

Distinctive Characteristics of China's Path of ICT Development: A Critical Analysis of Chinese Developmental Strategies in Light of the Eastern Asian Model¹

YU HONG

University of Illinois at Urbana-Champaign

Although China roughly follows the developmental path of Japan and the Four Asian Little Tigers [Taiwan, Singapore, Hong Kong and South Korea] to pursue an export-led industrialization in the global informationalized economy, the timing, agents and modes of China's information and communications technology (ICT) development are distinctively different from the Eastern Asian model, and therefore, China may not repeat the success stories of these economies. By comparing China's ICT development with these Eastern Asian precedents, this paper argues that because the state introduced a massive infusion of foreign direct investment (FDI) to jump-start China's ICT production and exports in the early 1990s, this mode of development has established the absolute domination of foreign capital in ICT production and exports. China's infant ICT industries have been compelled into global market competition, and the premature entry of China's infant industries has limited their development space from early on. Being squeezed by globalized market competition and hindered by financial and technological barriers, infant domestic enterprises do not enjoy an autonomous space to develop their R&D and market capacities and thereby could only hope to excel in the large-volume and low value-added stage of final production. As part of the global chain of production, domestic firms are specialized in handling large volume and low value-added production in global economy. Meanwhile, they lack financial, technological and marketing capacities to create a global reach and have to face an underdeveloped domestic market. It is uncertain whether China, while facing a different and difficult external business environment, can bypass its current position of low-tech assembly operation.

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Yu Hong: yuhong@uiuc.edu/yuhonguiuc@gmail.com

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Introduction

In the post-War global economy, the successful rise of Japan and the Four Little Tigers is largely attributable to "their initial participation in global electronics to jump-start their advanced industrialization via export-led growth and industrial upgrading" (McKay, 2006, p. 31). However, not being technological determinist, scholars have given more credit to national developmental policies than technological changes to account for the success of these economies. In particular, to understand how these newly industrialized countries bridled transnational forces to the benefits of national development, scholars have focused on the timing, agents and modes of their global participation. For example, Charles Gore analyzed, in the globalization context, that the East Asian model provides "how-to" tips for bridling transnational market forces to the benefits of national development. Specifically, the East Asian model promotes "selective integration," "strategic protectionism" and "deliberate efforts of upgrading comparative advantages" (Gore, 2000, pp. 796-798).

In the 1990s, when China accelerated its re-entry into the global economy, the ICT has spearheaded this movement. China has not only entered the global division of labor by receiving downstream ICT production relocated from Taiwan and Hong Kong, the state has also uplifted nationalist protective mechanisms against foreign direct investment by transnational corporations. By pursuing a FDI-driven and outward-looking mode of ICT development, the Chinese state wishes to achieve national industrialization and climb up the global value-added chain. However, although China roughly follows the developmental path of the Eastern Asian counterparts to pursue an export-led mode of industrialization in the informationalized global economy, this paper points out that the external environment, agents and timing of China's ICT development are distinctively different from the East Asian model. By focusing on the historical and political-economic traits of China's ICT developmental strategies and consequences, this paper argues that China's ICT development is distinctively different from the Eastern Asian model and therefore may not repeat the success stories of these Eastern Asian economies.

ICT Development in Global Economy

Since the Seventh (1986-1990) and Eighth Five-Year Plans (1991-1995), the state has put information and computer industry in a strategic position. What really distinguished this period of ICT development was the broader process of transition from planned economy to market economy. Since the late 1980s, China has undergone an epochal transition from the Maoist socialism to the Deng Xiaoping Era of pragmatism and economic reform. The overarching change of the Chinese state since the Cultural Revolution lied in its shifted orientation of prioritizing economic development over socialist considerations, which has legitimized adopting capitalist market techniques for economic development. Against this backdrop of establishing market economy, market demands in place of centralized planning were believed to be the only driving force of ICT development in the party's developmental theory. In 1984, the State Council put forth the "Development Strategy for Our Country's Electronics and Information Industry." This document called for wider application of computer technologies in various economic and social spheres (Chen, Dec 31, 1991). In 1988, the state further decreed to restructure China's computer industry for both domestic and international markets (Sheng, Dec. 14, 1993). Deng Xiaoping's 1992 South China Tour

was a decisive political moment of endorsing the systematic construction of market economy, including the computer industry. In 1993, a new Ministry of Electronics Industry was established. According to the then-minister, Hu Qili, the new ministry was designated to promote commercialization of technology and to nurture an outward-looking electronics industry (J. S. Xu et al., 1993).

Moreover, it was believed that because an underdeveloped domestic market could not be improved soon enough to allow for speedy expansion of China's computer manufacturing capacities, international market access would provide the space for developing economies of scale and therefore re-entry into global market appeared to be an imperative step for China's ICT development. So, while part of the strategy was still about nurturing a larger domestic market for computer technology, state policy was increasingly geared toward promoting an export-oriented mode of development. According to experts from the computer and microelectronics development research center of the Ministry of Electromechanics, during the Eighth Five-Year Plan period, while the total national demands for computers were estimated to be as many as 500,000, the South Eastern region alone was required to produce 300,000 to 400,000 computers. Due to the potential overproduction, enlarging the scale of exportation became necessary (Sheng & Cao, March 24, 1992).

