the countries or regions where they produced. By the end of the 1990s, this situation had changed markedly. The most capable suppliers became more “global” by establishing new plants, acquiring customer facilities, and purchasing smaller local and regional producers. Suppliers and supply-chain intermediaries from East Asia also set up facilities to serve customers from a larger set of locations. With this new supply base in place, retailers, branded merchandisers, and manufacturers, whether they were selling globally or simply seeking to cut operating costs to compete at home, could quite easily tap into supplier capabilities in multiple locations without the cost, risk, or time required to set up their own factories and nurture local supply chains from scratch. The next step was to simplify these supply relationships by using the same set of global suppliers in each of the regions where production was carried out.

Thus, the rise of the global supply base is not simply a story of more and better producers coming on-stream in East Asia to supply MNC affiliates in producer-driven sectors, nor of retailers in buyer-driven sectors placing increasingly large orders with firms and intermediaries in East Asia. The two trends are connected. This chapter lays out how the new global supply base emerged. It is a complex story, one that has played out differently in various places and in diverse industries. Indeed, much of our understanding of the dynamics of GVCs comes from detailed research on how these production chains have evolved in specific industries. We rely on a series of sector- and firm-level examples, largely from three sectors that dominate manufactured goods trade—electronics, apparel, and motor vehicles—to highlight several different facets of the phenomenon.

In this chapter, we first present some evidence of how suppliers based in advanced economies, especially US-based suppliers to technology-intensive industries such as electronics and motor vehicle industries, began to establish global operations in the late 1980s, and then accelerated their global expansion the 1990s. Second, we describe how the sourcing strategies of transnational

manufacturers, global retailers, and global brands spurred the emergence of a highly capable and responsive set of contract manufacturers and component suppliers from newly industrialized countries in East Asia. Third, we examine the related issues of modularity and consolidation in the global supply base, and discuss how they have helped to shape it and enable its growth. Finally, we take stock of the global supply base in light of the extreme volatility that has repeatedly wracked global markets during the past decade or so, especially the current global economic crisis.

The Globalization of Developed Country Suppliers

Lead firms did not only increase their reliance on suppliers through their global buyers and offshore affiliates in the 1990s. Outsourcing was a major strategy at home too, and as a result domestic suppliers won huge volumes of new business and grew spectacularly. As US-based companies embraced the main elements of “corporate re-engineering and restructuring” (Harrison 1994) with its focus on core competence, asset variability, and maximization of shareholder value, most outsourcing began domestically. In the 1990s, however, the largest suppliers and service providers in these industries and product categories developed global-scale operational footprints. In some instances, the motivation of suppliers was to expand their own market reach, but more often it was to provide integrated global supply capabilities for their largest customers.

Within the United States, the movement toward outsourcing began with non-manufacturing services, such as information technology, accounting, and call centers. By the 1980s, large companies were also outsourcing routine business functions such as accounting, legal services, advertising, billing, and payroll (Rabach and Kim 1994). Firms divested themselves of non-core activities such as provision of food, security, and janitorial services for their buildings. Despite recent alarm in the United States about “services offshoring” (see Sturgeon et al. 2006), most of these services remain difficult or impossible to source offshore—for both practical and regulatory reasons—and continue, in large part, to be provided by home-based suppliers (Batt, Doellgast, and Kwon 2006; Neilsen 2008). Nevertheless, there are some significant and very large-scale exceptions to this in industries where processes can be segmented, linkages between activities codified, and inputs and outputs transmitted electronically. Examples include call-center-based services, back-office business functions, IT services, enterprise computing, clinical trials, and contract medical research. In recent years, the economic geography of these services industries has begun to resemble the manufacturing industries—consumer

goods (household goods, apparel, and footwear), electronics, and automotive and aircraft parts—that have been driving the growth of GVCs for decades.

The rise of global suppliers has been most pronounced in technology-intensive manufacturing industries, such as electronics and motor vehicles. In these industries, it has proved to be a powerful combination for suppliers to have facilities both at home, to work out the manufacturing details of new product designs in collaboration with their customers’ design groups, and abroad, to perform high-volume production in locations with lower costs and proximity to promising new markets. In some cases, the offshore affiliates of these large domestic suppliers began to challenge developed country suppliers on their home turf. In other cases, a complementary pattern emerged where global suppliers rely on “second-tier” developing-country suppliers for components, services, and as subcontractors. A third pattern is for developed-country suppliers to specialize in products and services that require the initial co-location described above.

An example of this division of labor can be found in automotive parts. Suppliers making “original equipment” automotive parts for use in new vehicle final assembly have a requirement for initial co-location, while suppliers making “after-market” parts sold to repair shops do not. As a result, first-tier original equipment parts suppliers are generally global suppliers, while after-market parts suppliers operating mainly in Taiwan and China have been able to gain significant market share via exporting alone (Cunningham, Lynch, and Thun 2005).

Whatever the competitive battles and complementarities that have emerged amongst developed- and developing-country suppliers, the real news is that increasing supplier capability is allowing lead firms to implement global production strategies in ways that were undreamt of in the late 1980s. Lead firms outsourced to suppliers at home, and demanded that these firms set up operations offshore, both to serve and to substitute for their offshore affiliates. These sustained efforts to expand and consolidate their sourcing networks have helped to create a new class of huge global suppliers in a range of industries, and supplier consolidation has meant that there are larger, more capable suppliers to choose from. Global suppliers now have capabilities—accumulated through internal development and acquisition—to provide “one-stop shopping” for lead firms seeking regional and global supply solutions. This new class of suppliers has internalized many of the most difficult and costly aspects of cross-border integration such as logistics, inventory management, and the day-to-day management of factories, call centers, and engineering centers. To provide some detail, we briefly present several examples from the electronics and automotive industries.

