

# BEYOND JAPAN

## THE DYNAMICS OF EAST ASIAN REGIONALISM

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EDITED BY

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## Searching for a New Role in East Asian Regionalization: Japanese Production Networks in the Electronics Industry

**DIETER ERNST**

The electronics industry has been a trailblazer and test bed for East Asian regionalization—it dominates the region's international trade and investment, and it displays very high levels of integration into global production networks. Electronics has overtaken textiles as the region's main engine of growth, and governments compete to nurture this industry as a catalyst for industrial upgrading. An analysis of this industry can thus provide important insights into the forces that are remaking East Asia.

Japanese firms have played a critically important role in the region's electronics industry—they have been a major source of capital, components, and machinery, as well as business models and management techniques. However, in response to a persistent recession in this industry, the cards are now being reshuffled, giving rise to far-reaching adjustments in the region's trade and investment patterns, and in the development trajectories of its electronics industries. The traditional "flying geese" model of economic interactions between Japan and East Asia has clearly come to an end as a unifying force of regionalization (METI 2003; Ozawa 2003). But what new forces will shape East Asia's future regional development patterns?

Since the 1990s, U.S. corporations have consolidated their leadership in

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semiconductors and computers, creating new product, software, and service markets, for example, the Internet, e-business, advanced microprocessors, and operating systems for an increasing variety of digital devices (Ernst 2002a). Japanese electronics firms, on the other hand, have experienced a rapid erosion of their erstwhile leadership in consumer electronics and semiconductors, and they have failed to catch up with U.S. industry leaders in the above new product, software, and service markets.<sup>1</sup> The electronics industry thus appears to support the assessment of Stephen Roach (chief economist of Morgan Stanley) that “the world is more U.S.-centric now than it has ever been” (Roach 2003).

But does this imply that East Asia's electronics industry will be “Americanized”? And which role will Japanese firms play in this game? In this chapter I analyze one side of the equation. I explore how Japanese electronics firms are searching for new ways to transform their East Asian production networks (EAPNs) to cope with the new opportunities and challenges of a radically transformed East Asian regional economy. Far from withdrawing from East Asia, Japanese corporate capital in the electronics industry now critically depends on the region, not only as a global export production base but also as a major and increasingly sophisticated market for its products, services, and technology, and as a source of lower-cost knowledge workers.<sup>2</sup> To benefit from the growing importance of East Asia, Japanese electronics firms are searching for ways to expand and upgrade their regional production networks, with a particular focus on China.

The analytical challenge is to explain why Japanese firms are finding it difficult to make the necessary adjustments in the organization and management of their regional production networks. Accumulated weaknesses of the Japanese business model provide part of the explanation. However, equally important *exogenous* forces are at work. A central proposition of the chapter is that competition between distinct national business models is no longer the dominant determinant of East Asian regionalization. The dichotomy “Americanization versus Japanization” that has shaped the earlier literature is insufficient to capture what is really happening.

<sup>1</sup> While Japanese firms are leaders in next-generation digital consumer electronics, they are facing serious challenges from Taiwanese, Korean, Chinese, and U.S. companies (JETRO 2004, chap. 3).

<sup>2</sup> Data sources include the annual surveys of the Japan Bank for International Cooperation Institute (JBICI) on the overseas business operations of Japanese manufacturing companies; annual reports by the Ministry of Economics, Trade, and Industry (METI), Japan External Trade Organization (JETRO), and the Japan Electronics and Information Technology Industries Association (JEITA); the Nomura Research Institute (NRI); the Fujitsu Research Institute; the Japan Research Institute; the Japan Electronic Industry Yearbook (*Denpa Shinbun*, *Denshi Kogyo Nenkan*); and the *Yearbook of World Electronics Data*; and specialized newsletters, such as the *JETRO China Newsletter*, Nomura Research Institute Papers, *Oxford Analytica*, the *Interfax China IT & Telecom Weekly*, *Electronic Business*, *Electronics Engineering Times*, the *Semiconductor Reporter*, and CMPnet.Asia.

More important are fundamental transformations in the organization of international business that are especially pronounced in the electronics industry (Ernst 2005b): firms of diverse nationality compete and collaborate within multilayered global “networks of networks” of marketing, production, and innovation. This has forced Japanese firms into dense interaction with a multitude of firms from the United States as well as from East Asia’s leading electronics exporting countries. Another critical *exogenous* force has been the rise of China as a global export production base; as a sophisticated growth market, especially for mobile communications and digital consumer devices; and as a new source of R & D and innovation (Ernst and Naughton 2005). Both forces combine to produce increasingly complex processes of regionalization. Economic interactions within the region, such as trade, investment, and competitive strategies, have moved beyond a “short causal” chain, where causes and effects are easy to disentangle and where it is possible to name names and to develop effective responses.<sup>3</sup> Identifying, monitoring, let alone “controlling” the transformational actors and mechanisms by nationality has become much more tricky.

This chapter introduces a few conceptual building blocks that we need to capture the interactions between international business organization and regionalization. It also describes the growing dependence of Japan’s electronics industry on Asia; explores how Japanese electronics firms are searching for ways to expand and upgrade their regional production networks, with China as the main prize; and examines constraints to change. I highlight peculiar features of the Japanese network management model in East Asia that once may have reflected strength. Now these very same features have turned into systemic weaknesses, as they constrain the capacity of Japanese firms to cope with and shape East Asia’s increasingly complex processes of regionalization. The chapter concludes with an illustrative example of how some Japanese electronics firms are seeking to turn around gradually their EAPNs, by developing strategic alliances with emerging new industry leaders in Asia, primarily from China.

## Global Production Networks and Regionalization

“Regionalization” can be defined as the integration, across national borders but within a macroregion, of markets for goods, capital, services, knowledge, and labor. Barriers to integration continue to exist, of course, in different markets (especially for low-wage labor), so integration is far from perfect. But there is no doubt that a massive integration has taken place across East Asian borders that, only a short while ago, seemed to be impenetrable (Ng and Yeats 2003). This raises the question: Who are the “integrators”?

<sup>3</sup> See chapter 8 for an analysis of similar developments in renewable resource industries.

Research on East Asian regionalization has shown that, while states obviously play an important role in reshaping institutions and regulations, the dominant integrators have been corporations. Much of the literature has focused on the battle between "Japanization" and "Americanization" as the main drivers of regionalization. But there is little agreement on the precise features of business organization that differentiate the comparative capacities of Japanese and American firms to shape regionalization.

Unfortunately, there is very little theoretical work on this relationship; we still lack a unified theory of regionalization and international business organization. However, we can build on research that links theories of trade and FDI and theories of global production networks.<sup>4</sup> This research shows that corporate strategies, organization, and investment decisions shape trade patterns and the spatial division of labor of economic activities, as well as the transfer of technology and knowledge diffusion (Ernst and Guerrieri 1998). Corporations may also indirectly affect regionalization by lobbying states to change institutions and regulations. The driving force is competition (Ernst 2002a). In knowledge-intensive industries such as electronics, intense price competition needs to be combined with product differentiation, in a situation where continuous price wars erode profit margins. Of critical importance, however, is speed-to-market; getting the right product to the largest volume segment of the market right on time can provide huge profits. Being late can be a disaster and may even drive a firm out of business. The result has been an increasing uncertainty and volatility, and a destabilization of established market leadership positions.

