CHINA'S ICT INDUSTRY AND EAST ASIAN REGIONAL PRODUCTION NETWORKS

by

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ABSTRACT

This thesis discusses the impact of China's putative rise in East Asian regional production networks (EARPN) with regard to the ICT industry. Many research studies have focused on China's strengthening military and political power or are devoted to China's astounding economic achievements vis-à-vis Japan's recession in the world economy. The tone of much of this literature since the 1990s has been to highlight the 'danger of the rising China'. However, there is a gap in the scholarly literature regarding the impact of a rising China on EARPNs with regard to the ICT industry. Changes in this industry mark the latest industrial revolution, and the industry itself is characterized by rapid changes and powerful influences in every aspect of the economy. This thesis will analyse the impact China brings to EARPNs because of its rapidly developing ICT industry. To be more specific, it will show to what extent changes in China's ICT industry (re-)shape existing regional production networks (RPNs) in East Asia, which for a long time saw Japan as the key actor. Moreover, this thesis will also demonstrate whether flying geese paradigm can be still applied to EARPNs in terms of the ICT sector. This thesis applies a slightly revised flying geese model to evaluate the impact of the Chinese government's regional intentions and the Chinese ICT enterprises' behaviour overseas in EARPNs. Based on a number of cases, this work shows that the rise of China with regard to its ICT industry is establishing China's position as a regional leader in EARPNs. China's significant roles both in the region and in the world are even more prominent, which has contributed to directly shaking the role of Japan as the leading goose of the EARPNs. This thesis argues that the essence of the process of catching-up and the characteristics of a dynamic hierarchical division of labour in the EARPNs have not changed simply because of the developments in China with regard to the ICT industry. However, contrary to expectation, this thesis shows that it is too early to conclude that the dynamic hierarchical division of labour has changed, and to see China replace the previous leading goose, either in terms of large amounts of FDI or in terms of capabilities of continuously providing advanced technology. The very complicated international and regional relations that China is pursuing also influence China's ability to reshape EARPNs. In short, China has not yet become the leader of EARPNs.

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LIST OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

ABBREVIATION

ADB	Asian Development Bank
AEE	Adaptive Efficiency Enhancement
APT	Asia-Pacific Telecommunity
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AVS	Advanced Audio-Video Coding/Decoding Standard
CAR	Comparative Advantage Recycling
CCCPC	Central Committee of the Communist Party of China
EARPNs	East Asian Regional Production Networks
FDI	Foreign Direct Investment
FTNS	Fixed Telecommunications Network Services
GAID	Global Alliance for ICT and Development
GATT	General Agreement on Tariffs and Trade
GII	Global Information Infrastructure, the US
GOTA	Global Open Trunking Architecture
I2	The Internet2 Project, the US
ICT	Information and Telecommunication Technology
IGF	Internet Governance Forum
IMF	International Monetary Fund
IPNs	International Production Networks
IPTV	Internet Protocol Television
IS-EP	Import Substitution cum Export Promotion
IT2	Information Technology for the Twenty-First Century
ITU	International Telecommunication Union
IU	Industrial Upgrading
METI	Ministry Of Economy, Trade and Industry, Japan
MII	Ministry Of Industry and Information Technology, China
MNCs	Multinational Corporation
MOFCOM	Ministry Of Commerce Of The People's Republic of China
MOST	Ministry Of Science and Technology, China
NII	National Information Infrastructure
NPC	National People's Congress of the People's Republic of China
RPNs	Regional Production Networks
SASAC	State-Owned Assets Supervision and Administration Commission of the State Council, China
SEZ	Special Economic Zones
SDPC	National Development and Reform Commission
SIP	Suzhou Industrial Park
SMES	Small and Medium Enterprises
SOE	State Owned Enterprises
Super VCP	Super Video Cassette Player

TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
WAPI	WLAN Authentication and the Privacy Infrastructure
WTO	World Trade Organization

INTRODUCTION

The rapid economic development of East Asia has been characterized by the sequential 'take-off' of member countries. From the 1960s to the 1990s Japan first succeeded in modernizing its economy and continued to upgrade its industrial structures, and by the early 1960s it was heralded as the only 'developed' country in East Asia. During the 1960s, when a number of industries and sectors began to mature, Japan started to transfer them to its neighbours, including Taiwan, South Korea, Hong Kong and Singapore. Transfers to other leading ASEAN countries followed, such as Malaysia, Thailand, the Philippines and Indonesia. In the 1990s, there was a significant transfer to China, followed by Vietnam and other ASEAN countries. Such multi-tiered structuring and the so-called 'catch-up' model in East Asia is often called the 'Flying Geese pattern of economic development' (Akamatsu 1935, 1937, 1962; Kojima 1960, 1970, 1995). This flying geese pattern of economic development drove economic development in East Asia in the post-war period. In more recent times, it has served to accelerate the formation of integrated regional production networks, for which Japan is seen still to represent the lead goose.

However, the flying geese model is not without critics and in particular the much debated 'rise' of China has thrown its validity into doubt. China's 'new economy' is characterized by the rapid development of its information and communications technology (ICT) industry and by the astonishing rapidity of Chinese economic development more generally (Peng 2000; Das 2008; Das 2009). Kumagai argued that that Japan's place as lead goose has now been usurped by China, which has foregone the traditional step-by-step process of catching up in favour of developing cutting-edge products and technology (Kumagai 2008: 1). In other words, the multi-tiered and catch-up model of economic development in East Asia has been replaced by China's leapfrogging approach and rapid development. Studies of China's putative rise have taken many forms in recent years. They include not only arguments about its strengthening military and political power (Roy 1994; Shambaugh 1999; Deng 2001; Lampton 2006), and about the serious environmental problems and questions of sustainable development linked to economic development (Foster 2000; McCarthy 2005), but also debates about human rights (Nathan 1994; Foot 2000). By far the largest number of studies, however, are devoted to China's astounding economic achievements; to their regional impact; and to its rise relative to Japan's recession in the world economy, particularly after the 1997 Asian Financial Crisis (Naughton and Lardy 1996; Wong 2004; Zheng 2004; Beeson 2007; Yusuf 2008). The tone of much of this literature since the 1990s has been to highlight the 'danger of the rising China' (Kynge 2006: 11). As a country previously focusing on labour-intensive industries with a predominance in low-end products, such as garment and toys, China has gradually been transferring to more technology-intensive industries with advantages in more value-added high-end products, such as semiconductors.

In the face of such inexorable forces, other East Asian countries have been forced to confront the realities of shrinking job markets and decreasing investment inflows. Consequently, attempts to upgrade industries in those countries have stagnated, as they lack capital and depend on low value-added trade and on low-end manufactured products (Perlez 2002; Shenkar 2004; Holst and Weiss 2004). In the wake of financial crises in the region, a strengthening China is seen to threaten still further the ability of those countries to compete in the region and beyond. Concomitant to these findings has been a growth in the literature assessing the shifting balance of power in the global political economy (Shenkar 2004; Breslin 2005; Fishman 2005; Gu 2005; Preeg 2005; Kynge 2006). According to a *Nikkei* News Survey of 2001, 49.1% of Japanese manufactures were considering moving their plants overseas, and over 70 per cent of those intended to relocate their investments to China (PeopleDaily 2001). Moreover, after the mid-1990s East Asian intra-regional trade became increasingly significant. Given the similar export structures of many East Asian countries, this trend led to a serious risk of potentially damaging competition. Accelerating import demands from China (around 40 per cent in 2003 and 37 per cent in 2004) have been regarded as the engine of economic growth in East Asia (Gaulier, Lemoine *et al*. 2005).

Zhu argued that competition from China was a key factor in the decline in competitiveness of other East Asian economies (Zhu 2001: 15). Whilst China is to some extent influenced by the changes in the industrial structures of its neighbours, the evolution of China's own industrialization and the continuous upgrading of industries have impacted more significantly on those surrounding countries (Watanabe 2003;

Wong 2005: 31). Since China's reform era huge amounts of foreign direct investment (FDI) have entered China, especially the southeast. They have contributed to the development of international and regional production networks. Consequently, China came to play a significant part in the development of regional and international production networks. Alongside those speculating on the 'danger of the rising China', other scholars came to different conclusions. For example, Segal argues that, based on an assessment of its domestic problems, economic strength, military and political power, China is no more than a theoretical power that does not matter to Asia, not to mention to the world (Segal 1999: 1). Segal's original intention was to persuade policymakers to 'craft a sensible policy toward China' and 'treat China in a normal way', by reminding people of the other side of the rise of China. However, Segal's conclusion needs to be taken in the light of subsequent developments in China. As Harris notes in a later piece, for example, China now matters more because its concerns and interests resonate beyond its own borders and especially in East Asia, where both the structure of the regional political economy and the developmental trajectory of each country in the region are increasingly shaped by Chinese actions (Harris 2003; Breslin 2005). These studies were all important for attempting to understand the changing impact of China on its region and throughout the world. One crucial factor in that change, as this thesis will demonstrate, has been the role of the forces of information and telecommunication technologies (Friedman 2006).

According to a 2003 OECD report, China surpassed Japan and the EU, and in 2004 became the biggest exporter of ICT goods by USD180 billion (OECD 2006). China became the largest exporter of technology goods and the sixth biggest buyer of high-tech goods and services in the world in 2006 (*The Economist*, 5 October 2006). Moreover, China also contributed to the development of ICT standards, some of which have already been approved by the International Telecommunication Union (ITU). Considering the significant role played by the ICT industry in China's new economy and in the existing triangular trade[1] in East Asia, it is crucial to chart and analyse how changes to China's ICT industry impact upon the rest of East Asia. In a sense, the rise of China's ICT exports has lead to a decrease of ICT exports from other East Asian countries. In fact, the majority of China's trade performance can be credited to a remarkable increase of trade in ICT (Amighini 2005: 213). Until now, China has not only considerably improved its market share in ICT products, but has also successfully upgraded from the assembly of imported goods to manufacturing high-tech intermediate products (Amighini 2005: 204). In addition, China has gradually come to play a significant role in the setting of standards for ICT technologies. A key and well-known example is one of China's independent 3G standards, Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) (see Chapters Three and Four). The Asian Development Bank's (ADB) special report entitled 'East Asia will achieve strong growth in 2006' pointed out that China is the key factor that will decide the future of East Asian economic development (ADB 2006). As Breslin argues, the evaluation of China's performance needs to be revised if China gradually upgrades from low cost

[1] Triangular trade or triangle trade refers to the special trade pattern between the US, Japan and other East Asian countries. Geography and comparative advantage enabled Japan and the US to become the major suppliers of technology and capital-intensive goods and the final destinations of labour-intensive consumer goods for East Asian economies (Wang 1995: 8).

manufacturing sites to more value-added stages of production (2005: 751). For all of these reasons, then, China cannot be ignored as a growing player in regional and global ICT development (Harris 2003).