Indeed, rapid technological changes, increased central positioning of information technology in global capitalist development, and speedy expansion of market power of Western multinationals concerned the Chinese state that China would lag further behind, if not partaking into global economy. Within the contemporary political economy of communication, ICT is the forerunner of the global expansion of capitalism. Since the post-War and accelerated in the 1970s, global economy has developed toward informationized capitalism, i.e., systematically restructuring capitalist economy around these new technologies and turning communication-related activities and demands into a major growth outlet for capital (Schiller, 2007). For example, in the process of global expansion of business power, leading firms all started to heavily increase IT expenditure in order to gain global reach and control in procurement, production, marketing and R&D. Meanwhile, industries concerned with producing information technology hardware, software, services and content have rapidly emerged to become the central growth zone of global capitalism (Nolan, 2001, p. 136).

Therefore, in order to carve out a stronger position in global market economy, Chinese leaders decided in the early 1990s that China must focally strengthen ICT. Hu Qili quoted Jiang Zeming saying that

"exploring international market and establishing the mechanism of allowing external forces to instigate internal development already emerge as a major aspect of our problem. The speed of our country's development in electronics industry and that of technological improvement would be slowed down and the gap with the international level would widen, if we do not speed up on our re-entry into global market economy" (J. S. Xu et al., 1993, pp. 2-3).

After all, it was widely believed among Chinese leaders that it was prerequisite to enter the global market to gain access to the latest technology and industrial investments necessary for ICT development. As a cornerstone of contemporary globalization, modern information and communications technology has enabled transnational corporations to coordinate spatially scattered production, thereby allowing them to take advantage of low production costs in other parts of the world. Actually, ICT manufacturing was one of the few sectors to undergo a systematic production globalization (McKay, 2006, p. 31). This trend of globalizing ICT production presented a major juncture of restructuring global divisions of labor, which made Chinese leaders believe that China was given a right moment of re-entering the global economy. Since the 1970s and 1980s, rising wages, labor shortage, falling market prices and massive overproduction have started to plague major developed countries and regions in the world, including the U.S., Western Europe and Japan. To handle these situations, developed countries and regions started to adopt several strategies, including widely implementing production automation, relocating manufacturing facilities to developing countries for labor-intensive and low-tech operations, or importing large volumes of foreign labor. In this context, several Eastern Asian regions, including Taiwan, Hong Kong, Singapore and South Korea, became major outsourcing bases for Western capital.

However, as wages and production costs hiked again in these Eastern Asian regions, Southern Asian and Mainland China became new possibilities for capital relocation in the 1990s. Not only did Taiwan manufacturers, major computer hardware manufacturers from developed countries, including the U.S., Germany, Italy, Switzerland, France, Canada, Japan and South Korea also entered China's production of computer and telecommunications between 1992 and 1994 ("competitive situation," Feb. 1, 1994). Therefore, from 1990 onward, mostly large-scale foreign firms started to relocate the labor-intensive assembly stage of component production to Mainland China and then re-export the assemblies to their home plants for final testing and marketing under their own brand names.

Distinctive Characteristics of China's Path of ICT Development

In this context of global restructuring and expansion of ICT production and market, China follows the East Asian model of state-led industrialization, and wishes to repeat the success stories of Japan and the Four Little Tigers, i.e., Taiwan, Hong Kong, Singapore and South Korea. However, different from the East Asian model, China faces a more difficult international business environment, as it is censored from using outright protective mechanisms in the WTO era, and faces market challenges of how to foster indigenous corporate power in a FDI-dominated ICT industrial structure.

1). International Business Environment

China's re-entry into global economy has taken place in the context of unprecedented concentration of global business power. So, even though Japan and the Four Little Tigers all pursued industrialization in the framework of globalization and achieved considerable success in creating globally competitive large-scale business in the 1960s and 1970s, it is far from certain whether China would survive the competition from global giants. As Peter Nolan pointed out, the international business environment within which China hopes to build globally-competitive corporations is different from, and

even more difficult than that which confronted Japan and the Four Little Tigers in their catch-up efforts in the '60s and '70s (Nolan, 2001, p. 189).

Actually, since neoliberal policies and practices took hold of major Western countries and international institutions in the 1980s, trade liberalization, liberalization of capital flows, deregulation of national financial systems, privatization, collapse of communism, mergers and acquisitions, and the advent of information technology have all contributed to "the epoch of unprecedented concentration of global business power." Global giants in one sector after another underwent massive restructuring of assets, accelerated R&D and IT expenditure, spread production centers across the world and built global networks of brand-building (Nolan, 2001, pp. 100-102). As documented by Peter Nolan, after the mid-1980s, the extent of industrial concentration on the global level increased significantly. The ICT sector is no exception in this frenzy expansion of global business power. Despite the fact that the ICT sector is relatively young, this sector has undergone "a process of explosive concentrations" (Nolan, 2001, p. 134). By the late 1990s, Western transnational firms from IT hardware through to media have emerged, and their shares of the global market were even more dominant than in the traditional industries. In 1998, the top 10 companies accounted for 70% of the \$334 billion global market in computers and 86% of the \$262 billion global market in telecommunications (Nolan, 2001, p. 137). Because China need to develop ICT in the midst of consolidated global IT giants, it is more difficult for nationalist intentions and interests to succeed in such a global business environment.