No firm, not even a dominant market leader, can generate all the different capabilities internally that are necessary to cope with the requirements of global competition. Competitive success thus critically depends on "vertical specialization," a capacity to selectively source specialized capabilities *outside* the firm, which can range from simple contract assembly to quite sophisticated design capabilities. This requires a shift from individual to increasingly collective forms of organization, from the multidivisional (M-form) functional hierarchy (Chandler 1977) of "multinational corporations" to the networked global flagship model. Trade economists have recently discovered the importance of changes in the organization of international production as a determinant of trade patterns (for example, Cheng and Kierzkowski 2001; Feenstra 1998). Their work demonstrates that (1) production is increasingly "fragmented," with parts of the production process being scattered across a number of countries, hence increasing the percentage share of parts and

<sup>4</sup> Pioneering attempts to establish a unified analysis of FDI and international trade are the technology gap trade theory of Posner (1961) and the international product life cycle theory of Vernon (1966 and 1979). Other scholars have tried to link the theory of foreign direct investment to that of industrial organization of multinational enterprises (e.g., Dunning 1981; Ozawa 2000).

components in international trade; (2) that there is reintegration through global production networks (GPNs); and (3) that countries and regions that have been able to become a part of these network are the ones that have industrialized the fastest.

In this chapter I build on this work, but use a broader concept that emphasizes four characteristics of GPNs that influence regionalization (Ernst 2003, 2002b, 1997). First, *scope*: GPNs encompass all stages of the value chain, not only production but also sales, procurement, outsourcing, and R & D. Second, *asymmetry*: flagships exercise control over network resources and decision-making. Third, *knowledge diffusion*: the sharing of knowledge is the necessary glue that keeps these networks growing (Ernst and Kim 2002). Fourth, *information systems*: the increasing use of digital information systems to manage these networks enhances not only information exchange but also provides new opportunities for the sharing and joint creation of knowledge.

A Japanese EADN covers both intrafirm and interfirm transactions and forms of coordination; it links together the flagship's own subsidiaries, affiliates, and joint ventures with its subcontractors, suppliers, and service providers, as well as its partners in strategic alliances. A network flagship such as Hitachi or Sony breaks down the value chain into a variety of discrete functions and locates them wherever they can be carried out most effectively, where they improve the firm's access to resources, capabilities, and knowledge, and where they are needed to facilitate the penetration of important growth markets. It is important to emphasize that the chain of causation appears to work both ways; changes in the organization of Japanese EAPNs have led to changes in East Asia's trade patterns and investment allocation; those changes in turn give rise to further changes in the organization of the above networks.

### Expanding and Upgrading Links with East Asia

Japan experienced a long-term decline in its share in global trade and FDI during the 1990s, the country's "lost decade." Its share in global exports fell to 7.6 percent in 2000, after peaking at 10.2 percent in 1986 (JETRO 2002, fig. V-3). In 1992, Japan's outward FDI stock was 12.4 percent of the world total, second only to the United States, but by 2000 it had fallen back to eighth, the same position it had occupied in 1980.<sup>5</sup> Moreover, after being the world's

<sup>5</sup> Ministry of Finance data, quoted in JETRO (2002, 25). Note however that Ministry of Finance data on FDI do not include the quite substantial amounts of reinvestments of Japanese subsidiaries in Asia that do not require a capital transfer from Japan to the region (e.g., Nakagane 2002, 55).



largest source of outward FDI flows in 1990, Japan dropped to seventh place in 2001.

Yet, since the turn of the century, a reversal of Japan's declining global presence has occurred, primarily driven by an expansion of trade and investment links with East Asia. From a peak of almost 22 percent in FY1997, the overseas production ratio (OPR)<sup>6</sup> of Japanese manufacturing firms had declined until FY1999. Since then, there has been a steady increase to more than 24 percent in FY2001, with projections of an increase to almost 32 percent in FY2005 (JBICI 2003, 13). The electronics industry leads, with an estimated OPR in FY2002 of almost 41 percent, up from 38 percent one year earlier. East Asia is the main destination of this expansion of overseas operations of Japanese corporate capital in the electronics industry. I will describe the growing dependence of Japan's electronics industry on Asia (excluding Japan), and explore how Japanese electronics firms are searching for ways to expand and upgrade their regional production networks, with a particular focus on China.

#### *Growing Dependence on East Asia*

Japan's electronics industry critically depends on East Asia. Over time, this dependency has deepened, and it also has become much more complex and multifaceted. Of primary importance has been the region's role as a global export production platform. Since the catalytic shock of the 1985 Plaza Accord, when the yen appreciation inflated Japan's production costs, Japanese firms have relocated manufacturing to locations in Asia with lower labor costs, first in Korea, Taiwan, Hong Kong, and Singapore, then in Malaysia, Thailand, Indonesia, and the Philippines. China's role as Japan's global low-cost export production base has substantially increased over the last decade. In FY2002, almost two-thirds of the overseas manufacturing bases of Japanese manufacturing firms that have responded to the Japan Bank for International Cooperation Institute (JBICI) surveys were concentrated in East Asia, up from 60 percent in FY2000 (JBICI 2003).<sup>7</sup>

Initially, the focus has been on consumer electronics and home appliances, as well as related components. Yet, over the last few years, there has been a substantial diversification in the product mix that Japanese firms produce in

<sup>6</sup> The "overseas production ratio" of a company is defined as (overseas production volume) / (overseas production volume + domestic production volume) in percent (JBICI 2003, note 8).

<sup>7</sup> In 2002, the greatest number of production bases (1,067) was in the ASEAN-4 countries (+16% from FY2000). China was second with 890 Japanese manufacturing affiliates (+38% from FY2000), followed by North America (752, +17%), and Asian NIEs (616, +16%). This indicates that China has experienced the largest increase in the number of Japanese manufacturing affiliates.

Asia, to include both hardware and software required for computing, communication, and industrial applications. At the same time, increasingly complex stages of production and overall supply chain management have gradually been shifted from Japan to other Asian locations. This upgrading is a response to the intensifying competition that Japanese electronics firms face both from above and from below.

From above, American electronics industry leaders have raced ahead in the most prized areas of technological innovation, as far as these can be measured by patent statistics. The U.S. "innovation score" more than doubled from 41 (in 1985) to almost 101 (in 2002), a rate far better than for any other country<sup>8</sup> (CHI/MIT 2003). In 2002, all fifteen leading companies with the best record on patent citations were based in the United States, with nine of them in the electronics industry. Japan has maintained its second place, with an increase in its "innovation score" from 15 to 33, but it is now trailing farther behind the United States. And European industry leaders both in telecommunications and consumer electronics have strengthened their market position by aggressively partnering with Asian companies, especially those from China.

From below, Japanese electronics firms are facing new competitors from six Asian countries (China, Korea, Taiwan, Singapore, Malaysia, and India) that have emerged as the new center of gravity in global electronics exports (Ernst 2004). China has now become the third largest exporter of electronics products (up from tenth in 2000), and the second largest importer (up from seventh in 2000). Taiwan ranks as the number one world market supplier for fourteen electronics products. This includes silicon foundry services (involving leading-edge wafer fabrication), with a 73 percent share in global production value; wireless local area networks; and digital audio-video equipment such as CD-ROMs and DVDs, with most of these devices being produced in China. Similar dominant world market positions exist for Korea (in computer memories, flat-panel displays and mobile phones), Singapore (storage devices, printers), and China (computers and peripherals and digital consumer devices) (Ernst 2005a). Furthermore, while India has failed to excel as a global manufacturing exporter, the country has firmly established itself as a global export production base for software and information services.

<sup>8</sup> The U.S. "innovation score" measures the number of patents granted by the U.S. Patent Office, multiplied by the so-called citation index that indicates the value of these patents. The citation index measures the frequency of citation of a particular patent. When the U.S. Patent Office publishes patents, each one includes a list of other patents from which it is derived. The more often a patent is cited, the more likely it is a pioneering patent, connected with important inventions and discoveries. An index of more than one indicates that patents are cited more often than would be expected for a specific group of technologies, while less than one indicates they are cited less often than expected.