Global suppliers in the electronics industry

In the electronics industry, a combination of globalization, outsourcing, and vertical bundling in the 1990s helped to push a small but elite set of supplier firms to move quickly beyond their traditional cluster- or national-scale footprint to become global in scope. Vertically integrated lead firms with global operations, including Lucent, Nortel, Alcatel, Ericsson, and Apple Computer, sold off most, if not all, of their in-house manufacturing capacity—both at home and abroad—to a cadre of large and highly capable US-based contract manufacturers, including Solectron, Flextronics, Jabil Circuit, Celestica, and Sanmina-SCI (Sturgeon 2002; Sturgeon and Lee 2005).¹

Solectron (acquired by Flextronics in 2007) provides an example of how these contract manufacturers expanded. The company was concentrated in a single campus in Silicon Valley from its founding in 1979 through the 1980s. In 1991 Solectron's key customers in Silicon Valley, including Sun Microsystems, Hewlett Packard, and Cisco Systems, demanded that Solectron provide global manufacturing and process engineering support. The company went on an acquisition-fueled binge of global expansion and revenue growth; by 2001 the company's footprint had grown to more than 135 facilities worldwide, and annual revenues had increased from \$265 million to \$12 billion. In the process of this expansion the company gobbled up competitors, expanded customer facilities, and acquired an array of specialized firms with capabilities that allowed the company to offer a much broader package of services. In just a few short years, Solectron had morphed from a humble, if highly respected, regional contract manufacturer (the company won the Malcolm Baldrige Quality Award in both 1991 and 1997) to become the largest manufacturing firm that no one had ever heard of; a quintessential global supplier.

An example of a global electronics contract manufacturer that emerged as a lead firm spin-off is Celestica, an in-house manufacturing division of IBM that was spun off as an independent company in 1996. At the outset the firm had only two production locations, a large complex near Toronto, Canada, and a small facility in upstate New York, since closed. By 2001, after completing twenty-nine acquisitions of customer and competitor facilities, Celestica had accumulated nearly fifty facilities in North America, South America, Western and Eastern Europe, and Asia, and annual revenues had soared to more than \$10 billion.

In the round of consolidation that followed the bursting of the technology bubble in 2001, Flextronics (listed in Singapore but managed from San Jose, California) emerged as the world's largest electronics contract manufacturer, a position that was further solidified through its acquisition of number-two-ranked Solectron in 2007. Flextronics' 2009 revenues were slightly less than \$31 billion. Aside from dozens of stand-alone factories and technology centers

around the world, Flextronics, with its strategy of "vertical integration," operates nine huge "industrial parks," where it has invited many of its most immediate suppliers of product-specific components (bare printed circuit boards and plastic enclosures) to co-locate with its final assembly plants for rapid response in regional markets.²

The sale and spin-off of in-house manufacturing and parts operations underline the structural shift that was occurring in these industries from in-house production to global outsourcing, and the accumulation of this off-loaded capacity within a relatively small number of huge suppliers shows the dramatic consolidation and increasing integration of the global supply base. But outsourcing, as such, does not tell the entire story. In the electronics industry, fast-growing lead firms with little if any in-house production capacity, such as EMC, Sun Microsystems, Cisco, and Silicon Graphics, also demanded that suppliers provide global support.

In some key locations, lead firms did not necessarily have plants to sell or spin-off, especially in newer locations such as China and Eastern Europe. Because of this, a great deal of the global expansion of suppliers in the 1990s was either "organic" in character, involving the enlargement of existing facilities and the establishment of new, "greenfield" plants,³ or achieved through the acquisition of regional suppliers, in what some industry participants refer to as the "rolling-up" of regional supply bases into an (albeit imperfectly) integrated global supply base.

Global suppliers in the motor vehicle industry

In the motor vehicle industry, outsourcing and vertical bundling also exploded in the 1990s. Employment in final assembly and in parts had maintained a rough parity since 1929, but after 1985 employment began to shift dramatically into the parts sector. By 2000, parts employment stood at 61.4 percent of total sector employment, up from just 49.1 percent in 1985 (US Bureau of Labor Statistics, cited in Sturgeon and Florida 2004: 54). What is hidden by these statistics is the employment that supplier firms added by establishing and buying operations *outside* the United States.

Consider the example of Lear, which began the 1990s as a seat manufacturer for the American Big 3 automakers. By 2000, Lear had grown to 120,000 employees working at more than 200 locations in 33 countries, making a full range of automotive interior parts and systems that were used in vehicles bearing nameplates as diverse as Pontiac, Suzuki, Hyundai, Isuzu, Jaguar, Mazda, Opel, Ford, VW, Porsche, Mercedes, Chrysler, Saab, Subaru, Fiat, Dae-woo, Renault, Toyota, Mitsubishi, Honda, Audi, BMW, Peugeot, Nissan, Volvo, and Rover. As a result, the company rose from the world's thirteenth largest automotive supplier in 1995 to the fifth largest in 2000, with record

sales of \$14.1 billion. Since then, Lear has suffered from the severe financial difficulties plaguing the automotive supply base, along with most other large suppliers. While 2008 revenues and employment are down from the peak in 2000, the company's geographic footprint has continued to expand.⁴

The spin-off of the internal parts divisions of General Motors and Ford in the late 1990s created the world's two largest and most diversified automotive parts suppliers almost overnight, Delphi and Visteon. Because they were spun out of huge parent firms with strong international operations, these "new" suppliers were born with a global footprint and the capability to supply complete automotive subsystems. For example, Visteon was born with broad capabilities in chassis, climate, electronics, glass and lighting, interior and exterior trim, and power trains. In 2000 the company operated 38 manufacturing plants in the USA and Canada; 23 in West Europe; 21 in Asia; 9 in Mexico; 6 in East Europe; and 4 in South America; system and module engineering work was carried out in 1 facility in Japan, 3 in Germany, 3 in England, and 4 in the United States. Like Lear and other large global suppliers with significant business with the American automakers, Visteon has experienced deep financial trouble in recent years. Nevertheless, the company, in 2010, still has a global footprint, with 21 manufacturing facilities and 2 technical centers in the United States and Canada, 8 manufacturing facilities and 2 technical centers in Mexico, 43 manufacturing facilities and 5 technical centers in Asia Pacific, 23 manufacturing plants and 10 technical centers in Western Europe, 8 manufacturing plants and 2 technical centers in Eastern Europe, and 6 manufacturing facilities in South America. The shift, in the main, has been from the United States and Western Europe to Asia.

The emergence of global suppliers was mostly, but not solely, a phenomenon of American firms. European and a few Japanese motor vehicle parts suppliers followed their customers into new markets and went on acquisition sprees to gain both a global footprint and the ability to supply larger subsystems of the car. Examples include Continental, Bosch, and Siemens (Germany), Valeo (France), and Yazaki and Denso (Japan).