2). *"Open-Door" Industrial Policies*

In the context of the rise of neoliberal globalization in the '80s and '90s, the Chinese state has self-censored itself from flaunting strong protective mechanisms against foreign capital. However, back in the '60s and '70s, both Japan and South Korea were able to carefully control imports and massively protect their domestic markets (Sridharan, 1996, p. 35). For example, according to Marie Anchooguy, in the '60s and early '70s, the Japanese government was able to deliberately delay the entry of IBM in order to avoid dependency upon foreign makers for computer technology. Import substituting tactics, such as acquiring basic patents from foreign makers in exchange for their right to produce in Japan, giving small quotas for domestic sales to foreign makers and requiring domestic firms to purchase Japanese computer products, all enabled the Japanese government to create a friendly domestic environment for indigenous firms (Anchooguy, 1989, pp. 19-36). It is safe to say that production for the domestic market provided an incubator for Japanese indigenous firms in the early years of development. In the late 1970s when Japan officially opened its computer market, domestic firms were considerably strengthened (Anchooguy, 1989, p. 135).

However, in the globalization era of free market capitalism, the Chinese state already gave up outright protectionism before indigenous firms gain any significant market strength or technological advance. Indeed, domestic policy changes in the People's Republic of China (PRC), which can be summarized in the official rhetoric of "grabbing the advantageous opportunity of massive global capital relocation to China," not only have accelerated but also decided the terms of China's participation in the informationized global economy. Since the late 1980s, the Chinese government has increasingly adopted the neoliberal policy framework. The major form of China's re-entry into global economy was through liberating foreign direct investment. According to Wang Jianzhang, director general of the Department of Overall Planning of the

Ministry of Information Industry (MII), FDI liberation in the ICT sector has passed several distinctive periods. Before 1986, foreign capital was not a major economic driving force. Foreign trade was organized by unified planning and was only meant to supplement the country's complete industrial structure. 1986 was the watershed year when the state started to allow foreign direct investment via joint ventures and contractual agreements (Pecht et al., 1999, p. 82). In 1986, the Chinese government announced the Decision of Encouraging Foreign Investments, which promised preferential investment policies for "export processing foreign-invested enterprises and high-tech foreign enterprises."

Indeed, the state's intention of letting massive infusion of foreign capital to jump-start ICT production and exports was clear. Into the 1990s, the state cancelled most of its tariff protections of indigenous ICT manufacturers from foreign competitors, which brought about the massive entry of multinationals and prematurely compelled fledgling indigenous industries into global competition (Yi, Oct. 29, 2001). Especially, by 1990, most ICT products were included in the Directory for Foreign-invested Industries for tax refunds, reductions and exemptions (J. Z. Wang, Dec. 25, 2002). From 1991, even more preferential terms were provided to make China a cost-effective location for multinationals to outsource export-oriented productions. According to the Managing Rules of Imports and Exports by High-Tech Industrial Parks that took effect in 1991, imported manufacturing facilities and equipments would enjoy zero tariffs, raw materials and manufactured parts imported for export-oriented production would be exempt from the importation permission procedure, and locally manufactured products would enjoy exemption of export tariffs (*"Managing rules,"* Jan. 7, 1992). Under this FDI-friendly policy framework, China's reentry into global market sped up. At the end of 1991, more than 2,600 foreign-invested enterprises were established, 1,051 of which were introduced in the year of 1991. By the end of 1997, the electronics industry contracted foreign investments worth US\$10 billion and actually utilized US\$8 billion. By 1997, utilized foreign capital made up 40% of the total industrial investment, and its percentage continued to increase year-on-year afterward (Luo et al., 1999, p. 345).

According to the of Information Industry (2000), at the eve of China's accession into the World Trade Organization (WTO), the state further set the goal of making China the "top export processing base" in Asia and even in the world. First of all, the *2002 Directory for Foreign-Invested Industries* increased the number of products that foreign capital would be rewarded for investing from 186 to 262, which included 29 items in the electronic and telecommunication equipment manufacturing sector. The number of products that foreign capital would be restricted or prohibited was also reduced from 112 to 75, which included color televisions, cameras, video recorders, mobile communications systems, GPS and satellite communication equipment (Lou et al., 2003, p. 14). Secondly, following the International Technological Agreement (ITA), China eliminated import tariffs for most of ICT products in 2002, and would eliminate all import tariffs for all semiconductor products, computer-related and telecommunications-related products in 2005. According to Long Yongtu, chief negotiator of the Chinese government to WTO, zero tariffs for manufactured products and for export processing trades were imperative for achieving the goal of "making China a node of multinationals' globalized productions" (Quan, Nov. 29, 2004). Thirdly, in newly revised Sino-Foreign Equity Joint Ventures Law, Sino-Foreign Cooperative Joint Ventures Law and Law on Foreign-Capital Enterprises, China also lessened restrictions over foreign-invested enterprises, in the foreign exchange balancing requirements "where an enterprise has the level of imports linked to the value of its exports in order to maintain a net foreign exchange rate," and in the local content requirements "where governments require foreign enterprises to use or purchase domestic products," and in the limits over

foreign-owned shares" (Lou et al., 2003, p. 14). Overall, the WTO accession introduced further import liberation, expanded the access of foreign firms to domestic market, and reduced the requirement that would require localization and domestic linkages.