In order to understand the role of ICT, it is crucial to investigate the ways in which economic globalization is being structured in terms of the global supply chain and the global value chain.[2] The central point of interest for this thesis is the way in which globalization is increasingly characterized by the development of International Production Networks (IPNs) (Yun 2003). IPNs mean that any activity in International Production Networks can be digitalized, decomposed and moved around the world. In the 1990s, the US increased its imports of ICT products from East Asia, and the region has grown to be a global export platform base for the ICT industry as a whole, having developed sequentially from imitation to innovation through continuous ICT industry upgrades (Kim 1997). In reality, the creation of IPNs has seen the substantial reallocation of resources within a regionalizing East Asia. In line with the findings of Ge and Li, the development of the *de facto* Regional Production Networks (RPNs) in ICT will be shown to have accelerated Chinese industrial upgrading and to have promoted China's industrial structural adjustments. This thesis seeks to discover the extent to which such changes have resulted from the effects of developing regional

[2] The concepts of global value chain and global supply chain are approaches to inter-firm relations that draw on the simple idea that the design, production and marketing of products involves a chain of activities divided between different enterprises often located in different places (Humphrey and Schmitz 2000: 9). They are the combination of design, product development, marketing, production and retailing by which products progress from their conception to final consumer (Wilkinson 1995: 1). The specifications are supplied by the large retailers or marketers that 'order the goods…these companies design and/or market—but do not make the branded products they order.' They are part of a new breed of 'manufacturers without factories' that separate the physical production of goods from the design and marketing stages of the production process (Gereffi 1999a: 4).

production networks and international production networks. It also examines the extent to which such changes to China's ICT industry have impacted on East Asian regional production networks and international production networks. For example, is China's rise at the expense of Japan's regional role? Or is China's rise at the price of other East Asian countries' economic growth? Will China be a real danger, or a 'responsible stakeholder'? Moreover, during the process of development, what have China's government and China's businesses done to enhance China's regional impact? An additional factor is to assess whether such impacts on regional production networks in turn influence the amorphous nature of East Asian economic regionalism, with a growing China at its centre. In essence, what exact impacts does China bring to East Asian regional production networks because of its rapidly developing ICT industry? To be more specific, do changes in China's ICT industry (re-)shape existing regional production networks in East Asia, which for a long time saw Japan as the key actor (Ge and Li 2005).

This work takes as its starting point all previous significant Chinese policies and institutional changes made in the area of ICT. In particular, it will examine the efforts made by the Chinese central government, both domestically and at a regional level, to advance China's international ICT presence. Recognizing the crucial role played by the Chinese central government in making policies and regulations, this thesis adopts an historical approach to understanding how changes in the Chinese government can and do occur in particular sectors. Thus, it examines all those significant institutional reforms and industry plans pertaining to the development of China's ICT industry. An historical approach also facilitates an analysis of the central government's actions at the regional level. As will be demonstrated, the Chinese government has not only strengthened its ICT industry at domestic governmental and institutional levels, but has also tried to create a favourable regional environment for ICT industrial development, through a range of diplomatic channels. Through a detailed analysis of all relevant government white books, yearbooks and official websites, as well as personal interviews, this thesis aims to illustrate how China's regional ICT strategies are being constructed in a particular way. The thesis does not simply assume that the tremendous regional impacts brought about by a rising China will offer China a form of leadership of East Asia. Rather, it is clear from the findings of this work that the relationships between China and other East Asian countries cannot be understood in isolation from one another.

In order to demonstrate the changes in China's ICT industry, this thesis illustrates how Chinese businesses grow up from production bases, simple imitation and catch-up, to actively going abroad. It focuses on those changes in trade and investment cooperation brought about by ICT enterprises, alongside the important role of FDI and strategic alliances between enterprises in the East Asian that promote technology transfers and joint technological development (ASEAN 2002). This thesis presents five case studies in three main fields of the ICT industry against the background of EARPNs. The first two case studies concern Chinese ICT equipment manufacturing; the second two case studies look at the development of the Chinese software sector in the ICT industry; while the last addresses the Chinese state monopoly of telecommunications. These cases reflect changes at the low and middle ends of production in ICT, and show how the Chinese government and businesses are trying to strengthen their role as a big ICT power, whilst retaining their 'factory' appeal. These five case studies essentially show the development of Chinese ICT enterprises through different aspects of the industry.

By focusing on these key concerns and case studies, this thesis aims to develop our understanding of China's considerable regional impact in one significant sector, a sector viewed by many observers to be the main driving force for economic growth and a symbol of a country's competitiveness and power. As cornerstones for economic regionalization and for the processes of globalization more broadly, the rise of contemporary East Asian regional production networks can help us to appreciate more accurately the scale, trajectory and origins (and originators) of China's economic growth. By adopting a focus on RPNs, this thesis challenges those who assume that Japan is being replaced by China as the regional economic powerhouse, and seeks, rather, to develop a more balanced account of the ways in which China's regional presence is becoming more significant for the sector and for the development of regionalization itself.

In so doing, this thesis aims to fill a gap in the current literature on the relationship between a changing China and East Asia in terms of the development of regional production networks and their significance. As clearly noted in Chapter One, various criticisms have been put forward towards the utility of the flying geese model (Nester 1992; Rowthorn 1996; Kregel 1997; Kasahara 2004). In spite of those debates on the usefulness of the flying geese model, the flying geese theory clearly describes the essence of catching-up process through a regional hierarchy structure and the fact of the regional division of labour that was based on 'industrial and locational hierarchy'. The thesis concludes that the flying geese model can still account for the nature of contemporary changes to East Asian RPNs in the ICT sector, with some new factors in International Production Networks added. By focusing on an industry with crucial implications for the whole model of regional and international divisions, and by investigating both Chinese government and business action at the regional level, the relationships between China and East Asia may come to be understood as a complex set of intertwined networks. In charting these changes, this thesis also attempts to contribute to debates over the continued relevance and the critical sides of the flying geese paradigm. It finds that there is still a utility for the model: for explaining the relationships between advanced countries and later-developing countries from the perspective of comparative advantage in the process of catch-up; and for understanding investment flows and the international division of labour. By focusing on both gradual upgrading strategies, as well as leap-frog processes derived from technological advancement, this thesis aims to analyze the following two key questions in-depth by applying the flying geese paradigm. In essence this thesis focuses on two key questions: how have changes in China's ICT industry impacted on East Asian Regional Production

Networks; and, how can we understand the impact of a rising China on East Asian Regional Production Networks, with reference to the ICT industry? Backed the argument with facts, empirical work in this thesis shows China's position in East Asian regional production networks with regard to ICT industry. Moreover, empirical work shows different sides of the whole story, which helps to reflect on the usefulness and inapplicability of the flying geese theory.

The thesis is divided into four chapters. Chapter One seeks to provide a theoretical basis for the central research question, through an elaborations of the means through which regional production networks are constructed. It sets the context in which regional production networks should be considered, by refining the flying geese model and applying concepts of Wintelism and IPNs. Chapter Two offers an overview of the history of East Asian regional production networks, with particular reference to ICT. Tracing a path from the 1960s and the 1970s, when East Asian regional production networks gradually came into being, it shows the effects on East Asian regional production networks of China's launch of its 'open door' policy in the early 1980s. In particular, it charts how the ICT industry rapidly made great progress in China. Chapter Three focuses on the regulatory role of the Chinese government in driving the development of the ICT industry domestically and abroad. As will be argued in Chapter Three, the technological hierarchy based on various technological capabilities is of significance in determining the ranking of political powers in a region, since technological capability is one of the crucial parts of political power. Moreover, China's hands are still tightly tied by very complicated trilateral relations between Japan, China and the US. Chapter Four examines in particular the growth of China's indigenous ICT enterprises and the relative decline in involvement by multinational corporations (MNCs). Chapter Four also highlights the current stage of Chinese indigenous ICT enterprises and the significance of integration into East Asian regional production networks. The conclusion argues that an analysis of the Chinese ICT industry provides an objective and important account of the complicated relationships between China and the rest of East Asia.

CHAPTER ONE: UNDERSTANDING RPNs

This chapter seeks to provide a framework through which we might understand how and why a particular approach towards regional production networks (RPNs) gains prominence. Specifically, the goal of this chapter is to provide a foundation for the central concerns of this thesis: why the flying geese paradigm was so dominant in understanding RPNs; why the flying geese paradigm was challenged; and whether a modified flying geese paradigm could absorb its criticisms and continue to be relevant for understanding RPNs.

This chapter has four key sections. The first section provides an overview of how the flying geese paradigm conceptualizes and constructs RPNs, which establishes a necessary basis for the following discussions with reference to East Asia (see Chapter Two). The second section seeks to understand RPNs from the perspective of comparative advantages. The changes in international production networks are integrated into the third section, which discusses how these changes challenge the traditional ways of understanding RPNs. In the meantime, the third section also tries to explore how to integrate these changes into the flying geese paradigm, and to provide a basic framework that will contribute to the further discussion of this thesis. The fourth provides an overview of key factors contributing to applying the flying geese paradigm to RPNs, with specific reference to East Asia. This chapter aims to demonstrate how and why the flying geese paradigm can still be applied to understanding RPNs, in spite of continuous challenges to its utility. This chapter also provides a theoretical foundation for understanding RPNs, in the context of contemporary changes. These will help to allow us to understand better the current EARPNs and how certain changes happening to one country essentially influence the region.

A. Different Approaches

Various approaches have been applied to analyses of RPNs. Among all of those, the flying geese paradigm is believed to be one of the very earliest approaches to understanding RPNs with reference to East Asia.

1 The Traditional Flying Geese Paradigm and Japan

The flying geese theory was proposed by Akamatsu Kaname, a famous Japanese economist. He developed this theory based on empirical findings by observing what happened in the Japanese cotton and textile industries in the 1930s. Akamatsu explains the basic pattern of flying geese as following:

> Wild geese fly in orderly ranks forming an inverse V, just as airplanes fly in formation. This flying pattern of wild geese is metaphorically applied to the below figured three time-series curves each denoting import, domestic production, and export of the manufactured goods in less-advanced countries.(Akamatsu 1962: 9)

Being firmly convinced that industrialization is essentially homogeneous, presuming the existence of heterogenization in terms of production costs and natural resources, Akamatsu clarifies that the course of economic development of advanced countries can be replicated by less developed countries via a continuous 'catching-up' process (Ray, Ida et al. 2004: 465). During this catching-up process, advanced technology can be more easily accessible via trade and foreign direct investment (FDI); accompanied by stronger and more effective state support, both in terms of domestic policies and regulations and in terms of relevant foreign policies.

With an analytical focus on trade and production activities in the context of the economic development of a national economy, the flying geese paradigm stresses the changes in the factor endowments[3] that cause shifts in comparative advantages, including technology in each national economy, with regard to the given specific production process, FDI, technology and trade are regarded as three main mechanisms of the flying geese paradigm, by which the catching-up process and comparative advantages recycling process can be smoothly passed on. In Akamatsu's belief, trade is the main way of introducing new products and technology into a country (Akamatsu 1962). Imports to some extent benefit local consumers and facilitate the transfer of technology and the acquisition of capital goods, which are necessary for the production of the imported substituted products. In the meantime, imports might drive many local firms out of business and impoverish many manufacturing segments in the catching-up economies at the very beginning.