By the late 1990s it had become a requirement for automotive suppliers, large electronics contract manufacturers, and suppliers in several other sectors to have a global footprint. In separate interviews conducted in 2000, Sturgeon and Lester (2004: 69–70) quote managers at two global automotive suppliers as saying:

The industry began to change 5–10 years ago. If a supplier doesn't have a global strategy, it can't bid. New projects are no longer seen as an opportunity to expand globally—instead, a supplier must have a global base in place to even make a bid. This forces suppliers to have a global supply system in place.

Suppliers must support assemblers as a sole source for global product lines to support commonization. We must supply the same part, with the same quality and price, in every location. If [the automaker] says to go to Argentina, we must go or lose existing, not just potential, business. Logistics are becoming a key competitive advantage; we must have the ability to move production to where customer's facilities are.

Here we see market making in action. Globalization and consolidation in the automotive supply base were driven by management strategy at lead firms, first to divest their companies of the high fixed costs and labor needs of business functions related to production and back-office work, and, second, to demand that their key suppliers support them on a global basis to increase scale, reduce transaction costs, decrease redundancy, and increase the commonality of products and processes worldwide.

The Rise of East Asian Transnational Suppliers

In the previous section, we argued that global buyers in "buyer-driven" GVCs were not the only actors responsible for the expansion of GVCs, and that domestic outsourcing in "producer-driven" GVCs soon morphed into global outsourcing, as domestic suppliers were driven by customers to set up global operations (Gereffi 2006). In this section, we examine the rise of an indigenous East Asian transnational supply base through a series of "best case studies" of successful local supplier development in East Asia.

Foreign affiliates of MNCs were set up in East Asia and elsewhere during the 1970s and 1980s to lower costs and gain access to local markets. Over time, offshore affiliates began to use local suppliers for a broader range of inputs, materials, and services. In some cases, locals employed at these foreign affiliates used what they had learned to establish firms to supply their former employers and others like them. As more functions were shifted out of the affiliates and supplier competence grew, the affiliate activities, gradually and unevenly, shifted to higher-value functions such as purchasing inputs, adapting products to local markets, working with suppliers on new product introduction, and coordinating regional activities.

In the 1990s, some of the leading developing country suppliers from places such as Taiwan, South Korea, and Singapore, in response to customer demands to lower costs and to produce within large emerging markets such as China, began to set up offshore facilities of their own. The combined demand from global buyers and transnational affiliates helped to create a new class of transnational supplier based in East Asia (Bonaglia, Goldstein, and Mathews 2007; Yeung 2009). In the apparel industry there was an additional motivation:

to tap the available quota for export to the United States under the Multi-Fiber Agreement (MFA). This triggered investment in countries that would not otherwise have large-scale apparel assembly, such as Sri Lanka and Bangladesh. In contrast to the pattern set in the 1970s and 1980s, control did not migrate to local suppliers in these new locations. Rather, customer service and network coordination functions stayed in the suppliers' headquarters in Taiwan, Hong Kong, Korea, and Singapore, while production was partially and sometime completely relocated to less-developed countries.

Gereffi (1994a) calls this pattern "triangle manufacturing," with developed-country buyers, Hong Kong and South Korean intermediaries, and developing-country factories creating a tripartite spatial division of labor. On top of this, regional production systems, in which American and European apparel manufacturers had been steadily moving production to nearby countries with lower costs, such as Turkey, Morocco, Mexico, and the Caribbean Basin, began to be penetrated by a few of the largest East Asian manufacturers and intermediaries. As more countries were added over time, more complex regional and even global-scale production systems emerged, with coordination functions handled by East Asian suppliers and intermediaries. In the following sections, we show the variety of paths to international production using a few case studies.

South Korean investment in the Indonesian apparel industry

The role of firms from South Korea in developing the Indonesian apparel industry shows clearly how foreign direct investment (FDI) within Asia created more elaborate production networks over time. Hong Kong, Taiwan, and South Korea dominated garment exports in the 1960s and 1970s. In South Korea, much of the export business was organized through intermediaries, especially large trading companies who "played a pivotal brokerage role, linking designers and buyers from the developed core nations to the small Korean businesses that are the direct producers of the clothing" (D. Smith 1996: 222). These same intermediaries linked garment producers to producers of textiles and other inputs located in South Korea. As a result of their control over the export quotas established under the MFA, firms wishing to export to the USA tended to work through these traders (Gereffi 1999).

In the 1980s, one of the responses of Korean manufacturers and traders to rising labor costs in South Korea was to move factories offshore—to China, Indonesia, Central America, and elsewhere. Korean manufacturing FDI in the ASEAN-4 countries increased dramatically at the end of the 1980s. The total for the three years 1987–9 was four times the total for the previous fourteen years, and 55 percent of this manufacturing investment went to Indonesia. Many foreign-owned clothing factories were set up, enabling Indonesia to

move from thirteenth place to eighth place amongst global garment exporters between 1988 and 1992. About one-third of foreign-owned plants were set up by South Korean firms, and another third were established by firms from Hong Kong, Taiwan, and Singapore (Shin and Lee 1995: 187).

As with the contract garment assembly plants used by US companies in Mexico and Central America, the new Indonesian plants were inserted into a much broader division of labor. In many cases, they used materials and equipment supplied from South Korea. Two-thirds of their inputs were imported and two-thirds of output was exported (Dicken and Hassler 2000: 270). The plants were also linked with their parent company's marketing operations and through these to global buyers in the United States and Europe. A Taiwanese apparel manufacturer in Indonesia described how orders arrived at the plant:

90% of our orders for Indonesia are coming from our Taiwanese head office. The remaining 10% are orders from agents and representative offices in Jakarta. The Taipei office is working with the buying offices directly in America or their representative offices in Hong Kong or Singapore. Our main market is the US where we sell 80% of our products. (cited in Dicken and Hassler 2000: 275)

Similar processes were evident in China, where firms from Hong Kong and Taiwan created complex value chains with chain management and chain coordination functions at home and production operations in China. In many cases, firms from Taiwan and Hong Kong have relocated manufacturing plants to the Chinese mainland, but maintained ownership.