As a result of this friendly foreign investment environment, foreign capital has been a major source of capital since the 1990s. According to *China Yearbook of Electronics Industry*, between 1999 and 2002, the total industrial investment in the ICT sector by the government and domestic enterprises was around 180 billion. Whereas, during the same period of time, foreign investment in the sector amounted to US\$70 billion, which was twice as much as the above-mentioned domestic investment. Up to 2003, the sum of foreign investment has passed US\$100 billion, and contracted foreign investment was around US\$75 billion and paid-up foreign capital was US\$40 billion (C. L. Liu, et al., 2004, p. 261).

3). *FDI Dominance in ICT Production and Exports*

In contrast to Japan and South Korea whose export-led mode industrialization had fostered international competitiveness of indigenous firms, China's growing ICT exports have rather enriched and strengthened foreign-invested firms. To start with, the Seventh Five-Year Plan period (1986-1990) witnessed a policy shift from import substitution toward export orientation. Indeed, this export-led growth path had helped newly-industrialized Asian economies, such as South Korea and Taiwan, to achieve industrialization through exporting manufactured products, and also enabled them to "continually move up the value chain to products of increasing technical sophistication" (Chibber, 2003, p. 35). However, due to differences in the timing and agent of export-led industrialization, China's export-led mode of industrialization is rather dominated by foreign-invested enterprises and excludes domestic enterprises.

As Vivek Chibber pointed out, the East Asian model of export-led economic growth was not equivalent with the adoption of free trade (Chibber, 2003, p. 35). In South Korea for example, through state controls, FDI-led exports were limited in components assembly, and domestic firms dominated production and exports of consumer electronics (Sridharan, 1996, p. 57). In the 1970s when South Korea shifted from import substitution to export-led growth, the state practiced industry-biased protectionist policies throughout the 1970s and 1980s until domestic firms became international competitive in various consumer products. As a result, domestic Korean firms managed to dominate consumer electronics output and exports (Sridharan, 1996, p. 63). As domestic firms were the major agent of export-led growth of consumer products, consumer electronics provided a springboard for domestic players to accumulate competencies before moving into production of technically more sophisticated products. In other words, the exports promotion drive in South Korea helped domestic firms to develop comparative advantage in international market.

However, in contrast to South Korea in the comparable stage, the Chinese state used foreign direct investment to jump-start the export-led ICT development, even before infant Chinese ICT industries gained adequate domestic and international competitiveness. In particular, preferential trade policies have created an unequal play ground for foreign and domestic players. Since 1998, the rate of refunding taxes for exported commodities has been raised from 6% to 15%, and 10 electronic and information commodities even enjoyed a 17% tax refund rate (Lou et al., 2003, p. 14). However, because foreign-

invested enterprises have dominated production and trade for international markets, foreign-invested enterprises have been the largest beneficiaries of these rewards. According to a MII report, foreign-invested ICT companies have constituted a dominant and the most profitable segment of the whole sector. By 2005, a total of 6,480 foreign-invested ICT enterprises were established, which made up 40.4% of the total number of all ICT enterprises in China (Department of Economy System Reform & Economy Operation, April 4, 2006). While these foreign-invested ICT enterprises comprised 77.4%, 76.5% and 77.1% of the whole sector, respectively in terms of sales income, profits and industrial added values, the amount of tax contributed by the foreign-invested ICT enterprises only made up 42.3% of the total (Department of Economy System Reform & Economy Operation, April 4, 2006). Moreover, because of the fad of building industrial parks and high-tech parks, local governments competed for foreign investments by pledging preferential policies with "no up limits" (Ren, June 20, 2003).

So, in comparison with South Korea in the 1970s and 1980s, what distinguishes China's ICT development is absolute FDI dominance in industrial output and in exports. Having prematurely entered global market, fledging domestic firms were compelled to become agents for multinationals when multinationals attempted to localize their operations in China in the early 1990s (Qun, April 5, 1994). Domestic firms were significantly disadvantaged in the export-led development and had to avoid head-on competition with global giants which had developed new technology, had access to far greater funds, and had a massive advantage in global sales networks. As domestic firms confronted these entry barriers, foreign-invested enterprises would continue to be the major agent of export-led industrial growth.