Four stages are clearly indicated in the whole catching-up process. Developing countries import manufactured consumer goods from advanced countries and export primary products at the first stage. After gradually being capable of producing those imported goods domestically, developing countries start to import capital goods with declining manufactured consumer product imports at the second stage. The third stage can be

[3] Factor endowments refer to the identical factors of production. According to the Ricardian factor endowment theory of international trade, all exchange is based on simple Ricardian comparative (technological) advantages. International trade takes place because different countries have different factor endowments (Roy 1990).

regarded as an export orientation stage, in which developing countries initiate exporting those manufactured consumers products while manufacturing those capital goods simultaneously. At the fourth stage, these developing countries have already become matured exporters, which grasp all technology and skills in terms of manufactured consumer goods that were owned by advanced countries. Thus, these developing countries gradually transfer manufactured consumer goods production to other followers as advanced countries did at stage one. Simultaneously, these developing countries start exporting capital goods. In Akamastu's view, by these four stages countries in a given region will come to have similar industrial structures and similar development paths (Akamatus 1962).

These four stages represent the essence of the catching-up pattern of the flying geese paradigm. Akamatsu further elaborated that such a pattern not only exists within a given industry, in which crude and simple goods gradually progress to complex and refined goods; but in addition, national industries gradually evolve from consumer goods, such as textiles, to capital goods, such as computers and high-tech goods (Akamatsu 1961: 208). Through the four stages in intra-industry, implying the need for industrial rationalization, and the four stages in inter-industry that mean the diversification of production, a given industry can improve its efficiency and strengthen its competitiveness. Simultaneously, the structure of industries in a given country can be ultimately improved through the diversification of production.

The flying geese paradigm presumes the existence and the importance of hierarchy, with a dominant economy acting as the growth centre followed by other developing economies (Kasahara 2004: 8). Put simply, Akamastu's theory refers to a situation in which less developed countries employ development paths of advanced countries to develop their own economies. Akamatsu assumes that all relevant countries are closely connected by economic communication and are all trying to climb up to a higher level on the development ladder. Thus, a hierarchical structure is formed. In this hierarchical structure, as hypothesized by the flying geese paradigm, states are divided into two sub-groups. The first includes the leading states that advance first; the second includes the catching-up countries that follow behind the first group. However, there are no fixed positions for the leading countries and the following countries (Korhonen 1994: 95). Once a leading country drops back, some strong followers will advance to the front. In a word, the flying geese paradigm presupposes that the dynamic changes in economic relations run between the leading countries and the catching-up countries (Hiley 1999).

Moreover, in Akamatsu's view, the role of the state is crucial. The sequential process of the flying geese model is essentially a dynamic process in which the infant industry or sector can be much stronger with the support and promotion of the state (Ozawa 2001: 472). Along with the four stages in the flying geese paradigm, states are required to provide a favourable policy environment for technology transfer, inward FDI, and extensive restrictions on imports, by which relevant national pillar industries can be intentionally established and fostered.

All in all, the main ideas of the flying geese paradigm include two points. The first is a continuously catching-up process, both in terms of intra-industry and inter-industry, both within a country and across countries. The second is a continuous recycling process of comparative advantages within a country and across countries. The essence of Akamastu's flying geese paradigm is an evolutionary model of sequential catch-up in the stages of industrial upgrade of developing countries. As Akamatsu once summarized:

> The wild-geese-flying pattern of industrial development denotes the development after the less-advanced country's economy enters into an international economic relationship with the advanced countries.(Akamatsu 1962: 11)

Almost at the same time as Akamatsu proposed the flying geese paradigm in Japan, Raymond Vernon brought forward the theory of production cycle by observing a similar circulation phenomenon between parent companies and affiliate companies. The flying geese paradigm and the production cycle theory indeed have some things in common. Some scholars, such as Cumings and Tan, have used them interchangeably (Cumings 1984; Tan 2001). However, the two approaches only have similar conclusions on similar phenomena, but demonstrate observations from different perspectives.

2 Refining the Theory to Include Production Cycle Theory

The production cycle theory was initially proposed by Vernon in 1966, and then improved in 1971. It is a theory about the periodic change of a new product in international trade. Focusing on trade and production activities in the context of the strategic movements of large multinational corporations (MNCs) particularly from the US, Vernon claims that the shift of comparative advantage is because of the changes in production processes, and resulting from specific factor endowments, including technology in each economy (Kasahara 2004: 11; cite Vernon).

Vernon believes that any manufactured product undergoes the four stages of: the novelty of a product; the maturity of a product; the standardization of a product; and the declining market of a product (Vernon 1966: 195). In more detail, a new product is initially designed and produced for consumers' needs in the home market, and then continuous improvements and modifications are made for the purposes of satisfying consumers' various responses and increasing market share. At this stage, product standardization has not been established. Over time, as scale economies arise from specialization in the home market at the second stage, the product starts to be exported to other countries that are at a similar per capita income level. When the product gradually matures and its production technology becomes routine, marketing and production costs, especially materials, capital and unskilled labour costs start to be crucial in cost calculation. Consequently, its production sites are expected to be relocated outside its national territory. In other words, the production location of the matured products is likely to change over time for the reason of changing availability of particular types of inputs among countries (Vernon 1966: 201).

Vernon believes that a new product, particularly one that furnishes a company with a significant income, usually starts to be produced in a highly industrialized economy that has the advantages of a large domestic market and relatively abundant supply of technological and entrepreneurial resources (Vernon 1971). Moreover, when the product matures and the technologies associated with the product are standardized, the location of production is moved outside the national territory, and foreign firms will imitate and manufacture the same product for the local economy and for the purpose of exports. Under such circumstances, the products might be exported back to the countries where the product was initially designed and produced (Vernon 1971).

The production cycle theory implies a continuous upgrade of a country's industries that have comparative advantages. Because of the variations in each country's developmental stages and differentiation of each country's technology development policies, trade can be continuously developed among countries on millions of products that are at different stages of the product cycle (Vernon 1966: 198). As a result, international trade and international competition can be developed endlessly.

Vernon's production cycle theory gives a detailed description of the periodic development of a product among countries and the shift of production locations that is based on comparative advantage. It is usually used to explain the phenomenon that the US developed a large number of international subcontracting businesses in East Asia during post-war period (Vernon 1971). In other words, for the purpose of extending the manufacturing period of a product that still has comparative advantages, through FDI and international subcontracting, MNCs transfer the stage of labour-intensive manufacturing to the countries that have lower labour costs (Vernon 1966: 201). According to various requirements regarding factor endowment, MNCs adopt international subcontracting not only for a product but also for the different stages of production. Along with the economic advancement of developing countries, MNCs kept transferring the manufacturing of a product or the different stages of production to other developing countries. Thus, the FDI from the US spread over the world along with the production transfer of a product (Vernon 1971).

There are similarities between Akamastu's flying geese paradigm and Vernon's production cycle theory in terms of understanding the production transfer among countries based on comparative advantage. Both of those stress that the shift in comparative advantages between countries could contribute to the growth of exports. The process of the circulation of a product is similar in each model. Kojima once called the flying geese paradigm a catching-up product cycle (Kojima 1978). However, the flying geese paradigm focuses on the shift of comparative advantage in a particular industry, thus adding to the shift of comparative advantages among different countries. The flying geese paradigm is essentially about the development path of catching-up countries, as they go through the processes in which a new product is introduced to the catching-up country via imports and the catching-up country gains the necessary production techniques and ultimately becomes the exporter of the 'new product' (Dowling and Cheang 2000). In contrast, the production cycle theory places greater emphasis on the changes in the comparative advantage of a particular product. The production cycle theory keeps a closer eye on the developed countries and describes how a new product is designed and developed from its infant stage to the stage of exporting, and finally to its declining stage (Dowling and Cheang 2000: 446).

In a word, the flying geese paradigm describes the circulation of a product in which catching-up countries continuously catch up with advanced countries. The production cycle theory shows the circulation of a product in advanced countries that are skilled at technological innovation. The fundamental focus of the production cycle theory is the creation of a new product, while the fundamental focus of the flying geese paradigm is the introduction of a new product or a new technology. As Gore once said, the flying geese paradigm creates a precedent in the development model of developing countries; it explores how new emerging economic entities seek economic growth (Gore 1996).

B. Understanding Cross-National Networks

1 Cross-national Production Networks

Cross-national production networks refer to 'the consequent dis-integration of the industry's value chain into constituent functions that can be contracted out to independent producers wherever those companies are located in the global economy' (Borrus and Zysman 1997: 2). Economic interactions under cross-national production networks are not limited by geographic proximity, but are governed by the rules of pursuing maximum interests and saving maximum costs. In a word, comparative advantages are everything. Through inter-firm and intra-firm relationships, MNCs organize the entire range of their business activities including R&D, product definition and design, supply of inputs, manufacturing, production of services, distribution and support services (Borrus, Ernst et al. 1999). To be brief, it is about relationships between MNCs and their affiliates; and between MNCs and all the other relevant participants. Under such circumstances, cross-national production networks usually cover much larger areas and include most major economies.

Participants in cross-national production networks do not intend to spread their activities globally, as they are inclined to cluster regionally to a considerable extent. This approach can be called 'global regionalization' (Borrus, Ernst et al. 1999: 175). Cross-national production networks are essentially significant to the globalization of many national economies, and RPNs emerged as very important parts of this phenomena (Tan 2001). More production fragmentation across different countries happens in RPNs, which leads to an even better global division of labour and offers low-income countries more opportunities for getting involved into RPNs (Gill and Kharas 2007: 28). As a part of cross-national production networks, RPNs continuously evolve upward in the global supply chain and value chain, in which there is a hierarchical structure in terms of technology and manufacturing capacities.

However, unlike cross-national production networks, RPNs are closely related in many characteristics to models of regional economic development. Moreover, RPNs are more continuously influenced by changing international relations in the region and affected by the rise of and fall of powers in the region (Coe, Hess et al. 2004). It is because RPNs are 'essentially territorially specific and primarily at the level of the nation-state or the region' (Coe, Hess et al. 2004: 471). For example, as tensions rise over imbalances in international trade, the structure of the East Asian political economy can be influenced by the the dynamic interplay between politics and economics that results from the tension between the territorially based 'inter-state' system and the 'globalized' networks of production and exchange (Bernard and Ravenhill 1994: 172). Under such situations, changes and coordination in policies and regulations at different levels need to be implemented early in the process of regional integration, which affects the process of RPNs. The appearance and development of RPNs are also regarded as a prelude to economic regionalism (Arndt 2001). The capital and labour flows, technical cooperation and knowledge exchange in RPNs among countries contribute to the economic growth within a specific region (Lovering 1999; Amin 2002). As a result, these economic activities lead to even closer relationships among countries by means of regional clusters (Humphrey and Schmitz 2000; Humphrey 2001; Sturgeon 2001). At the same time, there is encouragement to devolve political and economic authorities from the nation states to regional institutions (MacLeod 2001b). (See below for more details)

The implementation of a regional system of production networks requires the harmonization of regulations and policies, and the removal of barriers to the flow of services, persons and finances (Tsutomu 2006: 21). Man-made and natural barriers should be removed; and transportation costs should be cut down. Both policy-makers and the private sector have roles to play in this respect. Governments must eliminate policy obstacles that prevent firms from choosing production locations anywhere in the region. The objective of government is to end restrictions on the flow of goods, which might contribute to creating an integrated regional production arena. In the meantime, companies in the region are increasingly linked across borders, and ongoing relationships extend beyond any individual company's boundaries and spread to the entire value chain in a given activity. For example, the affiliates of Japanese car producers in Thailand import engine parts from their parent companies or other companies in Japan and assemble these engine parts using some components procured from other countries in the region. After this process, the engines are exported back to Japan and other third-country markets (Athukorala 2003: 2). In such circumstances, the private sector must invest in the networks of services that will permit companies to coordinate production across borders (Arndt 2001: 15). If the conditions for a fully integrated regional economy are in place, then firms will be able to make decisions on production locations at the regional level rather than being limited within a country. This will give them a competitive edge in the world market.