An equally important aspect of Japan's growing dependence on East Asia are demand-side factors, that is, the growing sophistication of Asian markets for electronic products and services.<sup>9</sup> Gone are the days when Asia's protected markets were an easy dumping ground for low-end and mature products, locally produced by Japanese affiliates (the "mini-Matsushitas"). Procurement by Japanese subsidiaries in Asia has created a thriving market for Japanese exports of parts and components, as well as capital equipment (Ernst 2000). The development of rapidly growing electronics industries has further expanded the region's demand for such input imports. Over time, however, the procurement of Japanese subsidiaries and Asian firms has become less Japan-centered, substituting imports from Japan with purchases from within the region. Over the last decade, Japanese firms in Asia have substantially increased their localization of sales and procurement (METI 2002b, 10).

To some degree, this shift reflects the relocation of production by Japanese component suppliers to Asia, as part of an increasingly sophisticated division of labor within Japanese EAPNs (Ernst and Ravenhill 2000). One important result is that the sales of Asian subsidiaries now outpace Japan's exports to Asia: in FY 2000, Asian subsidiaries recorded sales of ¥364 billion, 1.7 times the value of Japan's exports to Asia (Takeuchi 2003, 13). An equally important cause for the regionalization of procurement by Japanese subsidiaries in Asia has been the emergence of highly competitive suppliers of manufacturing services in Korea, Taiwan, Hong Kong, Singapore, Malaysia, Thailand, the Philippines, and more recently China (Ernst 2005b).

In addition, Japanese electronics firms now belatedly realize the critical importance of Asia's thriving and increasingly sophisticated consumer markets. The contraction of Japan's domestic retail markets for home appliances, audio-video equipment, computing and communication devices provides a powerful incentive for developing aggressive market penetration strategies in the rest of Asia (JETRO 2003c, 19). In 2002, total consumer spending in East Asia was estimated to be \$1,461 billion. China's share was almost 40 percent, up from 27.5 percent in 1991. The region's middle- and upper-class market, the primary target of global competition, is estimated to comprise around 140 million people, roughly 10 percent of East Asia's total population. The four newly industrializing economies, or NIEs (Singapore, Korea, Taiwan, and Hong Kong) dominate these high-end sophisticated consumer markets, but China, with almost 41 million high-end consumers, accounts for almost 30 percent of the region's higher income market.<sup>10</sup>

<sup>9</sup> With more than 40% of the overseas sales bases of Japanese manufacturing firms (in FY 2002), East Asia is well ahead of the EU and North America (JBICI 2003). The number of Japanese sales affiliates in Asia increased by 24% in the two years from FY 2000 to FY 2002, with the largest increase (+30%) in China (Takeuchi 2003, 2).

<sup>10</sup> There are of course huge geographic disparities. Beijing, the Yangtze delta around Shanghai,

Probably the most important change is the growing sophistication of China's markets for electronic products and services. China is now the world's largest market for telecommunications equipment (wired and wireless), the third largest market for semiconductors, and one of the largest and most sophisticated markets for digital consumer and computing devices. Major global market leaders count on a continuous rapid growth of the China market to reduce the negative impact of the persistent demand stagnation in global electronics markets. This is true for the telecommunications market where Japanese producers of infrastructure equipment (Fujitsu and NEC) and mobile phones (Matsushita, Sharp, Sanyo, Sony, Kyocera) are intensely competing as well as collaborating with global industry leaders (e.g., Motorola, Alcatel, Nokia, Cisco, Samsung, Siemens, Ericsson, and LG), and where all of them are competing for market share with emerging local firms, such as Huawei, ZTE, Datang, TCL, Haier, and Ningbo Bird. Global industry leaders are also eager to penetrate China's markets for computing and consumer devices and key components such as semiconductors.

Japanese electronics firms have not been particularly successful in penetrating these markets, and competition has become extremely intense. For the profitable high-end markets, main competitors are Korean (Samsung and LG) and European consumer electronics firms (Philips, Siemens), as well as U.S. computer companies (HP, Dell, Apple, and Gateway), which are now entering the digital consumer market with a vengeance. Competition is even more intense at the mid- and low-level market segments, where in addition to the already mentioned firms, Chinese firms and their Taiwanese partners play an increasingly important role. In practically all of these market segments across the region Japanese firms are on the defensive and are now belatedly trying to repair the damage of earlier inaction.

#### *Priorities for Future Network Expansion and Upgrading*

To benefit from the growing importance of East Asia, Japanese electronics firms are now searching for ways to expand and upgrade their EAPNs. The emphasis is on trying to fine-tune the division of labor between domestic and overseas production, and on reducing reliance on traditional "keiretsu-type" linkages with other Japanese firms. This shift in strategy is driven primarily by the need to expand market share in attractive Asian markets, especially in China and Korea, and to find scale economies, which are necessary to cope with the intense price competition from emerging new competitors within the region.

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and the southern coastal provinces have all become leading growth markets, and in some cases even launch markets for digital consumer and mobile communication devices. But beyond these thriving high-end markets, persistent poverty keeps constricting effective demand.

This is a belated attempt by corporate headquarters to transfer to Asia basic changes in the Japanese business model. Of particular importance are attempts to move away from market-share expansion to profitability as the main measure of success, and attempts to strengthen vertical specialization, by outsourcing noncore activities. These changes in the Japanese business model have been debated at corporate headquarters since the mid-1990s. Yet the green light for implementing such changes in Asia was only given five years later, when the slowdown in the electronics industry gave rise to intensified competition and reduced profits.<sup>11</sup>

In 2003, Japanese manufacturing firms expected to pursue the following priorities in the expansion of their EAPNs (JBICI 2003, 28, 29). China stands out with a focus on expanding production (almost 73% out of 518 responses). ASEAN-4 has an equally high focus on expanding production (70% out of 341 responses).<sup>12</sup> But while in China this includes investment in new production lines, the focus in ASEAN-4 is almost exclusively on expanding and upgrading existing facilities. In NIEs, expansion of production plays a much less important role, with sales expansion being the dominant concern. In China, Japanese firms also assign a high priority to the expansion of sales functions (almost 60% of the respondents).

Particularly noteworthy is the low priority assigned by Japanese firms to an expansion of R & D in Asia. This contrasts with the approach of U.S. and European, as well as Korean and Taiwanese, companies, who are expanding R & D functions in their overseas affiliates in Asia (Choi 2003; Liu and Chen 2003). In Asia, the share of Japanese companies that intend to expand R & D hovers between 9 percent (for NIEs) to 13.5 percent (for China), compared to 19 percent for the European Union and almost 23 percent for North America. Japanese firms continue to neglect the huge potential of Asia as lower-cost sources of knowledge workers. Japanese firms, in their attempts to upgrade their Asian networks, still typically try to retain an unequal division of labor that keeps the development and production of leading-edge and high-value-added products and production stages in Japan. They also try to minimize possible leakages of technological knowledge. But their capacity to sustain this flying geese pattern of specialization has been critically weakened.

This provides yet another example of the slow pace of response of Japan's

<sup>11</sup> As Tachiki (1999) shows, it typically takes Japanese firms three to five years to translate a change in corporate business plans into decisions on the geographic location of resources and to mobilize organizational resources that are necessary to relocate overseas production. This reflects the strictly sequential procedure of corporate decision making in Japan: only after a systematic restructuring of the corporate business plan has occurred will management move on to a gradual implementation of changes in overseas operations.

<sup>12</sup> JBICI defines "ASEAN-4" to include Malaysia, Thailand, Indonesia, and the Philippines, while "NIEs" includes Singapore, Taiwan, and Korea.

major integrated electronics companies. In descending order of asset size, the industry leaders are Hitachi, Sony, Matsushita Electric, Toshiba, NEC, Fujitsu, Mitsubishi Electric, Sanyo, and Sharp. With massive overseas sales and extensive global production networks, these nine firms once embodied Japan's global leadership in the electronics industry. With a combined turnover of ¥46 trillion (ca. \$380 billion), a total workforce of 1.4 million, hundreds of subsidiaries and thousands of component suppliers around the world, adjustments in strategy and organization only come about incrementally.