4). *Indigenous Catch-up Process Amidst Global Competition*

The roll-back of state protection and support has left significant impact on the catch-up efforts and modes of capital accumulation of indigenous firms. To start with, China's computerization drive began on the import substitution basis. According to Yang Tianxin, former deputy director of the Department of Computers and Informatics in the Ministry of Electronics Industry, as early as in the Sixth (1981-1985) and Seventh Five-year Plan (1986-1990) periods, the state allocated limited amounts of investment to the computer industry (Li, Aug. 13, 2001). Between 1986 and 1994, the state provided subsidies for domestic manufacturers in software, IC, computer and numerically-controlled exchange machinery production, which entailed exemption of the valued-added tax, deduction by half of the income tax, retention of 10% of the sales income for R&D funds, and exemption of import tariffs for crucial manufacturing equipments. According to Yang, even though governmental investments were limited, these state policies during the import substitution period shielded the nascent computer industry from the outside world and allowed all-around development of this industry. By the Seventh Five-year Plan when import substitution was still the dominant policy framework, this favorable environment had helped creating a sufficient PC manufacturing capacity to meet domestic needs, with the indigenization rate reaching 60% and the domestic market share reaching 60% by 1991 (C. G. Wang, Nov. 18, 1991).

Since the late 1980s, domestic policy has increasingly shifted away from protecting the nascent domestic industry to selectively relaxing state controls on the one hand and to cultivating market opportunities for domestic commercial players on the other. The four-item subsidy was cancelled in the early 1990s. In 1995, because domestic firms suffered constricted means of investment, Yang Tianxin in

1994, publicly encouraged domestic firms to seek alternative investment channels, including foreign, local, collective and private investments (Yang, April 25, 1995). The rollback of state support was partially responsible for the domination of foreign capital in the ICT. Between 1990 and 2002, while the total investment from both government and indigenous companies accounted for \square 180 billion in the ICT sector, foreign investments in the sector reached US\$70 billion (J. Z. Wang, Oct. 25, 2002). As a concerted result of the shortage of domestic capital and massive influx of foreign capital, the market share of domestic firms shrunk considerably in proportion to expanding multinationals in the early 1990s.

In addition to the rollback of state investment, the state also decentralized and deregulated its used-to-be monopolistic control over foreign trade and granted the self-managing right of foreign trade to individual state enterprises in 1997 and private enterprises in 1998 (Teng & Ma, Jan. 11, 1999). As Pecht et al. pointed out, during the pre-reform period, foreign trade was unified to "jointly deal with the outside world" (Pecht et al., 1999, p. 82). Yet in the reform era, by granting domestic enterprises the self-managing right of deciding the volume and structure of foreign trade, this policy was meant to encourage the transformation from planned economy to market-oriented production, and to foster and strengthen market-oriented domestic firms. Besides, the state also expected domestic firms to achieve economies of scale by being the original equipment manufacturers for multinationals. As early as in 1994, the state already encouraged domestic firms to cater to international markets, and asked them to build a trade structure of importing upscale computers and exporting downscale computers (L. Y. Liu et al., Jan. 4, 1994).

However, this export-led mode of ICT development has generated a huge structural gap between foreign and domestic enterprises in foreign trade because the former possesses exclusive overseas sales networks. In 1995, for example, domestic firms exported US\$606 million exports consisted mostly of low-tech and low value-added peripherals, whereas foreign-funded firms exported US\$2.194 billion worth of exports. In contrast to the deregulatory drive of the Chinese state, both Japan and South Korea consolidated existing trading companies after its industrial policy shifted from import substitution to export-led industrialization. By using their organizational economies of scale to overcome high transaction costs in international marketing and sales, the consolidated global trading firms in Japan and South Korea considerably enhanced the international competitiveness of smaller indigenous firms (Sridharan, 1996, p. 61).

In the framework of globalized market economy, China's fledging domestic firms have been compelled to enter global market competition, which shapes the modes of capital accumulation of indigenous firms. Usually, domestic firms initially rely upon their capacity of conducting low unit-cost and large volume final product assembly to provide original equipment manufacturing services (OEM) for international brands. After accumulating some production and business capacities, domestic firms use the competences they have already accumulated in OEM exports as a springboard to start their brand names in the domestic market.

However, being squeezed by global market competition and hindered by financial and technological barriers, the infant domestic sector does not enjoy an autonomous space to develop their R&D and business capacities. As a result, the premature entry into global competition has compelled

domestic firms to disproportionately rely upon low value-added comparative advantages, such as price tactics and sheer large-volume production, in order to avoid head-on competition with global giants. In the exports market, China's low position of final product assembly is largely defined by the global chain of production controlled by multinationals. In the domestic market, Chinese firms strive to make breakthroughs in consumer electronics, including electronic household appliances, PCs and cell phones. This low-tech and low value-added division of labor could possibly entrench domestic firms from pursuing capacities-building and catch-up strategies in the long run.

Moreover, although the state has hoped that China would translate foreign-imported capital, technology and market power into indigenous capacities in the framework of globalization, many industrial indicators show that, despite massive marketization and opening-up, indigenous R&D and production capacities are not making as much progress as expected. In the 1990s, imports of high-tech products still overwhelmingly outweighed high-tech exports. The rate of commercializing high technology was 25% and the rate of industrializing high technology was as low as 7% (Xin, April 23, 1998). In other words, foreign capital didn't prepared domestic firms with high-end design and production capacities. It has proved very difficult for domestic players to escape the low position in the global production structure and to gain some sustainable competitiveness.