East Asian intermediaries: The case of Li & Fung

As we have seen in the case of South Korea, intermediaries (Spulber 1996, 1998) have played an important role in the rise of East Asian-based GVCs. Intermediaries help to create supplier markets by matching manufacturers with the right requirements to retailers and branded marketers seeking production in East Asia and beyond. The largest and best known of these companies is Li & Fung, a Hong Kong-based firm that specializes in sourcing for global buyers of apparel and household goods. Li & Fung coordinates production for many large American branded garment merchandisers and retailers, such as Donna Karan and the Gap. The company's website defines it as "one of the premier global consumer products export trading companies managing the supply chain for high-volume, time-sensitive consumer goods."⁵

Li & Fung offers a full service package for customers, taking responsibility for product development, the sourcing of inputs, management of all manufacturing processes—while owning only a handful of plants itself—and out-bound logistics. The difference between this division of labor and value-chain

configurations in which sourcing is done through specialist traders is that the retailer or branded marketer plays a role in product development. The extent of this role will depend upon the competitive strategy and market position of the buyer. Branded marketers and high-end retailers generally regard product development as an important part of their competitive advantage, while low-end retailers are often content to define broad concepts and to follow fashion trends, leaving the product-development process to intermediaries and manufacturers.

Global expansion began in earnest at Li & Fung in the mid-1990s, mainly through the acquisition of sourcing networks controlled by British-owned Hong Kong-based trading companies. The acquisition of one such competitor, Inchcape Buying Services, doubled the company's size and provided a customer base in Europe to complement its strength amongst American retailers. To support the new business from Europe, Li & Fung strengthened its sourcing relationships in India, the Caribbean, and the Mediterranean basin. In 1999 and 2000, Li & Fung further broadened its customer base in the United States and Europe through the acquisition of three more of its Hong Kong-based rivals, Swire & Maclaine Ltd, Camberley Enterprises Ltd, and Colby Group Holdings Ltd. The company also acquired Disney Sourcing, the consumer products sourcing arm of Disney International with responsibility for stocking Disney stores worldwide. By 2001, two-thirds of Li & Fung's revenues were being generated through its acquisitions. Revenues grew from \$750 million in 1995 to more than \$14 billion in 2008.

By the end of 2000, Li & Fung had acquired a global footprint, and in 2009 the company had approximately 14,000 direct employees working in 80 offices in 40 countries. About one-third of these offices are located in developed countries, mainly Europe and the United States (but also in South Korea, Taiwan, and Japan), to provide customer support services. Most of the remaining offices are located in developing countries, mainly in China (18), South Asia (12), and Southeast Asia (9), but also in Turkey, Egypt, Romania, Poland, South Africa, Mauritius, Mexico, Guatemala, Honduras, and Nicaragua. These offices provide supply-chain management services for the company's network of 12,000 suppliers, mainly contract garment and household goods manufacturers.

This strategy of intermediaries such as Li & Fung is to separate the service elements in the supply relationship from the production elements. This approach has advantages and disadvantages. It gives the intermediaries a free hand to find producers in various countries, and, in the case of the apparel industry, the MFA and preferential trade deals such as the African Growth and Opportunity Act (AGOA) have provided many opportunities for firms that can source production from multiple locations. The disadvantage lies in the lack of control over production and limited opportunities to introduce process

innovations and cost controls. The danger, as always for the trader, is that the manufacturer and the buyer will deal directly with each other. In fact, this has happened again and again, as both manufacturers and buyers have gained competencies. Li & Fung has tried to shore up its position by offering turn-key solutions, including product design services, and by helping buyers assure their customer that their products meet labor and environment standards with its "responsible sourcing" program.⁶

The case of Singapore's Beyonics

To get a more finely tuned look at how outsourcing by MNC affiliates has helped to drive supplier upgrading in East Asia, let us now turn to the case of the Singapore-based firm Beyonics. The case reveals a common dynamic of affiliate outsourcing, local learning, entrepreneurship, supplier upgrading, regional expansion, and organizational consolidation. In 1981, two Singaporean engineers decided to start their own company after they had been laid off from the Singaporean subsidiary of the German camera manufacturer Rollei. Seeing that the local tool and die business in Singapore was underdeveloped—because most foreign firms tended to bring in their own tooling—the two set up their own tool and die shop on a chicken farm owned by one of the founder's parents. From their experience at Rollei they knew that advanced lathes for precision metal cutting spin very fast, but could be stopped quickly to make rapid set-up changes. The two retrofitted some inexpensive lathes with motorcycle brakes to achieve the desired effect. The company, which was originally called Uraco, generated \$700,000 in revenues during its first year of operation, mostly by supplying precision metal parts to American disk-drive producers, which were investing heavily in manufacturing in Singapore and Malaysia at the time (*Business Times Online* 1995).

As Uraco grew, it began to supply a wider range of products to the disk-drive industry, including precision metal stampings and assembled electronic circuit boards. Most of the company's business was with Seagate, the leading American disk-drive manufacturer, but the company also exported precision parts to Hitachi's disk-drive operations in the Philippines. Because of the extreme volatility in disk-drive and PC markets, in 1987 managers began the first of many efforts to diversify Uraco's customer base by distributing electronic components, eventually winning distributorships from Motorola, Harris Semiconductor, and Siemens.⁷

In the mid-1990s, the company began to leverage its experience with electronic components, contract manufacturing, and warehouse management to manufacture and sell products of its own design, including connectors, crystals, automated warehouse vehicles, electronic ballasts for fluorescent lamps, light bulbs, and telecommunications products. Ultimately, these attempts

were not successful, and the bulk of Uraco's business remained in providing contract manufacturing services and precision-engineered metal parts to foreign firms operating in the Southeast Asian region. As traditional distribution networks in the region matured, the need for the company's distribution services waned as well.