This is different for Japanese small- and medium-sized enterprises, most of them specialized suppliers of electronic components, who can respond much faster than the global Japanese flagship companies. These small- and medium-sized enterprises are the main drivers behind the current expansion of production into East Asia. For small- and medium-sized enterprises, this is a question of survival—smaller Japanese component suppliers are most directly affected by the increasing competition from Asian suppliers. In FY 2002, almost 88 percent of suppliers of electronics components were planning to expand their overseas production networks over the next three years, compared to less than 73 percent of final assemblers (most of them global flagships). And Japanese small- and medium-sized enterprises in the electronics industry have a record OPR of 45 percent, way above the average OPR for all industries, which is slightly below 32 percent (JBICI 2003, 67).

The rapid internationalization of Japan's domestic supplier base in the electronics industry indicates that the widely feared "hollowing out"<sup>13</sup> has hit smaller specialized suppliers especially hard. This is borne out by the finding of the FY 2002 JBICI survey (2003, 16) that, compared to earlier surveys, fewer companies in the electronics industry intend to invest in an upgrading of domestic operations. Japanese electronics firms may thus lose one of their major traditional strengths, a vibrant and flexible domestic base of supplier industries.<sup>14</sup>

Larger global players on the other hand are under tremendous pressure to combine the expansion of production in Asia with a vigorous upgrading of their domestic production and innovation systems. Laying off workers in Japan is costly, as retrenched workers must be adequately compensated to en-

<sup>13</sup> "Hollowing out" stands for a decline in the manufacturing sector's contribution to economic activity (e.g., output or employment) in the home economy in response to increases in FDI outflows.

<sup>14</sup> Yoshihide Ishiyama's interesting study ("Is Japan Hollowing Out?"), published in 1999, was apparently too optimistic. He argues (Ishiyama 1999, 242) that "'hollowing out' . . . should not be a concern for Japan . . . [as] . . . Japan's manufacturing industry seems to be much more resilient than that of other countries. . . . After a short while, Japan's manufacturing corporations manage to increase efficiency in producing existing products, upgrading products, or moving to new product lines to defend turf against imports and sustain export revenue." Since then, this belief in Japan's invincibility has been thoroughly weakened.

able companies to maintain their reputations as good employers. This implies that wages are a de facto component of fixed costs. To sustain jobs especially for expensive knowledge workers, large Japanese firms attempt to sustain an unequal division of labor with Asia. They attempt to keep basic and applied research at home, plus “design work which promotes added-value, and basic programming development,” while product and system customization plus process adaptation are developed in major overseas markets such as the Asian NIEs and China (JBICI 2003, 21).

### **Constraints to Change: Systemic Weaknesses**

To establish why Japanese electronics firms find it difficult to implement the above priorities for future network expansion and upgrading, I highlight five peculiar features of the Japanese network management model in East Asia that once may have reflected strength but now have turned into systemic weaknesses: persistent diversity of organization; dispersed location driven by risk minimization; Japan-centered sales destination and a neglect of local market characteristics; a limited capacity to tap the creativity of non-Japanese skilled workers, engineers, and managers; and a reluctance to outsource R & D.

#### *Partial Convergence and Persistent Diversity*

Responding to the resurgence of the U.S. electronics industry during the New Economy boom, both the leading global Japanese flagship companies and smaller companies such as Kyocera have attempted to emulate what they perceived to be successful strategies by their American counterparts. Imitation has been an important force of change. Yet, imitation has not transformed Japanese companies and their EAPNs into clones of their American benchmark models. Instead, it has generated “a complex process of hybridization where partial convergence coexists with persistent diversity” (Ernst and Ravenhill 2000, 242).<sup>15</sup>

<sup>15</sup> The debate about whether there are differences between Japanese and U.S. FDI has a long history. Over time, the focus of analysis has shifted from trade impacts (e.g., Kojima 1978, 1986), transfer of technology, and the importance of relative factor endowments (Ozawa 1979; Urata 1999) to differences in the ways Japanese and American firms have organized their international business operations, and how these differences affect transaction costs, learning, and knowledge diffusion (e.g., Westney 1999a; Fruin 1997). By the late 1990s, a growing literature was addressing how these issues affected Japanese and U.S. production networks in Asia (e.g., Encarnation 1999; Hatch and Yamamura 1996; Ernst and Ravenhill 2000; Ernst 1997, 2000). Important differences have been identified in seven areas: geographic dispersion, product mix, localization of management, sourcing of components and capital goods, replication of domestic production networks, impact on trade, and distribution of R & D activities.

**Table 7.1.** Japan's integration into the global economy, 2000

	Japan (%, \$billions)	United States (%, \$billions)	Germany (%, \$billions)
Balance of Overseas Direct Investment/GDP	5.9	25.0	22.7
Overseas Production Ratio	14.3	30.7	46.8
Net Direct Production Ratio	4.9	103.2	4.6
Income Received	8.2	149.3	16.8
Income Paid	2.6	68.0	9.6
License Royalties, etc. Received	10.2	38.0	2.8
License Royalties, etc. Paid	11.0	16.1	5.5
Net Direct Investment Income/GDP	0.1	0.8	0.4
Net Direct Investment Income/Investment Balance	3.0	6.0	4.0
Export Reliance	9.7	7.8	26.3
Import Reliance	7.2	12.4	26.3
Balance of Inward Direct Investment/GDP	1.1	27.7	23.6

Source: Takeuchi 2003.

Note: The figures are for 2000, except for the overseas production ratio for the United States, which refers to 1999.

Convergence occurred in the mix of products that are produced in Asia. By the mid-1990s, Japanese firms had joined their U.S. counterparts in moving a substantial portion of personal computer production to the region. Japanese firms have also jumped onto the bandwagon of OEM (original equipment manufacturing) contracts that provided substantial competitive advantages to U.S. computer companies.<sup>16</sup> Similarly, U.S. firms were the first to take advantage of the growing concentrations of expertise in various areas of electronics production in East Asia by transferring increasing responsibility for engineering and electronic design to subsidiaries (Ernst 2004). Again, this has proved to be a cost-effective strategy that some Japanese firms were beginning to emulate starting in the mid-1990s. The new responsibilities devolved to Japanese subsidiaries have inevitably required changes in management practices that have brought them closer to their American counterparts (Ernst 2000).

Yet, important differences persist in the organization of Japanese EAPNs. An important reason for this persistent diversity is that Japan continues to lag behind the United States in its integration into the global economy (table 7.1). This truncated integration into the global economy constrains any convergence of Japanese networks with the U.S. model. As long as Japan continues to trail behind in its overseas production ratios and especially in its net direct investment income, Japanese firms will remain under pressure to min-

<sup>16</sup> During the early 1980s, when the U.S. dollar appreciated rapidly, cash-strapped American firms were the first to experiment with new forms of international production outsourcing (Ernst 1997).



imize risks by centralizing management control in the parent company, and by relying heavily on the parent and other long-standing partners for the supply of capital goods and components.

### *Dispersed Location*

Until the mid-1980s, affiliates of Japanese electronics firms were more geographically dispersed across Asia than U.S. ones, due to their primary focus on protected local markets. Once the focus shifted to export-platform production, locational patterns converged: both Japanese and U.S. electronics firms invested heavily in megaplants in a few industrial sites in Malaysia, Taiwan, Singapore, and Thailand. Since the turn of the new century, attempts to be more selective have gained momentum. Japanese firms are now attempting to gain scale economies through consolidation of investment in China and to catch up with global competitors in the penetration of the China market.

A huge investment gap remains in the China market between U.S., European, and Korean companies, on the one hand, and Japanese companies, on the other. The first group has focused on consolidating much of its global production in China, serving both the Chinese and global markets, and hence maximizing both economies of scale and scope. In contrast, as a share of Japan's accumulated stock of FDI, China still lags substantially behind Asian NIEs and ASEAN-4 (table 7.2).