The indigenous computer industry is a major industry directly shaped by China's re-entry into global economy, and it has faced many dilemmas and pitfalls of the FDI-driven and globally-integrated mode of industrial development. From 1990, the state no longer required import permits and lowered tariffs for computer products. As a result, in the 1990s, major PC multinationals established joint ventures or solely foreign-owned enterprises in the mainland and formed large-scale export-oriented PC manufacturing bases in coastal regions. In this environment, domestic PC makers started to conduct subcontracted mass production for foreign firms as original equipment manufacturers (OEMs). Relying upon foreign-imported automated machinery and propelled by large-volume orders for parts and components from overseas, the Chinese computer industry has expected to develop economies of scale. Meanwhile, domestic PC makers also managed to break into the personal computer market by providing their own brand names of economical products, while foreign PCs still dominated the upscale market of commercial and institutional users. In 1996, domestic PC producers initiated four price wars, which won them a major market share.

However, market saturation soon plagued domestic manufacturers for several reasons. On the demand side, apart from the relatively small size of affluent urban residents, the majority of the Chinese population in the countryside cannot afford ICT products. On the supply side, the majority of domestic PC manufacturers are only capable of semi knock-down (SKD) or complete knock-down (CKD) operations, which means that domestic firms undertake assembly processes for unfinished PC products and rely upon imports of key technology and components including CPU and hard disk to assemble their PCs.² In other words, because most of the existing players are cheap assembly plants with no production capacity of

² CKD and SKD refer to the practices of selling knocked down kits to foreign affiliates in order to finish the assembly process. Other benefits of this practice include avoid high import taxes and/or receive tax preferences for providing local employment.

high-end components and parts, they could not build an high enough entry barrier to block other traditional household appliances manufacturers from rushing into the low-end yet lucrative market. In 1997, a dozen domestic enterprises, many of which used to specialize in household appliances production, newly entered the PC market. By 1998, the domestic PC market already contained more than 100 PC manufacturers (Yue, July 2, 1998).

Without significant international market shares, underdeveloped domestic market and oversupply of manufacturing capacity have become a very keen problem for domestic PC manufacturers. In 1996, the utilization rate of the PC manufacturing capacity dropped from 70% to as low as 30% (Xie, March 1, 1999). In 2004, Lou Qinjian, vice minister of MII, advocated domestic ICT manufacturers to "go out" in order to bypass protective trading barriers and to reduce overproduction in some sectors of the domestic market (Lou et al., 2004). The 2005 edition of the Big Corporation strategy also encouraged major corporations to globalize their production, operation and sales. However, on the global side, mass production of PCs has already caused shrinking profit margins. According to International Data Corporation, the average price for PCs dropped 8.5% in 1997 and was expected to drop by 8% in 1998 (IDC, Oct. 5, 1998). Multinationals such as Compaq and IBM have been transforming themselves from purely PC manufacturers into Internet-related technology and service providers (D. Y. Xu, May 3, 1999).

5). *Selective Import Substituting Measures*

Although the state withdrew in several aspects, the state selectively continued import substituting initiatives. As the market economy deepens, the state came to realize the pitfalls of FDI-driven industrial development, in both domestic and international markets, various state measures have been resumed in order to bridle the gap between transnational market forces and indigenous firms. However, in the WTO era, the Chinese state could only resort to subtle and posterior import substituting measures.

In the 1990s, the state heavily invested in a series of "Golden" projects to expand domestic markets for computer and telecommunication technology. During the Eighth Five-year Plan period, as a result of the deliberate government investments in infrastructures, computerized management and information networks were constructed in various sectors including commerce, finance, foreign trade, railway transportation, electricity, metrology and tourism. According to Vice Minister Liu Jianfeng, during the Ninth Five-year Plan period, around 500 billion were further pledged to be invested in system and network construction (Zhou, Jan. 24, 1995). These government-initiated projects forcefully drove infrastructure construction and technological updates, which laid a foundation for systematic and society-wide expansion of information technology and generated a comprehensive set of market opportunities for foreign and domestic players.

Moreover, the state also pledged to support nascent domestic industries by reserving part of the domestic market for domestic manufacturers. In 2002, the state passed the Government Procurement Law, which decrees that government procurement should be confined to indigenous products, services and projects. However, despite this law, the scale of government procurement has not been large enough to sustain the development of China's indigenous ICT firms. In 2001, the budget for IT procurement was

□4.4 billion, which doubled in 2002 to a little more than □8 billion (Yan, Jan. 24, 2003). Even into 2006, as high as 50% of the servers purchased by government and educational institutions were still foreign brands. In the financial and telecommunications sectors, foreign-made servers made up 80% of the total IT procurement (Fang, April 10, 2007).