2 The Theory of Comparative Advantage

The theory of comparative advantage is based on analyses of international trade. David Ricardo, the founder of the theory of comparative advantage, realized that labour cannot freely flow between countries because of specific policy limitations, while labour can flow freely among different industries within a country (Balaam, Veseth et al. 2001 2nd ed.: 23, cite Ricardo directly). By comparing the production costs of different countries, Ricardo believed that countries should manufacture the products for which they have the lowest production costs and make exchange for other products via trade (Balaam, Veseth et al. 2001 2nd ed.: 25). A country could then benefit from international trade without the need to be good at manufacturing all products, but by creating a comparative advantage. The core of this theory is that every country has comparative advantages either in specific industries or in specific sectors; and every country should be part of international divisions according to the principle of comparative advantages.

Although the theory of comparative advantage provides a theoretical basis for international free trade, it is hard to find in reality a country that would only focus on manufacturing a specific product. Moreover, static analysis used by Ricardo also limits the application of the theory of comparative advantage, since comparative advantages held by each country are always changing. In part to remedy this problem, Heckscher and Ohlin later proposed the factor endowment theory. By comparing differences in factor endowments, they showed why comparative advantages exist among countries (Balaam, Veseth et al. 2001 2nd ed.). By focusing on factor endowments, Heckscher and Ohlin proved that comparative advantages are not static and they change all the time (Balaam, Veseth et al. 2001 2nd ed.). They pointed out that a country should export those products for which it has abundant factor endowments, while importing those products for which it is fairly short of the factor endowments (Balaam, Veseth et al. 2001 2nd ed.).

Later in the 1980s, Krugman and Helpman introduced the scale economy concept for analyzing the theory of comparative advantage. They argued that the scale economy in a country will ultimately affect its comparative advantages in the world (Krugman 1980; Helpman 1981). As a result, increasing internal return rates to scale turn out to be the origins of comparative advantages (Krugman 1980; Helpman 1981). Such comparative advantages would be still there even when other countries grasp similar technologies or have the same proportion of factor endowments (Roberts and Tybout 1997). The scale economy idea explains why increasing intra-trade happened between countries with a similar proportion of factor endowments. However, Dollar argued that the difference in technology is key for explaining specialization among developed countries (Dollar 1993). Grossman and Helpman further developed the theory of comparative advantage by focusing on R&D (Grossman and Helpman 1990a; Grossman and Helpman 1990b). They said that international trade can be grouped into inter-industry trade and intra-industry trade: inter-industry trade will be directly affected by factor endowments; while intra-industry trade is essentially affected by R&D costs (Grossman and Helpman 1990a). The manufacturers that invest in R&D earlier gain more opportunities to have more market share (Grossman and Helpman 1990b: 813). The FDI from other countries will be invested in R&D first; as a result, differences in products will appear. The trade on these products will be then develop according to the factor endowment theory (Grossman and Helpman 1990b: 797). As a result, the productivity in the production of final goods will be strengthened because more resources are being devoted to R&D (Grossman and Helpman 1990).

Based on the differences in physical and human capital factor endowments, Balassa proposed a 'stages approach' to comparative advantage. Balassa argued that differences exist among various countries in international trade and international manufacturing, and such differences are not invariable (Balassa 1979). Economic development in every country is essentially a dynamic process, thus the upgrade process of stage development is continuous rather than interrupted. During the entire process, changes to physical and human capital will happen to all economic elements, including factor endowments. In Balassa's view, according to the various stages in international division and economic development, countries are grouped into several types. The countries at the first stage are advanced countries; Asia's Four Dragons and Brazil belong to the second stage; the newly industrialized countries and regions including the ASEAN (except Singapore) and China are grouped into the third stage; while all the other developing countries are at the last stage (Balassa 1988). In such a pattern of tiered development, advanced countries and the NIEs develop those emerging industries respectively. Simultaneously, they transfer the industries that have already lost advantages to the countries that are located at lower stages. By carrying out export-oriented development strategies, a developing country can climb up to a higher stage by making use of its own comparative advantages and carrying on the industries that were transferred from advanced countries (Balassa 1985). As a result, the dynamic stage approach of comparative advantages came to be formed. Balassa realized the importance of dynamic development of comparative advantages, which can be used in part to explain why Japan and other East Asian economies rapidly rose after the Pacific War.

However, Ernst and O'Connor, commenting on the stage approach to comparative advantages, noted that developing countries are still at a disadvantage because of increasingly fierce international competition (Ernst and O'Connor 1989). For the Four Dragons and the NIEs that rely on labour intensive industries, international trade plays the role of the engine for their economies. However, such advantages will be lost when more and more developing countries start to rely on a similar export-oriented strategy. Although these NIEs and Four Dragons already launched strategies for industrial upgrade and tried to explore other international markets, progress was much slower than the decrease of market shares from North America. Hoffman also pointed out that it is hard for developing countries to enter into the development stages in which export-oriented development takes the leading role (Hoffman 1985: 451).

Dollar later introduced the analysis of the impacts that technology and institutions have on comparative advantages in developing countries. He argued that developing countries usually lag far behind developed countries with regard to advanced technology (Dollar 1993). However, the development of technological progress also plays as a significant role in economic development and a crucial part of comparative advantages for developing countries (Dollar and Wolff 1993). Barro provided cases to prove that developing countries actually have advantages in introducing advanced technologies from developed countries (Barro 1991: 407). However, with respect to the potential advantages, powerful institutional supports are also needed. With such stable and powerful institutional support, developing countries can gain more benefits from knowledge capital accumulation in the long run (Dollar and Kraay 2003: 146). As a matter of fact, Dollar placed more emphasis on the roles of institutional incentives and technological progress for driving developing countries to have long-term comparative advantages (Dollar 1993).

Compared with the flying geese paradigm, the theory of comparative advantage also emphasizes the catching-up process that results from the differences in the accumulation of factor endowments, which accelerates changes in the manufacturing structures of the products for imports and exports. The theory of comparative advantage introduced many more factors, including physical and human capital. It also applied different research methods, including the use of many graphs and tables. In the 1960s and 1970s, apart from the description of the inverted V pattern of economic rise, more Japanese scholars tried to explore the nature and mechanism of the flying geese paradigm by introducing the factors of FDI and trade within East Asia. They also applied methods of mathematics in economics. In this vein, Kojima made a distinguished contribution in the further development of the Flying geese paradigm.

C. Integrating Approaches for Cross-national Studies

1 Development of the Flying Geese Paradigm in a Cross-national Context

Akamatsu provided detailed descriptions and showed strong empirical findings on the flying geese paradigm. However, unlike the theory of comparative advantage, the flying geese paradigm was not explained by Akamatsu by a formalized theoretical model. Kojima, Akamatsu's student, later improved Akamatus's flying geese paradigm by building a theoretical model of economics. These are worth examining in descriptive detail.

Apart from using complicated economic mathematics, Kojima mainly argued that the sequential catching-up development model naturally happened because of the aspiration for economy growth (Kojima 1960: 766). Moreover, in Kojima's eyes, technological progress and FDI are significant in the flying geese paradigm. Kojima believed that technological progress and FDI are two direct motives for the rationalization of industry (intra-industry) and diversification of production, which further drive economic growth and trade expansion (Kojima 1960). Thus, Kojima characterized the flying geese paradigm as a 'catching-up product cycle model' (Kojima 1960). However, states need to make the decision about whether the rationalization of industry starts first or the diversification of production starts first, because of limited national resources of capital, labour and technology (Kojima 1960).

Kojima proved that FDI flows out from an investing country's comparatively disadvantaged industry and starts its overseas production in a given country that has comparative advantages, including low costs and cheaper resources in that specific industry. As a result, the FDI-receiving country starts expanding production and enlarging exports of the products on which the original investing country lost advantages. Simultaneously, the investing country is able to pour more investments into producing and exporting more capital-intensive goods. Therefore, both investing countries and accepting countries can fully take advantage of their comparative advantages and improve their industrial structures. At the same time, their economic power can be strengthened through increased productivity. Meanwhile, the continuously increasing trade contacts incurred in these processes leads to greater interdependence between countries.

Along with FDI flows, FDI receiving countries' production and management skills will be further improved, which essentially helps countries realize catching-up and ultimately allows them to converge into a similar development pattern with those investing countries. A similar development pattern would inevitably result in fierce and sharp competition among those catching-up countries. In such situations, direct government intervention and systematic regional cooperation are necessary for further cooperation and coordination among these countries, with the purpose of establishing a regional blueprint; preventing blind expansion and sharp competition (Kasahara 2004: 23); and clearing away those obstacles to mutual trade and investment for a better regional economic development environment.

By continuously stepping up technological progress, investing countries keep their advanced position and create regional divisions through agreed specializations within a given industry (Kojima 2000). In the meantime, disorderly competition can be avoided. As a result, every economy in the region gains a lot from those external linkages that focus on continuous transactions among them. The region gradually develops industrial sophistication as a whole, and interdependence among regional economies increases. Growing interdependence among regionally-clustered economies in East Asia was interpreted as a sign of integration, and has been seen as a key factor in the establishment of the framework of regional integration (Kasahara 2004).

In short, Kojima believes that FDI is pro-trade not anti-trade, namely pro-trade-oriented (PROT) FDI (Kojima 2000: 382). It is because of FDI flows and technological progress that the rationalization of industry and the diversification of production can be realized. Furthermore, regional integration would be fostered along FDI flows. In the meantime, mutual liberalization on trade and investment would be assured by such regional integration (Kojima 2000).

Based on previous academic research, Ozawa further developed the flying geese paradigm. Ozawa observed that states need to make policies in three consecutive stages in the flying geese paradigm: industrial upgrading (IU) -- from low value-added to higher value-added industries; 'import substitution cum export promotion' (IS-EP) -- replacing imports with domestic output and later promoting exports; comparative advantage recycling (CAR) and adaptive efficiency enhancement (AEE) -- transplanting comparatively disadvantaged industries or industrial segments to other countries and keeping higher value-added industries at home (Ozawa 2001: 473). Ozawa believed that the outcomes of those policies for the three stages are sequentially interrelated. For the sake of the ultimate goal of the flying geese paradigm, industrial upgrade is essentially supported by governments, while it is ultimately driven by market forces (Ozawa 2001: 474). One of the distinctive characteristics of the flying geese paradigm is intentional and deliberate cooperation and engagement, both by leading countries and catching-up countries. In this way, a multilayered regional development pattern can be formed in a hierarchical way with the intention of regionally-clustered development (Ozawa 2001: 475).