In China, Japanese electronics firms have invested in production much earlier than U.S., European, and Korean companies, but they were constrained, because the Chinese government did not allow foreign firms to invest in the final-product manufacturing of electronics products except for a few export-oriented joint ventures, primarily by Hitachi and Sanyo (Marukawa 2002, 184–87).<sup>17</sup> This is why, during the “China fever” between 1991 and 1995, Japanese electronics firms in China concentrated on the production of key components for the consumer electronics industry. By providing key components such as cathode ray tubes, compressors, and integrated circuits to Chinese set makers, and by assisting their integrated circuit design, Japanese firms supported the development of technological capabilities by Chinese firms that are now industry leaders, such as Haier, Konka, TCL, and others.

Japanese electronics firms, however, were unable to enjoy first-comers' advantages, such as Shanghai Volkswagen did for cars, and they failed to establish strong positions in China's final-product markets. This is true even for consumer electronics, a market that Japanese firms dominate in Southeast

<sup>17</sup> Until 1994, the domestic market was reserved for Chinese state-owned enterprises and virtually closed to foreign companies.

**Table 7.2.** Japanese foreign direct investment stock, by destination, 2002

NIEs <sup>a</sup>	\$24.9 billion
ASEAN-4 <sup>b</sup>	\$18.78 billion
China	\$12.48 billion

Source: Compiled for JETRO 2003.

<sup>a</sup>Singapore, Taiwan, Korea.

<sup>b</sup>Malaysia, Thailand, Indonesia, Philippines.

Asia. It thus made perfect economic sense for Japanese firms to sustain a dual production base both in Southeast Asia and in China. Today, this dispersion of production networks across Asia has become a major disadvantage, as it prevents Japanese firms from reaping cost-reducing scale economies in China.

Attempts to shift the center of gravity of Japanese EAPNs from ASEAN to China are constrained by a deeply entrenched history of Japanese management trying to shelter the company from risks and uncertainties (Tachiki 1999, 186).<sup>18</sup> Japanese firms are concerned that once they move most of their investment to China, their profitability will suffer, as they become unduly dependent on an array of perceived disadvantages and risks of investing in China. A major concern is that the legal framework and the tax system are opaque, and that both are prone to frequent, sudden, and unpredictable changes. Equally important are concerns about the absence of effective intellectual property rights protection, difficulties in raising local investment funds, and delays in the collection of account receivables, while Japanese firms are requested to settle accounts immediately. Japanese electronics firms are also concerned about an industry structure that gives rise to "excessive" competition and periodic overheating, and a tendency to shirk WTO regulations and to introduce hidden nontariff barriers (JBICI 2003, 34).

A fourth major area of concern is the availability of local managers and engineers and labor relations. Japanese electronics firms are concerned that the rising cost of managers and engineers in China may soon reduce the cost advantage relative to other locations in Asia.<sup>19</sup> Frequent complaints include high employee turnover, a low level of basic factory skills, and conflicts about wage level gaps between Japanese staff and Chinese workers. Because of these perceived difficulties and risks, Japanese electronics firms typically are very

<sup>18</sup> A typical example is Sony's "two-plant policy" that tries to avoid, at almost any cost, being dependent on only one centralized plant for a particular macroregion (Form 20 F report 2003).

<sup>19</sup> Japanese subsidiaries in China report that "in order . . . not to lose skilled managerial and technical personnel to other companies, we are paying them like we would Japanese employees. We are also giving favorable treatment for transportation and housing" (JBICI 2003, 39-43).

reluctant to move from dispersed Asian production networks to concentrated networks within China. Risk minimization, in other words, limits the pursuit of vertical specialization, and this sets Japanese companies apart from their American and European counterparts.

But there are signs of a possible reversal: Japanese FDI into China, which had stagnated in value since FY 1995, increased again for the first time in FY 2000 (JETRO 2002b, 35).<sup>20</sup> Since then, Japanese FDI inflows into China have accelerated, rising almost 60 percent in 2001, to \$4.6 billion, the highest level to that point. And during the first six months of 2002, Japanese firms invested an additional \$3.15 billion (JBICI 2003).<sup>21</sup> Like the first China fever in 1992, the appreciation of the yen has been a powerful catalyst. However, there are now additional attractions, such as substantial improvements in infrastructure and logistics, at least in China's three main growth poles; the signaling effect of China's WTO accession; the emergence of support industry clusters; and vast improvements in the quality of human resources, especially China's seven hundred thousand annual science and engineering graduates.

### *Sales Neglect of Asian Markets*

A third persistent difference can be found in the contrasting sales destination of Japanese and American EAPNs (Takeuchi 2001). While Japanese electronics companies have moved from sales to local markets to third country exports, and now to reverse importing into Japan, U.S. companies have moved in the opposite direction: from a primary focus on reverse imports into the United States to an increasing emphasis on sales in Asia. Throughout the 1990s, a defining characteristic of Japanese EAPNs in the electronics industry has been the rapid rise of reverse imports into Japan—more than 60 percent of Japan's imports from Asia are imports from Japanese subsidiaries (METI 2002b).

By the turn of the century, Asia replaced the United States as the main

<sup>20</sup> In the ASEAN region, Japanese firms over the last few years have concentrated primarily on financial consolidation and on the rationalization of supply chains and distribution channels. There have also been attempts to upgrade existing subsidiaries toward flexible mass production of products that, while no longer competitive in Japan, are considered to be too risky to transfer to China because of quality or intellectual property protection concerns. Overall, however, Japanese FDI in the ASEAN region is unlikely to expand: a "wait-and-see" approach is combined with selective upgrading of some major operations.

<sup>21</sup> Examples of this renewed inflow of Japanese FDI include NEC's decision to shift 70% of its cell phone production to China; Sanyo's decision to concentrate all air conditioner production in China; Canon's \$80 million investment in Suzhou, producing copiers; Sony's investments in new notebook computer production lines; Toshiba's decision to build a very large production line for laptops in Hangzhou, and to transfer a substantial part of its digital TV set production; and Matsushita's \$26 million investments in two new plants that produce semiconductors for homes appliances.

source of Japanese imports for computers, semiconductors, and electronic components. For semiconductors, Japan's import dependence ratio<sup>22</sup> grew rapidly, from below 20 percent in 1991 to around 50 percent in 1999. This was primarily due to foundry contracts and contract manufacturing arrangements for semiconductors, primarily with Taiwanese and Singaporean firms. By 2000, Asia accounted for over 60 percent of Japan's semiconductor imports, while the share from the United States had fallen to around 30 percent. This has resulted in a dramatic reversal of Japan's trade balance with Asia in the electronics industry, from a surplus to a deficit.

The Japan-centered sales destination has resulted in another major weakness of Japanese EAPNs: a lack of aggressive strategic marketing to address the specific requirements of East Asian markets (e.g., Meyer-Ohle and Hirasawa 2000). Japanese firms are on the defensive in practically all important electronic market segments across Asia, and they are now belatedly searching for ways to repair the damage of earlier inaction. Throughout Asia, and especially in China, Japanese electronics firms have failed to develop and exploit unique market positions. In consumer electronics, for instance, Japanese majors like Sony and Matsushita have been caught in price wars with the dominant local players, while in the high-end markets they are lagging behind Korean and European set makers, such as Samsung, LG, and Philips. And for computing and communication devices, Japanese firms seem to be in a bind. On the one hand they have difficulties advancing into the new product, software, and service markets developed by U.S. leaders, for example, the Internet, e-business, advanced microprocessors, and operating systems for an increasing variety of digital devices. On the other hand, for price-sensitive devices, such as laptops and mobile phones, Japanese firms are being squeezed by global brand leaders from the United States, Europe, and Korea, which are outsourcing manufacturing and design to low-cost suppliers of EMS (electronic manufacturing service) and ODM (original-design manufacturing) services. The Japanese are also being squeezed by Chinese set makers that can gain access to the latest product technology, say for smart phones, by licensing reference designs and so-called silicon intellectual properties, the building blocks that facilitate system-on-chip design (Ernst 2005a).