Nevertheless, in 1995 the company underwent a successful initial public offering on the Singaporean stock exchange. In 1996, as revenues were approaching \$53 million, Uraco won an important contract to manufacture flatbed scanners for Hewlett Packard. In this year the company was operating 82,000 square feet of production space in three Singaporean factories, and 165,000 square feet of nearby production space in five factories in Johor and Selangor, Malaysia (*Business Times Online* 1996a). In 1997, the firm reorganized its business into three divisions: precision machining, contract manufacturing, and investment (*Business Times Online* 1996b, 1997). The company's troubles were not over, however, and flagging profitability led to a management reshuffle in 2000 and a name change, to Beyonics, in 2001. The company returned to profitability in 2001, when it generated nearly \$300 million in revenues, with 62 percent coming from contract manufacturing services, 29 percent from precision engineering, and 9 percent from distribution (Geocities 2004).

The company's product and service offerings are electronics manufacturing services (that is, contract manufacturing), medical and consumer plastic injection molding and assembly, precision engineering services, precision metal stampings, and precision tooling design and fabrication services. This is a highly focused and complementary product portfolio, covering many of the processes and a few of the basic products required to produce a wide variety of electronics and closely related goods. The company has followed the rest of the electronics contract manufacturing industry toward the bundling of services to enable the production of complete products through its acquisitions of precision plastic moldings suppliers Techplas (in 2000) and Pacific Plastics (in 2002). In 2003 the company merged with a similar Singaporean contract manufacturer, Flairis Technology Corporation, to achieve additional economies of scale and scope. The company's distribution activities and attempts at selling its own branded products have been dropped entirely.

With this tighter focus the company has expanded dramatically. According to the market research newsletter *Manufacturing Market Insider*, Beyonics revenues of \$1.57 billion (with a razor-thin net profit of 0.3 percent) ranked the company thirteenth on a list of the world's largest electronics contract manufacturers in 2008.⁸ Through a combination of internal expansion and acquisition, Beyonics has developed a solid regional manufacturing footprint, most notably by establishing "vertically integrated" electronics contract manufacturing campuses in Kulai, Malaysia, in 2005; Suzhou, China, in 2006;

and Batam, Indonesia, in 2007. In 2010, the company operated 16 facilities: 3 in Singapore, 6 in Malaysia, 3 in China, 2 in Thailand, and 2 in Indonesia.⁹

While Beyonics may have grown much larger than most local firms in East Asia that started as suppliers to MNCs, there are several lessons to be drawn from this "best" case. First, Beyonics' managers demonstrated the use of dynamic capabilities (Teece 2009) for sensing opportunities, seizing them, and transforming the company as needed. Second, they stumbled by trying to diversify and develop their own products, which required end-user marketing competences they had not yet developed, but recovered when they refocused on providing producer services to MNCs in the region. Third, like most large electronics contract manufacturers, Beyonics has struggled to remain profitable, even as the company has grown rapidly. Fourth, as the company expanded, it chose a variety of lower-cost locations within East Asia, balancing its investments in China with locations in Malaysia, Thailand, and Indonesia.

What the Beyonics case illustrates most dramatically, however, is how with enough time (a twenty-eight-year span in this case), local firms with extremely humble roots have been able to grow, master advanced technologies, and set up multiple locations in East Asia, largely by serving American MNC affiliates in the region. Here, we see market making in East Asia, not via arm's-length buying by retailers and branded manufacturers in the United States, but by the combination of local sourcing (import substitution) by MNCs operating in the region with sustained efforts by local entrepreneurs who rely, at least in part, on local capital markets to raise the funds needed for regional expansion.

Taiwan's electronics contract manufacturers

While there are significant PC components, subsystems, and peripheral devices in which Taiwan-based firms are not active—namely, software, printers, hard disk drives, and higher-value semiconductors such as microprocessors and memory—the sum of the capabilities that have emerged in Taiwan comprise a powerful, agile supply base for the design, manufacture, and delivery of PCs and related products, especially notebook computers.¹⁰ Working in close geographic proximity, mostly along the Taipei-Hsinchu corridor in Taiwan, this supply base grew to constitute an extremely efficient system that could respond very rapidly to orders from lead firms (Dedrick and Kraemer 1998). Notebook computers, which generally have a high enough value-to-weight ratio to make air shipment viable, can be shipped to customers within two to three days of incoming orders.

This powerful productive engine has developed, almost in its entirety, in response to orders from lead firms based in the United States, and more recently Japan. At the same time, the development of contract manufacturing in Taiwan and elsewhere has provided lead firms with an increasing range of

sourcing options. This process of co-evolution has meant that Taiwan's electronics industry has been able to develop without a significant cadre of local lead firms. From the late 1970s to the present day, sourcing from Taiwan has expanded from computer monitors, to various components and subsystems, to complete desktop and notebook PC systems.

Firms from the American PC industry have played an especially important role in the development of Taiwan's electronics contract manufacturing sector. In the early 1980s, IBM began sourcing PC monitors from television and television tube producers in Taiwan, including Tatung and Chung Hua. As the demand for PCs expanded rapidly and the open architecture of IBM-compatible PCs became firmly established in 1984 with the IBM model AT, some entrepreneurial firms in Taiwan, such as Acer and Mitac, recognized the opportunities and moved aggressively to develop the capability to design PCs and peripheral devices based on the emerging standard. IBM's modular system architecture relied on a central processing unit supplied by Intel and on an operating system from Microsoft, and, because the contracts famously did not block Intel and Microsoft from selling to IBM's competitors, a bevy of new entrants, intense price competition, and a series of boom and bust cycles soon followed. These conditions caused contract manufacturing to become a popular strategy for lead firms in the United States seeking to cut costs and limit investments in fixed capital.

The surging demand for contract manufacturing services encouraged existing Taiwan-based contract manufacturers producing consumer electronics and electronic components, such as Hon Hai, to develop capabilities to assemble PCs. Then, in the late 1980s, a set of firms that had been focused on the design and manufacture of hand-held calculators entered the field. These firms, which included Quanta, Compal, and Inventec, eventually became the dominant notebook computer producers, in part because the design and assembly competencies that drove miniaturization in calculators were well suited to notebook computers, where small size, low weight, and efficient power consumption are key factors for success. Although much simpler, calculators are similar to PCs in that they are built around a central processing unit that determines system architecture and most of the product's functionality.