Like Kojima, Ozawa advocated a significant role for FDI, but Ozawa emphasized more on the influences of FDI in the process of industrial upgrade. Ozawa stressed the importance of FDI brought by MNCs in different stages of the flying geese paradigm, which Ozawa believed facilitated the structural changes of a given country. Ozawa called it the 'Industrial upgrading model of FDI' (Ozawa 2001: 474). Four sequential stages exist in this IU model of the flying geese paradigm. The first is the Heckscher-Ohlin industries stage, in which labour-intensive manufacturing of textiles and other light industry goods expand. The second stage is through non-differentiated Smithian industries, in which scale-economies-based modernization of heavy and chemical industries including steel and petrochemical, occupy the main positions. Thirdly, it comes to differentiated Smithian industries in which assembly-based, subcontracting-dependent and mass production of consumer durables, such as automobiles and early generation electronics goods grow. And finally, the Schumpeterian industries stage includes mechatronics-based, computer-aided flexible manufacturing of highly differentiated goods and R&D driven products, such as latest generation electronics and more sophisticated microchips (Ozawa 2001: 474).

As Ozawa claimed, no clear-cut boundaries exist among those four stages, but a certain industrial sector can be recognized as the leading motivator of structural transformation along with national economic development (Ozawa 2001: 475). This was actually indicated by Shumpeter in 1934 as the ‘leading growth sector’ (Schumpeter 1934). At the same time, by reviewing Japan’s four key institutional arrangements, including state-directed bank-based finance of development, keiretsu formation, the inner-dependent sector and Japanese-style management (Ozawa 2001), Ozawa insisted on the key roles of governments in the whole process. During the entire process, governments made great efforts to support and protect infant industries, with the purpose of transforming them into competitive industries. As a result, strong domestic MNCs could grow. To make it happen, governments were required to heavily regulate and protect industries from fierce competition (Ozawa 2001: 481). As a matter of fact, by such a neo-mercantilist industrial policy, Japan successfully climbed up the ladder of industrial upgrade in the post-war period (Ozawa 2001: 485). It is worth noting here that the US played the role of FDI provider at that time (see Chapter Two and Chapter Four).

Both Ozawa and Kojima agreed about the catching-up process of the flying geese paradigm. They broke the whole production process down into subdivisions and proved the flying geese paradigm by way of an economic mathematical model. Moreover, both of them emphasized the crucial role of FDI, which they believed facilitated the structural changes of a given country. As a result, industrial upgrade was accelerated; trade was expanded; interdependence among countries was strengthened; and fierce and sharp competition among catching-up countries was avoided. The role of government is fully stressed by both of them. They elucidated that governments needed to take action in regulation and policies, both domestically and regionally to protect infant industries and support them to become the pillar industries of the country.

In terms of their contribution to the development of the flying geese paradigm, it was Kojima who first incorporated regional integration with the flying geese paradigm, convinced that such a catching-up process in the flying geese paradigm practically promoted regionally-clustered economic development and drove regional interdependence and regional integration through continuous FDI flows and government intervention (Kojima 2000: 376). Ozawa carried forward Amakatsu's idea of regional hierarchy and developed it into 'hegemon-led macro-clustering' or 'economies of hierarchical concatenation', which implies that a hegemon's economy spreads the stimuli for growth including technology and skills to countries that are closely aligned with it (Ozawa 1992, 2001, 2005). These closely aligned countries can have a free ride and thrive by depending on these growth stimuli. In other words, catching-up countries can reap benefits from the forces of hegemon-led macro-clustering (Ozawa 2003: 701). Although Ozawa agreed with the harmonious flying geese pattern of tandem development within East Asian economies, he laid stress on the significance of a hegemonic economy, namely, the need for a leading economy. The hegemonic economy refers to the US, which Ozawa believed took the role of 'promulgating growth stimuli', not only right after the war, but also in the current New Economy[4] (Ozawa 2003: 703). With regard to this hegemon-led hierarchical structure, more explanation will be given later.

2 The Theory of MNE--Hierarchy and Strategy

In 1960, by applying the principle of monopolistic competition between companies, Hymer proposed monopolistic advantage theory to explain FDI motives for transnational corporations. Hymer's research essentially focuses on MNC. Stephen Hymer is regarded as a seminal figure in the establishment of the theory of the multinational enterprise (MNE) (Buckley, 2006).

Under the condition of perfect competition, it is impossible for FDI to happen. However, there are various factors in real economic life. Imperfection of commodity markets, imperfection of market economy resulting from scale economy and imperfect market due to government intervention will directly result in imperfection of market (Dunning & Pitelis, 2008: 169). Therefore, Hymer argues that the essential reason and basis for MNC to start FDI is the imperfection of market. Moreover, the reason that MNC have monopolistic advantages is also the imperfection of market, which, as Hymer believes, is the key reason for MNC's FDI (Buckley & Casson, 1976: 69).

4 Information and telecommunication technology lies at the heart of New Economy.
The 'old economy' factors like firm-building capabilities, managerial skills, a substantial supply of skilled labor and connection to markets were crucial for the take-off of the 'new economy' (Audretsch and Roy 2000; Nezu 2000; Bresnahan, Gambardella et al. 2001).

In Hymer's view, he believes that MNC is an institution for international production rather than an institution for international exchange (Hymer, 1972). As Hymer argues, firms are institutions with distinct and definite nationalities, which determines that firms' expansion is not for the purpose of seeking for the diversification of their original industry (Buckley, 2006). That is because, as Hymer explains his opinion in this regard, firms' legal nationalities constrain firms behaviours. It is firms' obligation to pay dividends in certain currency and most shareholders have established their home in a certain nation. Moreover, the nationalities of firms' managers also affect their allegiance to some nation (Buckley, 2006: 141). Hymer concludes that firms are essentially not global firms.

The main motivation for MNC to start FDI is the desire to control foreign operations (Buckley, 2006: 141). In the eyes' of MNC, it would be much more profitable for MNC to take control of enterprises in more than one country if MNC would like to lessen and remove competition (Pitelis, 2002). Especially for those MNCs having advantages in a particular activity, they realize that it would be in favour of the MNCs to establish operation overseas. In more details, MNC can control their raw material requirements in a relatively safe way, by investing in foreign production enterprises directly. Moreover, they can also directly and tightly control their technology advantages for the purpose of maximizing quasi rents (Hymer, 1972: 47). MNC can also reach their goals of forestalling competition by directly invest in foreign production enterprises. (Hymer & Rowthorn 1970). Under such circumstances, Hymer argues that the direction of FDI mainly depends on the level of difficulty for overseas markets' accessibility.

One of critical questions asked by Hymer (1960) is: 'how can a foreign company compete successfully in an unfamiliar market, where is must be at a disadvantage compared to local firms'. Hymer makes detail elaboration on that. With the purpose of having and taking control of foreign value-added activities, firms must have advantages in innovation, cost, finance or marketing (Hymer, 1960). All these advantages owned by firms would be sufficient to outweigh the disadvantages they have to deal with when they compete with indigenous firms in the country of production. To successfully compete with indigenous firms, it is necessary for MNC to have advantages including 'access to raw materials', 'economies of scale', 'intangible assets such as trade names, patents and superior management' and 'reduced transaction costs when replacing an arm's length transaction in the market by an internal firm transaction' (Hymer, 1960). For example, MNC needs to continuously introduce new products by innovation if MNC would like to grow steadily at a rapid rate (Hymer, 1972: 45-46).

The development of MNC necessitates that firms should have their specific advantages and sufficient conditions, by which firms can make more profits. As for firms, they would rather exploit the advantages internally than license it out to external organizations, as the latter would not help firms make the expected sufficient profits (Buckley, 2006). For that reason, on the one hand, MNC will affect the direction of firms' development and local economy by relying on its monopoly advantages. On the other hand, MNC is very proficient and efficient in integrating internal markets in goods, services, capital and information (Buckley, 1990). Different from previous traditional methods of organizing international exchange, MNC eliminates the anarchy of international markets, which makes for a more extensive and productive international division of labour (Hymer, 1972: 59-60). MNC’s cross national business activities represent the social nature of production on a global scale. By this means, national seclusion and self sufficiency are possibly eliminated and a universal interdependence can be created (Hymer, 1972: 59-60).

MNCs mainly focus on overseas markets where few indigenous concentrations of capital are large enough to operate on a world scale. A new structure of international industrial organization and a new international division of labour will possibly appear when some MNCs are approaching to oligopolistic equilibrium (Hymer and Rowthorn 1970). As Hymer (1972) analyzes, the hierarchical division of labour within the firm tends to be produced under the regime of North Atlantic Multinational corporations. A few key cities in the advanced countries under such a hierarchical structure are usually used as the ideal choices for centralizing high-level decision-making capacities. The rest of the world is confined to the lower levels of activity and income (Hymer, 1972: 38). Under such circumstances, ‘income, status, authority, and consumption patterns would radiate out from these centres along a declining curve and the existing pattern of inequality and dependency would be perpetuated’ (Hymer, 1972: 38). Relations between countries can be described as superior and subordinate (Hymer, 1972). Such a hierarchical system works to the advantage of MNC that gains strong support from state through centralized control. In a sense, MNCs are essentially ‘private institutions which organize one or a few industries across many countries’ (Hymer, 1972: 52).

MNCs overseas expansion may possibly lead to uneven development. Hymer already noticed the phenomenon of ‘trickle-down to less developed countries’. As he quotes from Fallers (Fallers, 1963: 208-216),

> It helps keep workers on the treadmill by creating an illusion of upward mobility even though relative status remains unchanged. In each period subordinates achieves (in part) the consumption standards of their superiors in a previous period and are thus torn in two directions: if they look backward and compare their standards of living through time, things seem to be getting better; if they look upward they see that their relative position has not changed. (Hymer, 1972: 51-52)

Under the environment of the more open economy and the greater extent of foreign investment, local government might not be able to tax properly from MNCs. It is because some governmental policy instruments including monetary policy, fiscal policy and wage policy could possibly not that effective when MNC’s subsidiaries are not the properties of local government (Hymer, 1972: 55). Such a trickle down process might not be able to provide proper opportunities for underdeveloped countries to gain economic development independently and equally. Uneven development between advanced countries and developed countries would exist (Hymer 1972: 55-56). That essentially brings about the practical hierarchy structure among countries in reality: hegemon-led hierarchical structure.

By thoroughly examining the growing hierarchical division of labour implanted by firms on states and regions, Hymer argues that global economy would become 'increasingly locationally or spatially specialized with a hierarchy of specialized locations emerging' along with the increasingly specialized MNC (Buckley, 2006: 144). Hierarchy is of significance and it is a key characteristic within firms and a key feature of the global economy (Buckley, 2006).

It is because of the overseas expansion of MNCs that the possibility of national seclusion and self sufficiency are possibly destroyed and a universal interdependence could be created. With regard to solving the problems in international cooperation, MNCs would not provide a perfect solution as private institutions. It creates hierarchy rather than equality, and it spreads its benefits unequally (Hymer, 1972).