In China specifically, Japanese electronics firms need to differentiate themselves from their increasingly important Asian (primarily Korean and Chinese) competitors. Debates on how to improve their market position emphasize that it is necessary to "maintain non-price competitiveness in areas where differentiation is possible in terms of technology and know-how" (Konomoto 2002, 8). But accomplishing this will not be an easy task. Take China's mobile communications market, which has experienced exponential

<sup>22</sup> Import dependence = imports / (production - exports + imports).

growth, tripling in value between 1998 and 2002. Reflecting China's WTO membership obligations, foreign companies can establish joint ventures in China as of January 2003, for mobile phones, data communications, fixed telephones, and international telephone services. Furthermore, China's government is expected to introduce 3G mobile phone service during 2005.

To succeed in China's telecommunications market, global companies must be willing to share their accumulated experience in providing "integrated solutions" for complex technology systems. According to Davies et al. (2001, 5), "integrated solutions" encompass four sets of capabilities: (1) system integration: designing and integrating components and subsystems into a system; (2) operational services: maintaining, financing, renovating, and operating systems through the life cycle; (3) business consulting: understanding a customer's business and offering advice and solutions that address a customer's specific needs; and (4) finance: providing a customer with help in purchasing new capital-intensive systems and in managing a customer's installed base of capital assets. By and large, U.S. and European electronics firms have sophisticated and proven strategies in place that can provide these four critical support services.

Japanese firms (both equipment vendors and service providers) lag well behind their rivals from the United States and Europe in the penetration of China's communications markets. For instance, NEC and Matsushita Communications Industrial established a joint venture to develop 3G mobile handsets at the end of 2001. But as this venture was about to become operational during 2003, price competition had already drastically increased for mobile handsets. Intense price competition is driven primarily by purely Chinese manufacturers such as Ningbo Bird, TCL, Legend, and others that can provide low-cost handsets, based on key components and reference designs that they have licensed from global platform leaders such as Ericsson, Texas Instruments, and Philips. In short, Japanese firms may have again missed the opportunity to reap first-mover windfall profits.

There are several reasons why Japanese firms have made little headway in penetrating China's emerging "systems solutions" markets. Probably of greatest importance are constraints imposed by the Japanese production system that prevent Japanese electronics firms from sharing "integrated solutions" capabilities. As convincingly demonstrated by Yoshihara (2000, 67–68), Japanese parent companies typically insist on an (almost) exact replication of plant layout, quality control, and management routines in overseas subsidiaries, and they exercise tight control over capabilities required for "integrated solutions." This unwillingness to share the basic ingredients of the Japanese production system with outsiders has become a major stumbling block for Japanese penetration strategies into the China market.

### *Human Resources Management*

Human resources management (HRM) used to be considered a major advantage of the Japanese business model (e.g., Dore 1986; Aoki 1988; Nonaka and Takeuchi 1995; Fruin 1997). Somewhat ironically, it has now become an important weakness. No other factor arguably constrains Japanese electronics firms in East Asia more than their very limited capacity to recruit, develop, and benefit from non-Japanese skilled workers, engineers, and managers. In China, for instance, European and American firms put enormous energy and money into training Chinese staff and promoting them on the corporate ladder. Japanese companies have instead bred "China experts"—Japanese fluent in Chinese who have studied Chinese business practice and behavior. These Japanese managers maintain a firm grip on the business and keep their Chinese colleagues at a distance.

Typically, Japanese companies manage their Asian subsidiaries in a top-down, bureaucratic way. The main objective is to make sure that the subsidiary responds faithfully to orders from Japan, which requires taskmaster managers. Existing organizational structures and incentives do not help to breed initiative and innovation. Such a top-down HRM approach worked as long as the main objective was to exploit low labor costs. Typically, Asian subsidiaries produced lower-end, commodity-type products to a given design, and they provided a narrower range of products and services than in Japan. As a result, it was relatively easy for Japanese expatriate managers to convey the wishes of headquarters' management to the shop floor. The main task was to achieve results, and there was not much need to listen to local subordinates. This system provides very little flexibility, however: without the Japanese expatriates, the subsidiaries cannot function. As Japanese managers make most decisions among themselves, they "often find themselves making decisions based on hearsay (e.g., about what strategies rivals may have adopted) and guesses (e.g., about what customers may be thinking)" (Konomoto 2000, 9).<sup>23</sup>

I experienced a vivid example of this system during an interview in November 2002 with the general manager of a subsidiary of one of the largest Japanese electronics conglomerates in China. As he spoke only Japanese, he brought along two interpreters, one to translate between Japanese and English, to communicate with me, and the other to communicate with his six

<sup>23</sup> This can have disastrous effects. For instance, Sony's critically important release of its PlayStation 2 game console in China was delayed by an embarrassing miscommunication with the Chinese government. Although the Chinese Ministry of Culture classifies the PS2 as a gaming machine, Sony registered it as an electronics product, and hence did not get the required approval in time for the 2003 Christmas season. It took Sony a few weeks to correct its mistake (*Interfax China IT & Telecom Weekly*, January 31, 2004, p. 3).

Chinese middle managers (representing the main functions of the subsidiary, such as sales, production, quality control, R & D, procurement). Under these conditions, communication was not easy and required a quite extraordinary amount of concentration on all sides. Fortunately enough, the Japanese general manager was mild mannered and had a good sense of humor. But what was supposed to be a standard hour and a half interview required almost three hours. Even then, we had not achieved what we wanted to discuss, but all participants agreed to end the interview due to sheer exhaustion.

Such communication barriers are ever present in Japanese subsidiaries in Asia: "The cultural and linguistic gap between expatriate Japanese managers and local employees has obscured the latter's true feelings from the former" (Konomoto 2000, 10), giving rise to misunderstandings and mutual recriminations. This has had a negative impact on local staff morale. In addition, obscure selection criteria for choosing local senior managers, and persistent glass ceilings for non-Japanese managers, de-motivate local employees: "Veteran employees arrange with each other to do the minimum amount of work necessary and wait for instructions rather than volunteer suggestions" (Konomoto 2000, 6). Japanese subsidiaries are especially weak in motivating higher-skilled local employees with scarce skills: "The greater the educational qualifications of employees . . . , the more they tended to be dissatisfied with the company's merit orientation" (Konomoto 2000, 6). Unsurprisingly, such employees tend to search for quick financial gains, especially in the highly competitive skilled labor markets of China.

An important reason for these communication barriers is that headquarters management in Japan fails to examine the motivations of local managers and engineers, which shape the corporate culture of Japanese subsidiaries. This gives rise to a vicious circle. Because of an unwillingness to promote local managers to top positions and because of the operation of a seniority system that inhibits rapid promotion, Japanese companies have found it difficult to recruit and retain quality managers and engineers in their Asian subsidiaries. Japanese managers typically argue that they cannot feel confident about increasing the role of local management "because the skill level of locally recruited managers is low" (JBICI 2001, 68). They continue to have great difficulties in Asia in recruiting top technical talents and local managers. Linguistic barriers are one important reason: the capacity to speak Japanese is often a prerequisite for hiring local managers, but Asian managers prefer to learn English.<sup>24</sup>

<sup>24</sup> For local employees, knowledge of Japanese can be a double-edged sword. On the one hand, it might foster their chances to move up the career ladder, even if other skills are missing. On the other hand, these local employees tend to be used as troubleshooters and frequently get caught in the middle of conflicts between shop floor workers and senior Japanese managers, who often cannot communicate directly. As a result, they find it difficult to concentrate on improving

Another reason is the negative image of Japanese firms as employers of skilled labor. Surveys have shown that most Asian managers consider working conditions and promotion opportunities in U.S. subsidiaries to be far more favorable, placing Japanese subsidiaries at a competitive disadvantage. The rapid expansion of the electronics industry in Asia has offered high-caliber personnel the opportunity to change employers. Extensive job-hopping is the name of the game, a phenomenon that Japanese corporations have found alien.