The modular system architecture of PCs, and the dominant role of the central processing unit (CPU) and operating system software in setting system architecture, along with intense competition and short product life cycles, created the conditions for the emergence of a set of firms that specialized in the iterative, post-architectural portions of product design. This includes, for example, the board-level input/output system (BIOS) of the PC, which determines how the machine handles the input and output from its main board to the other elements of the system, such as storage and displays; and industrial

design, which determines the physical appearance of the product. However, because most functionality resides in chips sets and software—system elements that computer producers do not design—control over the innovative trajectory of the industry has continued to reside in “platform leaders” such as Intel and Microsoft (Gower and Cusumano 2002), which have traditionally worked closely with branded PC firms on future requirements. However, as the notebook format has come to dominate consumer PC sales, and branded PC firms have either left the business (IBM) or changed their business focus to bundling services with PCs (Hewlett Packard), Intel has begun to work more closely with Taiwanese firms on the requirements for next generation CPU design (Kawakami 2008).

The story of lead firm, supplier, and platform leader co-evolution that we have outlined here reveals a powerful dynamic of outsourcing, upgrading, and subsequent outsourcing; the enabling role of open standards and modular product architecture in PCs; the intense competition and rapid product life cycles that drove lead firms to seek to spread risk and lower costs through outsourcing; and the entrepreneurial agility that many firms in Taiwan displayed in shifting to export production by recognizing and seizing new opportunities to specialize in narrow segments of the value chain. But there were two other important factors that have not yet been discussed. The first is the Taiwanese government, which helped by licensing, refining, and disseminating foreign technology and encouraging, and in some cases underwriting, the entry of local firms into promising market areas, especially for IT-related products. The second is the role of Japanese technology partners, which provided critical technologies and components, such as disk drives, but with little support and with restrictions, such that Taiwanese firms were inhibited from building on the technology to develop independent product development strategies. Licensing agreements of this kind have continued to be important in Taiwan's flat panel display industry (see Akinwande, Fuller, and Sodini 2005).

The migration of Taiwan's electronics production to Mainland China began in the mid-1990s, following Compaq's demand for a sub-\$500 desktop PC. The migration started with components and peripherals, and then spread to the assembly of desktop PCs and motherboards, with the latest stage being notebook computers. As sales of notebook PCs expanded rapidly, surpassing desktop units in the early 2000s, production in Taiwan soared from 2.3 million units in 1995 to a peak of 14.3 million in 2002. After 2002, notebook PC production in Taiwan dropped just as rapidly, even as Taiwanese firms produced a larger share of the world's output, reaching 92 percent in 2008. At the same time, production by the largest five Taiwanese notebook PC producers—Quanta, Compal, Wistron, Inventec, and Asustek—grew to more than 70 million units in 2006.

Under the tight control of headquarters in Taiwan, manufacturing subsidiaries co-located with their component suppliers to respond to the time-to-market, ramp-up, and cost-reduction requirements set by lead firms. This migration contributed to the dramatic expansion of two industry clusters for electronics manufacturing, one in the Pearl River Delta near Hong Kong and the second in the Yangze River Delta region near Shanghai. Smaller Taiwanese contract manufacturers and component suppliers were not able to make this move, leading to a dramatic consolidation amongst firms specializing in notebook PC production: the number of Taiwanese notebook PC producers fell from forty-five in 1993 to only twenty-one in 2006, with market share shifting dramatically in favor of the largest five producers (Kawakami 2008).

Modularity, Consolidation, and Crisis in the Global Supply Base

The making of the global supply base was enabled by the deployment of information technologies, which, along with better standards for sharing information, enabled companies to achieve more precise forms of coordination, even with highly complex and technologically sophisticated products and processes, a mode of governance that we have referred to elsewhere to as *value-chain modularity* (Sturgeon 2002; Gereffi, Humphrey, and Sturgeon 2005). By the end of the 1990s, the depth and breadth of the global supply base, along with new Internet-based tools for buyer-supplier matchmaking, quotation, and operational coordination, was opening a new chapter in the development of the global supply base, in which the barriers to global sourcing could fall far enough to encourage smaller and less technologically adept retailers and start-ups to engage in global sourcing.

On the supply side, new requirements to respond rapidly to buyers and make timely deliveries of complex products from multiple locations around the world put a premium on size and technological competence, and raised barriers for new entrants. Smaller local suppliers in developing countries were often relegated to the margins of the value chain, if they were included at all. The result was a process of consolidation, where the largest suppliers gained at the expense of smaller, regional producers. Today, in the midst of an unprecedented global economic slowdown, the survival of this system has come into question on several fronts. Even prior to the current crisis, supplier profitability in some sectors, such as automotive and electronics, had been low to negative for many years (Sturgeon, Van Biesebroeck, and Gereffi 2008). Repeated severe economic cycles, previously contained within specific regions and industries, and now being experienced across the board, have exacerbated this persistent low profitability in the global supply base, triggering a wave of plant closures and driving some of the largest and most capable firms to

financial ruin. Nevertheless, prior experience reveals that outsourcing and offshoring have not reversed following economic crises.

Value-chain modularity

The making of the global supply base has been enabled by rapid advances in computerized design, automated production planning and inventory control, logistics and production planning software, and robotic manufacturing equipment. Tighter integration between lead firms and suppliers has been facilitated by the development of global industry standards (both open and de facto), not only in the electronics industry, where standards at the component level have created modularity in system design, but in all global industries. For example, even when components are unique to specific products and design architecture is integral and proprietary, as they are in the motor vehicle industry, information technology can help firms coordinate cross-border activities; exchange complex design files; track incoming, in-process, and finished inventories; and direct the shipment of finished goods directly from factories to lead firms. In services, information technology and low-cost, high-bandwidth communications systems installed during the late 1990s facilitate the expansion of remote call centers for after-sales service and the real-time provision of a host of other business services. Because these are not capabilities that can be acquired cheaply or maintained easily, and because they allow suppliers to handle larger and more diverse orders, increasing value-chain modularity has helped to drive consolidation in the global supply base.

Consolidation in the global supply base

After decades of expansion and fragmentation in the global supply base, driven by the needs of multinational firms to develop unique supply bases in each of the countries where they operated, a cycle of expansion, shakeout, and consolidation has played out repeatedly since the late 1990s. It is important to point out that GVCs were not distributed equally across the globe. More production locations were added to the system, but large-scale agglomeration economies, focused around historic production centers with new, world-class port facilities, favored specific cities and regions. This triggered unprecedented booms in some places, such as the region around Shanghai and the Pearl River Delta region of southern China, while other regions continued to struggle or remain entirely severed from GVC-related economic development.