Monoplistic competition laid strong basis for FDI study. It clearly argues that the motives for MNC's FDI are to strengthen and improve their monopolistic advantages. That helps understanding the behavours of American MNCs (Dunning and Pitelis, 2007). One of the crucial prerequisites of MNC's FDI is the monopolistic advantage of enterprises. By focusing on overseas markets where few indigenous concentrations of capital are large enough to operate on a world scale, Hymer's research highlights that multinationals locate different activities in different locations. In this regard, Hymer's theory has similarities with the description of the flying geese theory that believes continuous transferring process from advanced country to developing countries. Hymer's theory also contributes to clarification of MNCs' overseas behaviours for the purpose of strengthening monopolistic advantages. That essentially helps understanding the structure of production networks at the regional level and at the global level.

However, as Hymer's research is mainly based on American MNCs that have obvious monopolistic advantages, Hymer does not successfully explaining FDI from developing countries that do not have monopolistic advantages. Moreover, Hymer does not give full elaboration on those enterprises that start investing overseas directly without accepting licenses of export and technology transfer (Pearch and Papanastassiou 2006). That is one of key limitation of Hymer's research. As researches in this field go on, more and more scholars realize that the development of enterprises' advantages is indeed a dynamic process. As enterprises develop by running FDI, it is possible for those enterprises with certain strength gradually develop and upgrade their monopoly advantage.

3 Refining the Theory with Wintelism and International Production Networks

Wintelism and International Production Networks

Three new forces caused the global economy to be, in Castell's terms, transformed from a 'space of places' into a 'space of flows' (Castell 2000a: 171). These were: the globalization of production networks, defined as 'an arrangement linking a multitude of producing units in different countries so as to provide all components, materials, and management for the assembly of a particular products'; increased intergovernmental disputes over bilateral economic relationships; and the fast-changing technology that has 'fragmented product market and decentralized the locus of manufacturing activity' (Bernard and Ravenhill 1995: 172). In the mid-1980s, new electronics markets started to converge on a cost-effective, common technological foundation of networkable and microprocessor-based systems (Borrus and Zysman 1997: 16). Such a shift in the market led to the birth of Wintelism in the 1990s.

As the expression originated from Microsoft Windows and Intel Microprocessors, Wintelism actually reflected the dynamism brought by the emerging electronics sectors that is driven by the forces of information and telecommunications technologies (Friedman 2006). It originated from the success of Microsoft's Windows in operating systems and Intel's central processing unit in the computer processor market; hence *Wintel*-ism (Tan 2001: 2). The appearance and the victory of Microsoft and Intel are believed to have created even fiercer competitive markets, in which components and subsystems through operating and applications software can be subdivided, and the standards of a given manufacturing, including products and software, can actually control the competition of the whole industry (Borrus and Zysman 1997).

Wintelism emphasizes how market competition can happen anywhere in the production value chain, including components, subsystems, system assembly, operating system software and applications software, which traditionally are an integrated system and were tightly vertically or hierarchically controlled by some traditional powerful corporations (Tan 2001: 2). Wintelism argues that the vertical control of markets by traditional corporations such as Japanese *keiretsu* trading groups and final assembly is already outdated (Borrus and Zysman 1997). Distances are no longer restricting factors, given tremendous improvements in telecommunications, and the globalization of finances and the continual reduction of entry costs make transactions much easier. At the same time, systems products have shifted away from stand-alone proprietary systems[5] to open-but-owned systems[6] intended to be interconnected into digital information networks (Borrus and Zysman 1997: 18). An era marked by digital electronics thus replaced the era symbolised by mechanical and electro-mechanical products. In such circumstances, as long as a country or an industry could grasp a minimum capability to profit by manufacturing certain segments and components, the country or the industry could be competitive. In other words, the idea of having competitiveness in a whole product for upgrade became obsolete (Jones and Kierzkowski 1990). Companies in the ICT industry can be very competitive in markets as long as they are specialized in some parts of the production value chain, which helps

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[5] Stand-alone proprietary system implies that the vertical control over technologies and manufacturing was the key to market success, and it was necessary to capture closed system rents and lock customers into proprietary standard (Borrus and Zysman 1998: 8)

[6] Two factors accelerated the shift to open-but-owned systems that helped to spread and consolidate Wintelist business strategies. First, it is much more difficult for any company to maintain ownership and control over all of the relevant technology because of the increasing cost and complexity of continuing innovation. Second, major industrial users made increasingly strident demands for increasing interoperability of complex systems purchased from multiple vendors. Open-but-owned systems refer to 'open at the interface to permit interconnection of systems from other vendors, but owned to reap a return from innovation. In short, users demanded highly functional and interoperable systems'. Open-but-owned standards are the hallmarks of Wintelism (Borrus and Zysman 1998: 41).

them further separate the market within the industry (Borrus and Zysman 1997). Comparative advantage could easily be lost to far-away competitors, since market power can be found anywhere in the value chain; for example, components, software and R&D.

The competitiveness of countries and companies will be strengthened if they are capable of setting and developing product standards in markets, especially for those product standards that take significant roles in a market that is characterized by vertical specification (Borrus and Zysman 1997). That is because it essentially implies control over the market. Some components or software made or designed by some companies have already become *de facto* market standards (Borrus and Zysman 1997: 16). Strategies to set and control the evolution of the standards were developed (Borrus and Zysman 1997). To put it briefly, those who have advantages in designing products and setting standards in some specialized and separate markets can be winners. In such circumstances, location is no longer a key factor in the value chain. And those who take control of key standards can define the terms of competition, not only in their particular segments, but also in the final product markets (Borrus and Zysman 1997: 17).

Changes that occurred in the ICT industry essentially sparked the appearance of Wintelism, which actually brought the world into a new era in terms of the means of implementing and controlling production and manufacturing. The architecture of the global manufacturing industry also sees a predominance of international production networks (Yun 2003: 170). International production networks essentially refer to an attempt to capture the spread of broader and more systemic forms of international production that cut across different stages of the value chain and that may or may not involve equitable ownership (Ernst 1997). The industry's value chain can be subdivided into constituent functions that can be contracted out to independent producers wherever those companies are located in the global economy (Borrus and Zysman 1997). As a matter of fact, international production networks have been in existence ever since the Pacific War. The tremendous changes in the ICT industry transform further international production networks.

International production networks are regarded as conceptual frameworks that grasp the relevant global, regional and local economic and social dimensions of the processes involved in the many forms of economic globalization (Henderson, Dicken et al. 2002: 445). They combine a 'concentrated dispersion of the value chain across firms and national boundaries, with a parallel process of integration of hierarchical layers of network participants'(Ernst and Kim 2001). International production networks refer to the relationships between companies that set business strategies, including organizing manufacturing, customer support services, R&D, procurement, distribution and production design in a given industry and all relevant economic activities that are actually across national borders (Borrus and Zysman 1997). Such production networks cut through state boundaries in highly differentiated ways, partly influenced by regulatory and non-regulatory barriers and local socio-cultural conditions (Henderson, Dicken et al. 2002: 446). Put simply, every function or sub-stage of value chains is spatially or geographically transferred to the most efficient site by offshoring or outsourcing, and carried by different firms including MNCs and local companies (Yun 2003). Without denying the inherent hierarchy and dependence, international production networks actually strengthen mutual benefits and enhance local manufacturing capacities through offshoring and outsourcing (Yun 2003: 173). Such a network thus increasingly enhances the building up of a more efficient production system (Yun 2003). In brief, it can be assumed that international production networks offer more chances to those countries that have strong technological power and facilities to succeed even without 'being giants'.

International production networks are believed to be multi-scalar, ranging from the local and national to the regional and global (Dicken and Malmberg 2001). Two major forms of international production networks have been seen so far: Turnkey Production Network Services[7], and RPNs. The former means that some leading firms take control of the entire manufacturing network. Production networks happen between the leading firms and their customers, with the purpose of providing turnkey (Borrus and Zysman 1997). The latter indicates that varied individual activities are reintegrated into entire production systems that explore local specializations throughout the region (Borrus and Zysman 1997).

An even more intricate division of labour was explored in such networks, in which not only lower wages and access to markets and natural resources, but also the mixes of technology and production at different cost performances are major motivators for initial investments. Moreover, international production networks are constructed through a mixture of contracts and FDI, and a balance of internal and external management, which means that MNCs do not have to become too involved by taking advantages of turnkey services. Furthermore, although local economies might import technology and skills at the very beginning of their economic development, local

[7] In 1990s, evidence from the electronics industry suggested that a new American model of industry organization emerged. American electronics firms started outsourcing an increasing share of their production. As a result, manufacturing capacity is building up in turnkey production networks. Turnkey production networks consist of specialized and highly capable merchant suppliers that provide the industry with a functionally coherent set of commodified production services (Sturgeon 1997: 3).

innovation and creation capabilities play crucial roles as long as the local economies wish to upgrade.

Changes in technology, then, especially in ICT, play key roles in adding new characteristics to Wintelism and international production networks. Wintelism is more theoretical, while international production networks provide an organizational framework for Wintelism. In a sense, they are essentially the same and usually interchangeable, but the relationships between them are the relations of content and form. Huge changes happened in production networks after Wintelism appeared. Motivated by the international fragmentation of production, the trade of final goods has been gradually losing dynamism and there is more trading on parts and components, middle products or fragments of final goods.

All in all, the main idea of international production networks driven by Wintelism is that even those following countries that are located on the bottom tiers of the flying geese paradigm can gain more benefits, thanks to a given specific advantage in some part of production value chains. This advantage results directly from the changes caused by the rapid development of the ICT industry. It implies that those following countries do not need to wait very long for technology transfer to happen, and do not follow the recognised path from import to domestic manufacturing, to export and to reverse export. Instead they can leap and jump up several rungs of the ladder as long as they win advantages in some parts of production value chains.

The theory of international production networks overvalued the significance of technological changes and the power of ICT in shaping and transforming global networks. Although the roles of government are indeed addressed in the theory, businesses supported by rapid technological changes are still believed to be able to transcend political and other borders between territories (Henderson, Dicken et al. 2002). As Evans once noted:

> Trade happens globally but not nationally; products are created through the integration of production processes performed in a multiplicity of national territories, and whether any given territory is included in global production networks or excluded from them depends on the decisions of private actors rather than states, while states can try to make their territories attractive but they cannot dictate the structure of good production networks. (Evans 1997: 66)

However, in East Asia where every national state places sovereignty at a premium, businesses cannot make arrangements simply according to business interests. In comparison, the flying geese paradigm stresses the significances of states, and indicates that the fundamental reason for East Asian countries to take the flying geese model is because they use it as their national development strategy for the purpose of enhancing comprehensive national power.

Moreover, the theory of international production networks holds that any country could be a ‘giant’ as long as the country has advantages in manufacturing some parts of the production value chains. That is similar to the view of the fragmentation theory, which was proposed by Jones and Kierzkowski. The main idea of the fragmentation theory is as follows:

> 'locating fragmented production blocks in different locations, and becoming cost-saving when the production cost substantially falls and the cost of service links for connecting production blocks is low enough' (Kimura 2006: 335).