To address this problem, Japanese electronics firms have adopted a strategy of in-house training of their engineers. Based on a careful selection process, an affiliate in Asia develops a pool of highly motivated operators who are then trained over a period of five to seven years to become (sometimes unlicensed) engineers. In this manner, engineering skills are made firm-specific, reducing the likelihood of job-hopping behavior.<sup>25</sup> The disadvantage, however, is that this requires a lot of time. Most important, this reliance on internal recruitment gives rise to an increasingly serious failure to compete for the best local management and engineering talents across the region, who could provide new ideas and a fresh commitment to upgrade Japanese EAPNs.

Japanese electronics firms recognize that they must drastically change their human resources management practices in East Asia. They are searching for ways to catch up with more open, flexible, and decentralized HRM approaches of global industry leaders, including those of Korean and Taiwanese competitors. Japanese firms know that without such changes in HRM, "any competition strategy they have will prove ineffective" (Konomoto 2000, 1). After years of hesitation, Japanese firms are now eager to tap into East Asia's huge pool of lower-cost managers and engineers to facilitate and accelerate decision making, and to cope with the frantic pace of change in Asian business practices, values, and ways of thinking (JETRO 2003c, 33).

Necessary changes in HRM include the introduction of transparent performance evaluation criteria, adapted to local routines and labor market regulations, and career perspectives that match those of competing U.S., European, and Asian firms. Above all, local staff needs to become an integral part of the decision-making process and of the search for solutions to problems. Furthermore, local managers need to be groomed for and transferred to global positions, like Motorola does, for instance, when it sends the general manager of its Penang subsidiary to manage its newly established Chinese facilities.<sup>26</sup> This high interfirm and geographic mobility of local senior man-

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their specialist skills, while at the same time becoming the objects of jealousy from their local coworkers.

<sup>25</sup> Information provided by Dennis Tachiki.

<sup>26</sup> Incidentally, this general manager, P. Y. Lai, used to head Intel's Penang facility in 1992 when I interviewed him in that position, which indicates the breadth of his exposure to leading-edge management practices by U.S. global industry leaders.



agers that work for U.S. global network flagships contrasts with the Japanese approach of promoting the intrafirm transfer of (overwhelmingly) Japanese managers.

### *R & D Management*

Before the mid-1990s, Japanese corporations undertook little R & D in their East Asian subsidiaries. This contrasts with U.S. subsidiaries whose parent companies increasingly delegated responsibility for product design and development to them, in some instances not only for local but for global markets. By the turn of the century, R & D continued to play a limited role in the EAPNs of Japanese firms, compared to those of North America and the European Union. But as East Asian customers become increasingly demanding, Japanese firms can no longer rely on products designed in Japan to penetrate Asian markets. Instead, localization of design and engineering is necessary to customize products and services and to accelerate speed of response to changes in demand. Successful market penetration in East Asia thus requires a break with established patterns in R & D management.

Yet we have seen that Japanese firms continue to assign a low priority to an expansion of R & D in East Asia. This reflects a defensive bias of Japanese R & D management: intellectual property rights protection and restrictions on royalty payments are the predominant concern. This is in stark contrast to R & D management in American electronics companies where value creation through aggressive commercialization of a company's intellectual property rights now has become the top priority. Leading competitors in the United States, Europe, and Korea have aggressively moved ahead with R & D outsourcing to tap into the region's vast lower-cost pool of human resources and specialized skills. Japanese firms thus need to complement intellectual property rights protection with a consistent strategy of relocating more R & D to major new clusters in East Asia (e.g., Walsh 2003).

However, after a long period of being reluctant to do so, Japanese firms are finally investing in R & D centers, both in China and Southeast Asia, and the focus is shifting from product customization and process adjustment to chip design and software services.<sup>27</sup> However, retaining control over core production technologies remains a dominant concern, reflecting fears that Japan's competitiveness might be eroded by production technologies leaking over-

<sup>27</sup> The number of Japanese R & D affiliates in the region covered by the JBICI surveys has increased by 102%, from thirty-nine (in FY 2000) to seventy-nine (in FY 2002). Yet, this compares with ninety-two R & D affiliates in North America and seventy in the European Union (2002). China again has experienced the fastest growth: the number of Japanese R & D affiliates there increased by 115%, from thirteen to twenty-eight.

seas (JETRO 2003c, 44).<sup>28</sup> This reluctance to penetrate aggressively Asia's emerging technology markets runs counter to important long-term interests of Japanese electronics firms. As Takeuchi (2003, 17) demonstrates, Japanese firms need to increase their revenues from both FDI and technology licensing, in order to compensate for declining export revenues. Some Japanese industry leaders have developed robust leadership positions in key technologies such as system-on-chip design, liquid crystal and plasma displays, and nanotechnology.<sup>29</sup> This should help them to bear the risks of relocating some parts of R & D to East Asia.

### Hybridization—Partnering with Asian Companies

Japanese electronics firms are now searching for ways to readjust their production, distribution, and innovation networks to cope with the opportunities and challenges resulting from the increasingly complex regionalization in a radically changed East Asia. This constitutes a fundamental change in Japanese corporate strategy and organization. At long last, Japanese electronics firms appear ready to accept that they are no longer capable of imposing an unequal flying geese division of labor on East Asia. Equally important, the belief in the innate superiority of the Japanese business model has become an endangered species—Japanese electronics firms are all trying to emulate successful features not only of American and European rivals but also of leading Korean, Taiwanese, and Chinese firms. For the first time, Japanese electronics firms are now also using successful Asian firms, such as Samsung, LG, Acer (BenQ), Hon Hai, Haier, and TCL as benchmark examples to reformulate their regional networking strategies. And they are searching for ways to develop strategic partnerships with emerging new industry leaders in Asia, most prominently with Chinese companies.

Some Japanese firms are belatedly following the partnering strategies pio-

<sup>28</sup> A unifying theme of current Japanese R & D strategies that shows up in many annual reports and strategy papers is the concept of "black box" technologies. Matsushita defines them as technologies "that cannot be easily imitated by competitors because they are (1) protected under intellectual property rights, such as patents; (2) made of complex materials, processes, and know-how that cannot be copied; or (3) made using unique production methods, systems or control technologies" (Matsushita Annual Report 2003, 7). And Sharp, one of the most innovative Japanese electronics companies, believes that protecting technologies through patents alone is insufficient, and that the key to success is to maintain exclusive control of manufacturing technologies by "concealing them more assiduously than product technologies" (JETRO 2003, 44).

<sup>29</sup> For instance, NEC, the leader in R & D among the nine major Japanese electronics corporations, is a world leader in nanotechnology research, having invented the carbon nanotube that will be the basis for extremely lightweight computer display screens and miniscule and orders-of-magnitude more efficient semiconductors.

neered by such global industry leaders as Motorola, Intel, IBM, Cisco, Alcatel, Philips, Siemens, Infineon, as well as Korea's Big Four (Samsung, LG, SK Telecom, and KT), Singapore's Temasek, and Taiwan's industry leaders.<sup>30</sup> Particularly instructive is a partnership between Sanyo and Haier (announced in January 2002) that shows signs of a radical break with the tradition of unequal ("vertical") forms of collaboration, where the Japanese partner dominates, to a "horizontal" relationship among equals. As the first attempt by a major Japanese electronics company to establish a comprehensive business alliance with a Chinese industry leader, the Sanyo-Haier agreement has been hailed by METI as the new "standard for Japan-China business relationships. . . . Rather than antagonizing Chinese players, Japanese businesses should team up with them to share profits in mutual markets."<sup>31</sup> But this agreement has also encountered "an enormous number of protests from various sides,"<sup>32</sup> indicating the still substantial resistance of Japanese firms to changes in their China strategies.