China is also implementing the "Go Out" strategy in the Global South and particularly is aiming to explore markets in Southern Asia, Eastern Asia, Africa and Latin America. According to Zhou Zixue, because indigenous manufacturers of household appliances and telecommunications equipments have relatively strong technological advantages and are internationally competitive, they are encouraged to build factories overseas in order to save production and trading costs, and at the same time, to gain new markets that otherwise would be closed (Zhou, 2005). The state, and in particular, the Ministry of Information Industry, has facilitated corporate expansion through many forms which include hosting so-called South-South cooperation forums, inviting foreign leaders from developing countries to visit China, and helping Chinese ICT enterprises enter developing markets in the South. By 2003, several Chinese enterprises have established manufacturing facilities, Chinese-controlled shareholding corporations, trading firms and R&D centers in developing countries (C. L. Liu, 2004, p. 260).

Indeed, developing and promoting indigenous corporate power is an integral part of China's globalization scheme. As Chibber has defined, the core of the import substitution industrialization is "the doctrine of infant industry protection, which aims to nurture domestic business undertakings to ready them for the rigors of the world market" (Chibber, 2003, p. 32). In this sense, while China has exposed domestic firms to global competition and opened domestic market to foreign players, import substituting initiatives and steps are selectively continued. Actually, there is nothing new about this approach, because the Four Little Tigers, to varied degrees, combined the export-led industrialization with selective import substituting steps. According to Peter Nolan, while Hong Kong and Singapore, due to their small size, selectively picked multinationals to create local ICT bases, Taiwan and South Korea massively protected indigenous economy and actively promoted indigenous firms in their early period of export-led industrial development (Nolan, 2001, pp. 11-15).

So, in contrast to South Korea and Taiwan, what is unique about China is that China introduced foreign direct investment to jump start export-led industrial growth in the early 1990s, before domestic firms could participate sufficiently in ICT production and exports. In this context, catch-up efforts of strengthening and promoting domestic business have to take place as a posterior practice in the heavy presence of transnational market forces. In other words, different from South Korea where the state selectively continued import substituting steps to shield export-led domestic industries from global competition, China's import substituting policies come as a subsequent practice to hopefully redress the vulnerable position domestic firms have already been compelled into.

Conclusion

The dominant neo-liberal belief in the reform era views re-entry into global economy as an inevitable developmental path toward accumulating scarce financial and technical resources, and thereby to develop indigenous high-end manufacturing capacities and even to gain global competitiveness. This

policy orientation has led to an FDI-friendly and market-fundamentalist policy framework since the late 1980s. However, contrary to what was promised by this neoliberal agenda in the guise of nationalist promises, this mode of development has nevertheless established the absolute domination of foreign capital in ICT production and exports, and has also structured China's ICT industries in a way to serve as the downstream industrial cluster of the globalized chain of production.

Because the state introduced a massive infusion of foreign direct investment to jump-start China's ICT production and exports in the early 1990s, China's infant ICT industries have been compelled into global market competition. The premature entry into global competition, in turn, has limited their development space from early on. Being squeezed by globalized market competition and hindered by financial and technological barriers, infant domestic enterprises do not enjoy an autonomous space to develop their R&D and market capacities and thereby could only hope to excel in the large-volume and low value-added stage of final production. As part of the global chain of production, domestic firms are specialized in handling large-volume and low value-added production in global economy. Meanwhile, they lack financial, technological and marketing capacities to create a global reach and have to face an underdeveloped domestic market. It is uncertain whether China can bypass its current position of low-tech assembly operation.

If the low-end and foreign-dominated ICT structure indicates the failure of the early strategy of "exchanging market for technology," more recent state interventions are meant to redress the vulnerable position domestic industries have been placed. As this paper has pointed out, the state has practiced import-substituting initiatives, such as preserving expanding domestic markets for national champions and assisting global expansion by domestic firms, in order to expand the development space for domestic industries. However, in the WTO era when the state's hands are tightened, whether these state-led market campaigns will succeed in orchestrating and consolidating domestic corporate forces into stronger market power is largely uncertain.

Although China is facing the challenge of practicing catch-up efforts amidst dominant transnational market forces, the process of shaping China's ICT development is by no means complete. Therefore, several key questions arise for future research: What catch-up strategies have been practiced to expand the development space for indigenous firms? Under what circumstances would these initiatives and practices be successful? And as posed by Peter Nolan, will China's unified and powerful state power and its potentially largest domestic market provide effective leverage to invigorate progressive industrial policy (Nolan, 2001, p. 189)?