As a matter of fact, the rapid changes in technology, particularly ICT, did contribute to providing more opportunities for each national state to accelerate their industrial upgrades and climb higher up the development ladder earlier. However, positional changes on the development ladder do not wholly depend on the strengthening power only in some parts of production value chains. Rather, they are determined essentially as a result of an overall consideration of national economic and political power. But the essence of the flying geese paradigm is based on industrial upgrade as a whole, and not on the improvement to some parts of production chains. In other words, the theory of international production networks confounds the concept of an individual firm's development path and the concept of a national state's development path.

Criticism and Usefulness of The Flying Geese Paradigm

It was not Akamastu's purpose to use his theory as a way of lending intellectual legitimacy to the Japanese government to justify the Greater East Asian Co-prosperity Sphere. It was, however, used in this way. Akamastu might also not have expected his theory would later be regarded as a theoretical basis for Japan's regional development strategy in the 1980s. East Asian economies have actively established close and tight linkages through trade and investment, and exhibited remarkable performances that were labelled the 'East Asian Miracle' by the World Bank (World Bank 1993).

The flying geese paradigm is undoubtedly a very popular theory for explaining East Asian economies in the 1980s and the 1990s. However, it has also been highly criticised, on a number of counts. Most of those voices have concentrated on the fact that the flying geese paradigm was actually used to explain what happened in East Asia before the Asian Financial Crisis, while it could not be applied to East Asia in the face of a rising China or following the recession in Japan (Tung 2003). Especially immediately after the 1997 Asian Financial Crisis, people started to argue that the flying geese theory failed to justify Japan's reluctance to be a major exports absorber. Because of changes that happened during the IT revolution, the appearance of international production networks also challenged the application of the flying geese paradigm, as it failed to explain that countries in East Asia can climb higher up the ladder faster if they hold capabilities in one subsection of a product manufacturing process.

Moreover, the flying geese paradigm was also challenged from eight important angles (Kasahara 2004). First, flying geese paradigm is challenged for 'the ambiguity of the technology transfer mechanism' (Kasahara 2004: 14), which means that the flying geese paradigm does not give a convincing explanation on how and when advanced technology is transferred from advanced countries to developing countries. Neither does this paradigm explain how important to economic development are the advanced technologies that were transferred to the developing countries. It is true that the original version of the flying geese paradigm failed to provide a detailed description of the mechanisms of technology transfer. However, Kojima and Ozawa later argued that technology would be transferred to other countries along with the FDI that drives the establishment of manufacturing factories and overseas affiliates (Kojima 2000; Ozawa2001). Second, the "reverse import" idea is based on the perceived maturation pattern of production and technology (Kasahara 2004: 15). Third, by replicating some parts of the experiences of the forerunners, the second-tier and lower-tier countries are capable of burgeoning manufacturing through catching up processes (Kasahara 2004: 15-17). As for the challenges on the 'reverse import' idea and the contrasting catching up processes, Shinohara concluded that the 'boomerang effect' offered a reasonable explanation for the rise and fall of economic power in the catching-up model of the flying geese paradigm (Shinohara 1996). Shinohara, as the first to present Akamatsu's idea to Western academia, showed a reverse flow of imports from the Newly Industrialized Countries (NICs) to the advanced capital-exporting countries, which Shinohara called the 'boomerang effect' (Shinohara 1996). The boomerang effect would finally lead to the 'industrial hollowing phenomenon' in advanced countries, since those market shares originally held by advanced countries were later taken by following countries (Shinohara 1996). Shinohara proved that any industrial upgrade process is a continuous catching-up process and catching-up countries indeed have opportunities to replace the position of advanced countries.

Fourth, in reality, East Asia does not always follow the pattern of import substitution-export promotion, which results in the process of import substitution is much more incomplete in some second-tier NICs, particularly in the area of consumer products (Rasiah 1998; Yoshihara 1988). Fifth, the self-containedness of the paradigm refers to the fact that the US took a significant role as an export absorber and advanced technology and FDI provider, while Japan mainly outsourced technology and intermediate products to other East Asian countries. This is significant because it means that the implementation of the flying geese paradigm within East Asia needs support from third-party markets (Nester 1992: 121; Rowthorn 1996: 4; Kasahara 2004: 18).

However, as for the self-containedness of the paradigm, Cumings defended the flying geese paradigm in a historical way. The role of the US was indeed identified and addressed, which proved that the flying geese paradigm had never implied that RPNs should be exclusive and isolated (Cumings 1994). Sixth, the presumed diffusion of Japanese-style business practices was evaluated as a ‘prescription’ for other East Asian countries (Bernard and Ravenhill 1995: 184). However, the ‘prescription’ did not always apply to the situations in different countries. Seventh, ideologically there is no consensus about East Asian regional integration because ‘regional integration does not progress without creating various tensions among States’ (Kasahara 2004: 21). Finally, it was also criticised on the grounds that it did not in fact create stability in the regional hierarchy. And this is important because the relations between domestic producers and foreign investors are usually shaped by ‘negotiated confrontation’ (Kregel 1997: 225). Some economies might be excluded from the regional clustered development process (Kasahara 2004). As for the stability of the regional hierarchy, both Akamatsu and his successors (Ozawa 1995; 2001) arugued that flying geese paradigm was essentially a process of circulating or recycling comparative advantage and elaborated that some countries might descend the ladder due to synthetical national power or to a stagnant technology innovation process, and the position of leading goose would possibly be taken by a follower (Ozawa 1995). That would not essentially affect the stability of the regional hierarchy; however, the characteristics of RPNs would be marked by the rise of the new leading goose to varying degrees.

In spite of such trenchant criticisms, this theory does nevertheless summarize Japan’s economic development path since the 1930s (Korhonen 1994), and gives us a lens to see the regional economic and political impacts that are brought by a more powerful state.

As this thesis will demonstrate, the flying geese paradigm might have some difficulties in explaining some empirical work under such circumstances; however, the flying geese paradigm still provides a comprehensive framework and a theoretical basis, from which to uncover the essence of the East Asian economic development model and its impacts. The flying geese theory describes and fully explains what happened in East Asian economic development, how this happened, and what future it is supposed to bring to the region. The flying geese theory has always been claimed to be the one that accurately describes the picture of the East Asian catching-up process through a regional hierarchy structure (Kasahara 2004), in which Japan plays the lead goose and others follow. The flying geese paradigm offered a classic explanation to describe the East Asian Miracle and it can be applied to an understanding of East Asian economic regionalism, as the rest of this thesis will argue (Harvie and Lee 2002: 126). Akamatsu, was one of the very first to recognize the economic significance of 'the alignment from advanced nations to backward nations according to their stages of growth'(Akamatsu 1962) and by the early 1990s 'the flying geese theory had come to be a quite standard term for referring to the East Asian model of development' (Korhonen 1998: 144).

Based on the thoughts of the flying geese paradigm, the annual report of the United Nations Conference on Trade and Development (UNCTAD) offered an interpretation of the integration and industrialization processes in East Asia. The flying geese paradigm was believed by the UNCTAD (1996) to show the establishment of a regional division of labour that was based on 'industrial and locational hierarchy', and pictured the life cycle of various industries from one country to another through trade and foreign direct investments in response to the shifts in competitiveness (UNCTAD 1996). In the UNCTAD (1996) report, the significance of the flying geese paradigm lies in the analysis of the linkages between the different countries in a regional hierarchy; the mechanism by which development is transmitted from one country to another; the respective roles of policy and markets in this process; and the stability of the process itself (Ginzburg and Simonazzi 2003).

It is still true that technology transfer is even more difficult when there are large gaps between countries' economies (Hill and Athukorala 1998: 42), especially when advanced countries are extremely alert with regard to technology transfer, such as Japan. So-called technology-spill-over effects would not happen in such circumstances. As for the mechanisms of the 'circulation of catching-up', more detailed proof is needed to show how these mechanisms work. However, with the emergence of the New Economy, which is characterized by the ICT boom and the revolution in the international production networks, subsections continuously emerge during the entire manufacturing process of one product. As a result, almost every country has an opportunity to be a 'giant' as long as it has a key technology in one subsection of its entire production networks. This essentially helps to explain the step-by-step mechanism of technology transfer from advanced countries to developing countries. Moreover, more countries get the chance to jump and leap in the RPNs because of the ICT boom in the international production networks. Thus, the FGP can still be used to explain the catching-up process in RPNs.

D. Applying the Theory

1 Structure and Agency

The word 'structure' indicates that all aspects of social life are assumed to be structured, such as modes of production that structure social formations (Stones 2007). In Durkheim's view, structure is opposed to individual or group of agency. In other words, for him the features of social existence are primary and immutable, which are defined as structures that can be reified. Structure also implies stability, which helps to explain how social life is shaped into consistent patterns. Giddens insisted that structures shape people's practices, and social systems are constituted by both the medium and the outcome of the practices. In the meantime, people's practices constitute and reproduce structures (Giddens 1981: 27).

According to Giddens's definition, structures consist of rules and resources. A structure is a complex of rules with a virtual existence, while practice is an enactment of these rules in space and time. Levi-Strauss refers to structure as a set of rules (Levi-Strauss 1963). Giddens defines rules as generalizable procedures that can be extended to and applied in the production and reproduction of social life (Giddens 1984: 21). Resources are defined as anything related to serve as a source of power in social interactions. Giddens defines resources as 'the media whereby transformative capacity is employed as power in the routine course of social interaction'. In this view of things, Giddens believed that structures must be regarded as 'dual' (Giddens 1976, 1979, 1981, 1984): not only rules, but also rules and resources (Giddens 1984: 377).

By comparison, agency is believed to be a more processual and active dimension of society. Agency is not in opposition to structure but a constituent of structure. In Giddens' view, human agency and structure are far from being opposed, they presuppose each other (Giddens 1976: 161). To be an agent indicates that an agent has power to exert influences and control over the social relations. In addition, the agent is also capable of transforming the social relations in which the agent exists. Agents understand rules well and they have capabilities in getting access to resources. As a result, that lends themselves to enact structures by putting into practice their necessary structured knowledge (Sewell 1992). For example, based on the knowledge that agents have on rules, the agents would be able to make arrangements over a series of resource mobilizations. As such, social relations and structures may be then changed. In short, agency implies that actors have the capacity, and gain power, to change and apply schemas to new contexts.

In the meantime, the various natures of structures determine the knowledge and resources that persons would have (Sewell 1992). In other words, the intentions and knowledge of agents are normally influenced by the structures that enable agents to varying degrees.

Hindess argues that agency must be applied in the same sense to collectivities as it is applied to individuals (Hindess 1986). But agency is profoundly social or collective. The ability to coordinate actions among agents is necessary for agency. The positions that individual persons have in collective organizations directly determine the extent to which the individual persons can exert their influence. An individual's capacity is affected by structures, while structures can be transformed when individuals are powerful enough to act to transform them (Sewell 1992).

Power, as one of the resources defined in structures, is essential in structures. States that have stronger power have more influence to maintain structures. However, as mentioned above, structures are not immutable. In such circumstances, no states can be sustained without going through structural transformations (Sewell 1992). For example, states with less power may also exert an influence over the transformation of structures, since political structures are not taken for granted, but are consciously established, maintained and fought over. In the meantime, a structure is usually transformed by external changes, rather than by the operation of structures inside a society. All the above is important and relevant for understanding the roles of the state and businesses in RPNs.