The Sanyo-Haier agreement has four components: (1) sales of Sanyo products in China under Sanyo and Haier brand names through Haier's distribution network; (2) sales of Haier products in Japan through a joint venture in Japan, with Sanyo owing 60 percent and Haier 40 percent; (3) a new Sanyo factory to be built next to Haier's huge refrigerator factory in Tsingtao, to supply Haier with Sanyo's leading-edge compressors; and, most important, (4) technological collaboration across a broad range of key components.

For Sanyo, important benefits include privileged access to Haier's vast sales network in China, the largest of any electronics company.<sup>33</sup> Additional attractions are Haier's market leadership across a broad product portfolio;<sup>34</sup> Haier's state-of-the-art production system; and, most important, a highly motivated and well-trained workforce (with a high share of engineers and managers trained in the United States) that is exposed to strictly enforced performance-based evaluation and incentives. Sanyo's CEO, Satoshi Iue (the son of the company's founder), was greatly impressed during an earlier visit to a massive Haier Group plant that is four times larger than his company's largest factory.<sup>35</sup> He was particularly impressed by Haier's ability to purchase

<sup>30</sup> Although large Taiwanese firms such as Hon Hai, Acer, and Mitac are constrained by government regulations, they have been highly innovative in developing indirect and informal partnerships with Chinese firms.

<sup>31</sup> "Sanyo-Haier Group Alliance Offers Lucrative Foothold," *Nikkei Weekly*, January 15, 2002.

<sup>32</sup> "China Alliance Brings Opportunity, Problems," *Yomiuri Shimbun*, September 23, 2002.

<sup>33</sup> Haier's sales network consists of forty-two subsidiaries, nine thousand sales locations, and almost twelve thousand service locations.

<sup>34</sup> In addition to refrigerators, home air conditioners, washing machines, and vacuum cleaners, in which Haier is the market leader, the company also has moved aggressively into higher value-added digital consumer and communication devices.

<sup>35</sup> *Asahi Shimbun* 2002a. "Deal Sees Sanyo, Haier as Equals," January 10, 2002.

the sort of expensive, leading-edge machinery (primarily from European suppliers) that is beyond the reach of Japanese manufacturers, due to their financial difficulties.<sup>36</sup>

For Haier, in turn, the main attraction has been Sanyo's willingness to sell and support its products in the Japanese market, a first in the notoriously closed Japanese market. Haier understands that it will take time to overcome the resistance of Japanese customers, because of the persistent "low quality" image of Chinese products. But it expects to use Sanyo's decision to support its products in the famously difficult Japanese market to enhance its brand recognition in other markets, including the increasingly demanding Chinese market. Although several leading Japanese firms had been courting Haier, it appears that no other company was willing to follow Sanyo's offer of a comprehensive business alliance that includes broad-based technological cooperation.

Arguably the most interesting development is a new sense of urgency on the part of Sanyo managers to make a serious effort to overcome communication problems with their Chinese counterparts, and to adjust to modern Chinese business practices. Symptomatic is the approach taken by the thirty-five-year-old president of the Sanyo-Haier joint venture.<sup>37</sup> He admits that this comprehensive business alliance is "a new type of project that Sanyo has no experience with. Dealing with the Chinese style of business creates problems I've never faced before, but . . . I am comfortable with it and enjoy this challenge." To illustrate this, he told the following story:

The Chinese way of starting business is to take orders regardless of their capabilities to fill the orders at the time. When they are asked to do something, the Chinese normally respond by saying, "It can be done." This means an absolute commitment in Japan, but in China it is used to express one's eagerness to do business. . . . In such a situation, the Japanese would respond by saying, "We'll take it back to our office to determine whether we can accept the job." In the beginning, we trusted our Chinese counterpart's words and began doing our part. After a while, we found out our partner could not live up to its part of the agreement. *That was our mistake — we should have been aware it was the Chinese way of getting orders, and we shouldn't have taken their first response as a full commitment. . . . I have finally come to understand that they are not malicious. . . . I admire the eagerness and aggressiveness of the Chinese toward business. The Japanese tend to be too humble and uncertain when doing business. The Chi-*

<sup>36</sup> Machine-tool orders placed with Japanese firms totaled ¥790 billion in 2001, down 19% from a year earlier. As recently as 1997, this figure exceeded ¥1 trillion (METI figures, quoted in *Asahi Shimbun* 2002b. "Machine Tools: A Shrinking Domestic Market," February 6, 2002).

<sup>37</sup> Toshiaki Iue, president of the Sanyo-Haier joint venture and son of Sanyo's CEO, as quoted in "China Alliance Brings Opportunity, Problems," *Yomiuri Shimbun*, September 23, 2002.

nese are more determined, and I think that has led to their recent economic growth. (emphasis added)

This chapter has demonstrated that, far from withdrawing from East Asia, Japanese corporate capital in the electronics industry now critically depends on the region, not only as a global export production base but also as a major and increasingly sophisticated market for its products, services, and technology, and as a source of lower-cost knowledge workers. This explains why Japanese electronics firms are searching for ways to expand and upgrade their regional distribution, production, and R & D networks, with a particular focus on China. These networks will continue to affect Asian regionalization patterns, but their impact will now differ from earlier periods. I have shown, for instance, that Japan's trade links with Asia have shifted from surplus to deficit, and that important changes have occurred in the composition of traded products. Japanese firms continue to be a major source of components and machinery. They also continue to play an important role as providers of shop-floor management techniques for Asian suppliers (e.g., quality control and supply chain management). But in many other areas of management, Japanese firms now play second fiddle.

We have seen that Japanese firms are finding it difficult to make the adjustments in organization and management that are necessary to expand and upgrade their regional networks. I have highlighted five peculiar features of the Japanese network management model in East Asia that once may have been strengths but now have turned into systemic weaknesses: persistent diversity of organization; dispersed location driven by risk minimization; Japan-centered sales destination and a neglect of local market characteristics; a limited capacity to tap the creativity of non-Japanese skilled workers, engineers, and managers; and a reluctance to outsource R & D.

I have also identified equally important *exogenous* forces. In the electronics industry, firms of diverse nationality compete and collaborate within multi-layered global "networks of networks" of marketing, production, and innovation. This has forced Japanese firms into dense interaction with a multitude of firms from the United States as well as from East Asia's leading electronics exporting countries. A second critical exogenous force has been the rise of China as a global export production base, as a sophisticated growth market, especially for mobile communications and digital consumer devices, and as a new source of R & D and innovation. Both forces have produced increasingly complex processes of regionalization. And they are both unlikely to fade away. Increasingly, global networks are being extended beyond manufacturing into the production of knowledge-intensive services, such as software, information services, engineering, product development, and research (Ernst 2005a), creating ever more fine-grained patterns of East Asian specialization. And

while periodic hard or soft landings may slow down China's growth, the country is unlikely to lose its role as an engine of regionalization (Ernst, Guerrieri, and Iammarino 2005).

To cope with the new challenges they are facing in a radically changing East Asia, Japanese firms are now beginning to emulate successful features of Korean, Taiwanese, and Chinese business models. Belatedly, some Japanese firms are now attempting to develop more equal partnerships with emerging new industry leaders in Asia, primarily from Greater China. This outlier behavior may act as a powerful catalyst for change. The key to successful alliances with Asian partners is hybridization of business organization beyond national models, where Japanese firms adopt successful features of East Asian firms. In this sense, Asianization of production networks may be in the process of superseding in the longer run the battle between Japanization and Americanization.