Within this system of uneven development, consolidation has been especially acute in some of the most geographically extensive and dynamic global value chains, such as motor vehicles, electronics, apparel, consumer goods,

and horticulture, reversing the trend toward organizational fragmentation and geographical dispersion outlined earlier. It is hard to overstate the rapidity of this consolidation and the enormity of the changes that it has wrought in key industries. Substantial segments of important industries such as autos and electronics were utterly transformed. Value chains that had been increasingly fragmented and dispersed were rationalized, beginning in earnest during the latter half of the 1990s, creating more tightly integrated global systems comprised of far fewer, much larger players. The fragmentation and dispersion that had marked the 1970s and 1980s, it seems, had reached their limits.

For MNCs, the rationalization of in-company operations has involved the concentration of production in fewer, larger plants, often placed to serve regional markets. The division of labor between these plants has also been rationalized. Even when companies expand internationally to meet the needs of new markets, new subsidiaries are designed to function within a larger international division of labor. Lead firms have moved aggressively to source from fewer suppliers with larger operations in a smaller number of low-cost locations, even as they redouble their efforts to sell globally. As China becomes a more important location for many global suppliers, some investment has been either shifted or diverted there from competing existing low-cost locations in Southeast Asia, Eastern Europe, and Mexico, although rising wages in China's coastal region are driving some new investment inland and to countries with lower wages, such as Vietnam.

Consolidation in the global supply base is primarily driven by a desire on the part of lead firms to simplify and streamline supply-chain management. As the complexity of inter-firm transactions has risen along with outsourcing, so too has the impulse to simplify the supply chain. Using fewer, larger, more capable suppliers has meant a smaller number of relationships to manage, and the ability to collaborate with the same set of suppliers worldwide. Since design work tends to be carried out in advanced-country locations and high-volume manufacturing in developing-country locations, this approach requires suppliers to establish a tightly integrated global network of subsidiary operations, and, most recently, to rationalize those operations by concentrating activities in a few key locations to build up scale economies and simplify logistics.

The impact on suppliers has been clear. The largest and most capable global suppliers, such as the San Jose-based electronics contract manufacturer Flextronics and the Detroit-based automotive seat supplier Lear mentioned earlier, stepped up to internalize many of the truly difficult and risky aspects of global production, such as FDI, global purchasing and inventory control, capacity planning, fixed asset management, and logistics. In apparel, intermediaries such as Hong Kong-based Li & Fung and manufacturers such as Taiwan's Nien Hsing and Pou Chen and China's Yue Yuen, also moved to set up global

operations and offer a broader package of services. In fresh fruits and vegetables, the large supermarkets in the UK, such as Tesco and Asda (owned by Wal-Mart), rationalized the supply systems that they had developed in the 1980s and 1990s. They have begun to outsource functions such as planning year-round supply, customer research, and benchmarking (product variety, space allocated to different products, and so on) to "category managers." According to one leading UK importer, the goal is to reduce the number of direct suppliers for the complete fruit and vegetable product offering from dozens to perhaps three or five. These first-tier suppliers will be responsible for organizing the rest of the chain (Dolan and Humphrey 2004).

This overarching trend, from vertically integrated lead firms with "captive" supply bases dedicated to them, to outsourcing into a series of national and regional supply bases, to consolidation and the rise of global suppliers, is depicted in Figure 8.1. The role of modularity in facilitating this transition is depicted in the character of inter-firm linkages, shifting from idiosyncratic to

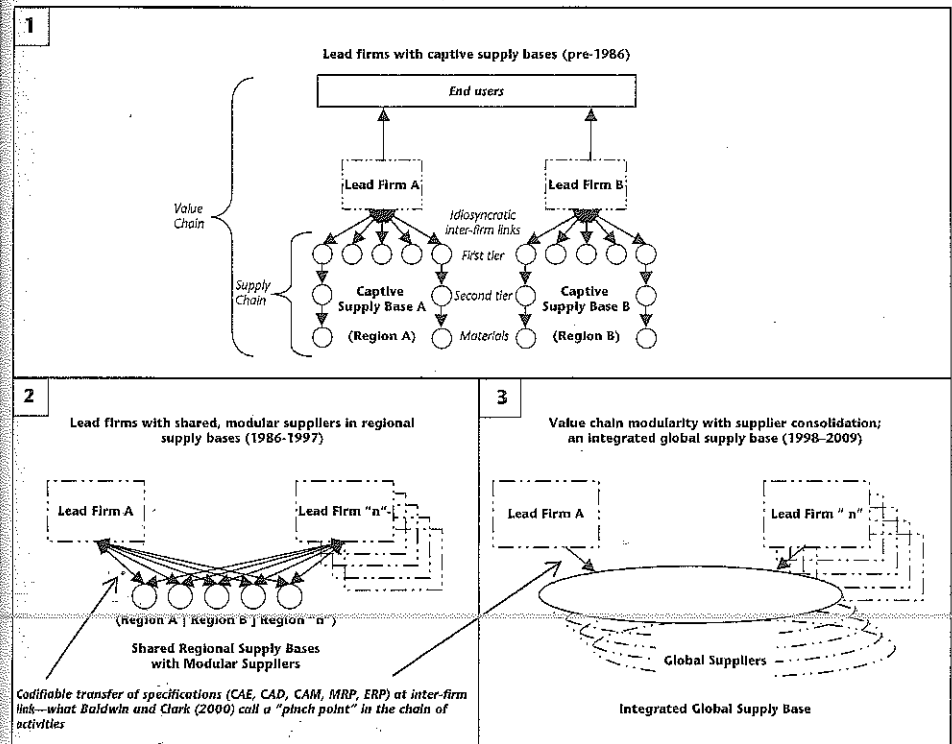


Figure 8.1. The evolution of supply-base modularity, consolidation, and global integration

codifiable, standardized, and modular in later periods. Note that we define the "value chain" as the full range of value-added activities, from component and material production to end use, and the "supply chain" as the specific set of companies that serve a specific lead firm in the context of producing a specific product or service.