References

- Anchordoguy, M. (1989). *Computers inc.: Japan's challenge to IBM*. Cambridge, Mass.: Published by Council on East Asian Studies, Harvard University and distributed by Harvard University Press.
- Chen, Z. Q. (Dec. 31, 1991). A discussion of applying electronic and information technology to modify traditional industries. *China Computers*, p. 7.
- Chibber, V. (2003). *Locked in place: State-building and late industrialization in India*. Princeton, N.J.: Princeton University Press.
- The competitive situation of domestic and foreign manufacturers in the Chinese market. (February 1, 1994). *China Computer*, p. 27.
- Department of Economy System Reform & Economy Operation, Ministry of Information Industry. (April 4, 2006). Foreign-invested firms have high profits and low taxes in 2005. *China Electronics News*, p. A3.
- Fang, Z. G.. (April 10, 2007). The promotional drive of government procurement needs to be tested. *China Electronics News*, p. A1.
- IDC. (Oct. 5, 1998). Market review of global PC market. *China Infoworld*, pp. E8, E9.
- Gore, C. (2000). The rise and fall of the Washington consensus as a paradigm for developing countries. *World Development*, 28 (5), 789-804.
- Li, Y. J. (Aug. 13, 2001). Policy paves the way for China's PC industry. *China Infoworld*, p. A21.
- Liu, C. L., et al. (Eds.). (2004). *China yearbook of electronics industry 2004*. Beijing: Publishing House of Electronics Industry.
- Liu, L. Y. (Jan. 4, 1994). Market demands keep up fast growth. *China Infoworld*, pp. A1, A2.
- Lou, Q. J., et al. (2003). *2003 research report on china's exportation of electronic and information products*. Beijing: China Economic Publishing House.
- Lou, Q. J., et al. (Eds.). (2004). *2004 research report on china's exportation of electronic and information products*. Beijing: China Economic Publishing House.
- Luo, H.X., et al. (Eds.). (1999). *China yearbook of non-state economy 1998*. Beijing: Qunyan Press.
- Managing rules of imports and exports by high-tech industrial park of the People's Republic of China*. (Jan 7, 1992). *China Computers*, p.A6.

- McKay, S. C. (2006). *Satanic mills or silicon islands?: The politics of high-tech production in the Philippines*. Ithaca, N.Y.: Cornell University Press.
- Ministry of Information Industry. (Dec. 18, 2000). Six major strategies to expand exports of information industry. *China Infoworld*, p. A1.
- Nolan, P. (2001). *China and the global economy: National champions, industrial policy, and the big business revolution*. Houndmills, Basingstoke, Hampshire; New York: Palgrave.
- Pecht, M., et al. (1999). *The Chinese electronics industry*. Boca Raton, Fla.: CRC Press.
- Quan, R. (Nov. 29, 2004). Long Yongtu: Zero tariffs are positive to IT imports and exports. *China Infoworld*, p. A1.
- Qun, Y. (April 5, 1994). Foreign business thinks highly of the mainland computer market. *China Infoworld*, p. A19.
- Ren, A. Q. (June 20, 2003). Policy effects should speed up industrial development and preferential policies are not materialized yet. *China Electronics News*, p. 3.
- Schiller, D. (2007). *How to think about information*. Urbana: University of Illinois Press.
- Sheng, M. L. (Dec. 14, 1993). The outward-looking developmental strategy of China's computer industry starts to take effects. *China Computers*, p. A1.
- Sheng, M. L. & Cao, D. M. (March 24, 1992). Industrial and market predictions of computer industry in eastern regions during the eighth five-year plan. *China Computers*, p. A 9.
- Sridharan, E. (1996). *The political economy of industrial promotion: Indian, Brazilian, and Korean electronics in comparative perspective 1969-1994*. Westport, Conn.: Praeger.
- Teng, X. & Ma, Y. (Jan. 11, 1999). Behind the endowment of private firms with the self-managing right of imports and exports. *China Infoworld*, p. A 18.
- Wang, C. G. (Nov. 27, 1990). The average indigenization rate of China's computer products reaches 60%. *China Computers*, p. A1.
- Wang, J. Z. (Oct. 25, 2002). Utilizing foreign capital to speedily develop the industry. *China Electronics New (Zhongguo Dianzi Bao)*, p. 1.
- Xie, X. X. (Institute of Industrial Economy Research of the Chinese Academy of Social Science). (March 1, 1999). Facing overproduction: China's electronics and information industry in globalization. *China Infoworld*, p. A11.

Xin, X. (April 23, 1998). Our country's high-tech commercialization rate is 25% and industrialization rate is 7%. *China Infoworld*, p. A3.

Xu, D. Y. (May 3, 1999). PC industry is undergoing great reforms. *China Infoworld*, pp. A14, A15.

Xu, J. S., et al. (Eds.). (1993). *China yearbook of electronics industry 1993*. Beijing: Publishing House of Electronics Industry.

Yan, J. P. (Jan. 24, 2003). Can policy generate market? *China Electronics News*, p. 1.

Yang, T. X. (April 25, 1995). Welcoming China's greater development of computer industry during the ninth five-year period: Targeting informationization and facing two markets. *China Infoworld*, p. A7.

Yi, M. Y. (Oct. 29, 2001). Combating WTO. *China Infoworld (Zhong guo Ji Suan Ji Bao)*, p. A16.

Yue, X. J. (July 2, 1998). Coldly observing the frenzy of PC production. *China Infoworld*, p. B7.

Zhou, J.L. (Jan. 24, 1995). Calling for modern electronics and information industry. *China Infoworld*, p. A11.

Zhou, Z. X. (Dec. 27, 2005). Improve industrial developmental environment and cultivating indigenous transnational corporations. *China Electronic News*, p. 4.