Unmaking the global supply base?

At the time of writing (January 2010), the consolidation of the global supply base appears to be accelerating further as the global economy undergoes a severe contraction. For suppliers with the ability to form modular value-chain linkages, business depends not on the success or failure of any single customer or narrow industry but on the ability to switch to growing customers or industry segments when hard times arrive. The difference in the recession of 2007–9 is that there has been a very steep drop in orders across the board, not to mention difficulties in obtaining the credit needed to keep the wheels of global production and trade turning. In a broad downturn, there are very few if any sectors or customers where new business can be won. In a period where business grinds to a halt, global suppliers suffer more than most, given their huge investments in factories, equipment, and large-scale employment. What we can predict is that some will fail, or become easy takeover targets, with further consolidation the result.

While there is no way to predict the future course of offshoring, outsourcing, and the nascent global supply base with any certainty, past experience is instructive. The long-term trend in intermediate goods trade from 1962 to 2006, with a variety of bubbles and crises, as noted in Figure 8.2, suggests that outsourcing and offshoring tend to accelerate both in boom times, when companies are scrambling quickly to add new capacity, and directly following downturns as well, when cost cutting comes to the fore and companies are reluctant to expand internally in the face of uncertainty.

While history has shown that that volatility does not spell a retreat from outsourcing, the bigger question is supplier survival, both in the near and the long term. Supplier markets may be dramatically remade through consolidation, but it seems unlikely that they will be entirely unmade.

Conclusions

This chapter has outlined how the new global supply base has come about, how it has begun to remake the global economy, and what its prospects are going forward. Retailers have been only one of several driving forces in the development of this supply base. While the global supply base is concentrated

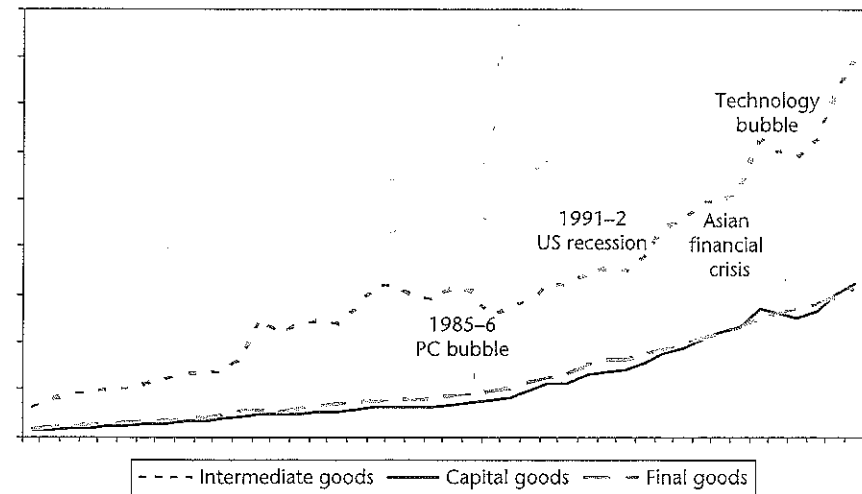


Figure 8.2. World imports of intermediate, capital, and final goods, 1962–2006

in East Asia, it now extends far beyond that region, creating a more-or-less integrated network of plants, service facilities, distribution and collection points, and logistics hubs in key locations across the globe.

Suppliers from developed countries, especially the United States, expanded their roles and set up global operations through the 1990s. Beginning in the late 1990s, decisions by lead firms (retailers and technology-intensive producers alike) sought to simplify and consolidate their sourcing networks and in the process created a new class of *global suppliers*. As global suppliers added capabilities and scale, they began to offer their customers *turn-key* access to a *full package* of manufacturing processes, finished products, complete product lines, and even complementary bundles of services, including product design, component purchasing, final packaging, global logistics, and after-sales repair. To establish their global footprints and provide full-package capabilities, global suppliers invested in new plants, acquired regional competitors and facilities previously owned by MNC affiliates, and in some cases "vertically integrated" by entering the business of upstream and downstream component suppliers and service providers.

While global suppliers have lowered the bar for lead firms to participate in global value chains, they have at the same time raised the bar for local manufacturing firms that want to enter GVCs as suppliers. As global suppliers expanded their operational footprint to new locations, such as Southern Asia, Central America and the Caribbean, Eastern and Central Europe, parts of sub-Saharan Africa, and the Middle East, it became harder for new entrants to compete. Firms and countries that try to enter global value chains today must

meet standards and performance requirements that are much higher than firms entering one or two decades ago.

Within these broad patterns, there is plenty of room for variation in company strategy, even in what might appear to be the same market niches. Thus, The Limited and Gap, Nike and Reebok, Ford and Toyota, Coca Cola and Pepsi, Hewlett Packard and Fujitsu, and so on, might follow different specific strategies related to outsourcing and offshoring based on managerial choices (Berger 2005) or the institutional norms of the company's home country (Lane and Bachmann 1997; Sturgeon 2007). A major theme in this chapter is that market making in global supply chains is not just about offshoring, fragmentation, and specialization. By highlighting that there is consolidation, concentration, and rebundling going on in particular locations and within MNCs around the globe, we reinforce the core idea that market making takes place through the exercise of "power" by big firms and large countries. These issues are captured by the GVC perspective, and introduce critical elements of agency and institutional variation into the story that would be lost in a straightforward "market-forces" account of global integration.

This chapter has emphasized the self-reinforcing, co-evolutionary character of the market-making process. In earlier chapters in this volume, we have seen how experiments with global sourcing in the 1970s and 1980s by a handful of pioneering retailers and multinational manufacturing firms created the initial markets for export-oriented economies in East Asia. Retailers and branded manufacturers in rich countries became more experienced with international outsourcing; developing countries acquired the infrastructure and capabilities needed to sustain more complex operations; and suppliers upgraded their capabilities in response to larger orders for more complex goods. As these resources improve over time, more lead firms gain the confidence to embrace the twin (and often entwined) strategies of outsourcing and offshoring. The global supply base has been made in a self-reinforcing cycle of outsourcing and supply-base upgrading that connects firms across developed and developing countries; its frontiers and capabilities continue to evolve.