2 Theories of the State and State and Production Networks

Understanding the State

The state is still the main provider of governance services to societies having emerged, according to Spruyt, as the winner of a long competition between different ways to organize political authority (Spruyt 1996). The state can be broadly defined as 'the one whose component parts include but reach beyond the legislative, bureaucratic and coercive elements to include other social organisations such as business, the church, media, Masonic lodge and the like' (Koenig-Archibugi 2002: 19). As an institutional form, the state possesses a near monopoly of the legitimate use of violence and expands its activity into most social spheres (Fawcett and Hurrell 1995: 46). Apart from all the other characteristics of the state, sovereignty is the dominant one, by which the state is endowed with autonomy in domestic politics and economy and in foreign affairs (Väyrynen 2001; Krasner 2009). Maintaining national interests is the primary and the utmost important function for a sovereign state to survive or improve survival vis-a-vis other states.

The State and Neo-realism

Neo-realists insist that the structure of the international political system and policies of major states will ultimately determine the so-called autonomous market process (Fawcett and Hurrell 1995: 53). Almost all states in the region, especially weak states, will be influenced by external constraints and the structure of the international system. Only when material interests and incentives can converge or the power of the regional hegemon can be extended, would regional cohesion be possible (Fawcett and Hurrell 1995: 53). States choose to cooperate when their goals cannot be achieved at acceptable costs through unilateral action, while cooperation with others can achieve them more effectively (Ravenhill 2001: 7). Moreover, if cooperation were to go against the states' geopolitical interests, it would be firmly opposed. Bargaining chips in negotiations determine the shape of the international economic order. In such a situation, economic cooperation can be seen as a strategy in the game of neo-mercantilism (Fawcett and Hurrell 1995). For example, in the Asia-Pacific region, the evolving balance of power between China, Japan and the US essentially influenced the fate of existing regionalism, such as the ASEAN and broader cooperative schemes including the Asia-Pacific Economic Cooperation (APEC) and the ASEAN Regional Forum (ARF) (Fawcett and Hurrell 1995).

Changes in the global economy, particularly in technology and production systems, have driven almost all states to reconsider the ways in which they have defined the two most important goals of their foreign policies: economic development and political autonomy (Fawcett and Hurrell 1995: 59). States are required to protect their national industries and to strive for as many FDI inflows and as much technological support as possible. They also need to create a favourable policy environment by opening markets or reducing tariffs. States have to face dilemmas between, for example, the:

> nationalistic urge to keep foreigners … out of their core economies and the need to open up in recognition of the fact that their institutions and behaviour must accommodate international trade and investment if they hope to underwrite more robust economic growth and industrialization (Lincoln 2004: 4).

With a growing range of trade-offs, states consider cooperation at different levels leading to a further deepening of interdependence among states. Once such interdependencies are established, the states of a given region are all in the same regional boat, strategically and economically. As a result, to varying degrees, all the relevant states put aside their national foci and work out regional resolutions (Fawcett and Hurrell 1995: 39). For example, the emergence of economic regionalization in East Asia is essentially an attempt to find a middle path to keep the West at arm's length by creating a preferential opening up between the East Asian countries (Lincoln 2004).

In summary, the role of the state plays an undeniably important role. The state cannot afford to be weakened in any kind of regional cooperation, but at the same time must seek to cross the geographical boundaries that separate it from other states. Does the state formulate policies to promote and drive cooperation at all levels? Or does it stick with absolute national sovereignty without making any cooperative gestures? Of course, states' reactions depend on domestic needs or pressures. But sometimes they rest on external pressures. In short, so-called economic interaction among countries is not a real 'natural' process, but to a large extent it depends on support from state policies and regulations. Economic cooperation in a region necessitates leadership, either nominal or *de facto*. For example, Japan provided a large amount of investment and increased the speed of establishing its overseas manufacturing basis in the 1980s, which to a large extent drove other East Asian countries' economic growth and further consolidated the whole region. However it was the US, and not Japan, that absorbed a huge proportion of exports from East Asia. That is important because it shows the trade pattern in the East Asian region and also helps to explain changes brought by the emergence of China's ICT industry, which will be further discussed in Chapter Three and Chapter Four.

The State and World System Theory

National states are regarded as the conventional unit of analysis in World System theory. Wallerstein elucidated that the capitalist mode of production essentially rests on division, in which core producers provide industrial and commercial products while semi-peripheral economies take the role of balancing between core economies and peripheral economies. Peripheral producers then provide natural resources and their advantages mainly centre on cheap labour (Wallerstein 1979). In Wallerstein's world system theory, the balance of power in multilateral international politics is established on the basis of the capitalist mode of production, and such a balance of power makes the basic political structures that support the world's capitalist mode of production (Wallerstein 1979).

Both core national states and peripheral national states strive for more accumulation of economic benefits from the world economic system, which results in competition between countries. How much an individual country can win from such competition depends on the comprehensive national power and competitive capabilities of that individual country (Wallerstein 1979). Along with the whole process of such competition, core economies can accumulate much more than peripheral countries, which finally determines the position of each country in the world capitalist mode of production, namely, relations between core and dependent (Wallerstein 1979). Wallerstein also indicated that such a world system is not static but dynamic. The dynamics of capitalism determine that there is a period of growth and recession, which implies that core economies might become semi-peripheral or peripheral countries some day. As a result, the position of each country would be switched. In a sense, Wallerstein's world system theory has something in common with the flying geese paradigm, such as non-static order among countries and the spread of technology. However, the world system theory mainly focuses on understanding the world capitalist system and analyzes the development path of world capitalist system.

Wallerstein also pointed out that the balance of power system caused a situation where no core economies can monopolize the world economy, since intense competition for an accumulation of economic benefits exists between core economies and peripheral economies (Wallerstein 1979). Each economy fights to maximize its benefits and drive capital in the direction that favours its own interests, through various political and economic strategies. These strategies actually provide more opportunities for spreading technologies globally and prevent any given country from taking control of the world economy and securing monopolized interests (Wallerstein 1979). All in all, Wallerstein insisted that the world capitalist mode of production system would not change because of the existence of the balance of power system.

The State and Hegemonic Stability Theory

As Wallerstein mentioned in his world system theory, core economies, which accumulate much more than peripheral countries, finally determine the position of each country in the world capitalist mode of production. As a matter of fact, this idea can also be seen in Kindelberger's hegemon-stability theory. According to Kindleberger, the hegemon controls the provision of international public goods (Gamble and Payne 1996: 5; cite Kindelberger). Kindleberger argues that the hegemon is the country that consciously or unconsciously is prepared to set standards of conduct for other countries and got other countries to follow them; in the meantime, all these were carried out under some system of rule that it has internalized (Beeson 2002: 30; cite Kindleberger 1973: 28). In Keohane's view, the hegemon refers to a single country that has supreme dominance (Keohane 1980: 132), such as Great Britain in the nineteenth and the US in the twentieth centuries. Keohane describes the hegemon as having or having access to the 'preponderance of material resources' (Gamble and Payne 1996: 4); and such material resources then provided the means by which the hegemon could both make and enforce the rules of the world political economy. As a result, power is conceptualized in terms of traditional resources and hegemony is regarded as power (Gamble and Payne 1996). In sum, as Cox's definition on hegemony shows:

> dominance of a particular kind where the dominant state creates an order based ideologically on a broad measure of consent, functioning according to general principles that in fact ensure the continuing supremacy of the leading state or states and leading social classes but at the same time offer some measure or prospect of satisfaction to the less powerful (Gamble and Payne 1996: 7).

Though scholars give definitions on hegemony from different points of view, there is a common ground among their opinions: the hegemon is the state with the absolute advantages in political, economic and military power; the one that can and would like to intervene and control the international system and international affairs. To gain these ends, the hegemon will establish relative rules and norms to discipline other states so that each could 'feel secure enough to open its markets and avoid beggar-thy-neighbour policies' (Milner 1998: 113). This definition of a hegemon implies two important aspects: one is internal—referring to whether a state has the capability for hegemony and the will to be the hegemon to discipline others; the other is external, concerning whether the hegemon can ensure that the established rules and norms function as expected.

Kindleberger's hegemonic stability theory focuses on the role of leading states. Just as its name implies, the factor of power takes the core position in this argument. Leadership essentially implies the three attributes of the hegemon: the capability of the hegemon, the will to be the hegemon and the hegemon's commitment to the international regimes (Mastapeter 2008). That is important because it corresponds to the characteristics of the leader in the flying geese model. As the flying geese paradigm emphasized, several key factors are needed to be in place for the model to function. Firstly, the leading goose must be capable of continuously providing technology and capital, and implementing continuous industrial upgrades and adjustments. These are essential for driving the development of other countries. Secondly, there must be sufficient market demand for all the exports products manufactured by the members of the RPNs. Thirdly, the countries at the catching-up stages must always have access to capital and technological support when needed. Fourthly, there should not be a huge difference in the pace of development among the leading strata of geese. These are similar to the major points of leadership that are emphasized in the hegemonic stability theory. The hegemonic stability theory stresses the importance of leadership; emphasizes the importance of power; and believes that the world is anarchic and that all states are selfish. As Olson states, it is evident that a hegemonic state should have the will to provide collective goods, if they can be obtained at a sufficiently low cost compared with their benefits, and if the hegemon believes that it would gain from providing these collective goods (Olson 1965: 22). In addition, no states other than the hegemon have enough capability to provide international public goods. Therefore, only the hegemon can provide those collective goods needed for the smooth running of international affairs, such as international regimes.

The hegemonic stability theory better explains the importance of the hegemon for the creation and maintenance of international regimes. Hegemonic structures of power are most conducive to the development of strong international regimes, in which rules are well obeyed. The decline of hegemonic structures of power indicates the decline of the strength of corresponding international regimes (Keohane 1980: 132). In short, international regimes cannot survive if the hegemon collapses. All international cooperation would be impossible without the existence of the hegemon unless a new hegemon could replace the old one.

The State and Production Networks

As mentioned above, every state formulates trade expansion and growth policies based on its national priorities. Growth and industrialization are typically considered at the national level (Arndt 2001). National policies and actions hold considerable competitive elements when the growth goals pursued by the countries of the region are similar (Arndt 2001). At the same time, the implementation of a regional system of production networks requires a harmonization of regulatory and other policies and the removal of barriers to the flow of services, persons and finances among countries. In such circumstances, it is necessary to clarify the role of the state in production networks.

Based on the above reflections, it would not be difficult to understand why national policies and actions among countries might be competitive or even in rivalry with one another. Each state sets its development strategies based on its its own particular needs and circumstances. Such autonomy will not be changed or eliminated because of involvement in production networks. However, policies and regulations made by different states add different weight to production networks, due to the differences in their national power. The state with stronger national power can independently set policy goals of particular groups and change the group's or the class's behaviour, and even the structure of the whole society (Cumings 1984). One state's national priorities might be influenced by the leading state's policies when the leading states sets clear goals and takes practical steps to meet them (Korhonen 1994: 101). There are some similarities in the roles of states that are located at different phases of production networks.

States need to make the correct national development strategies, depending on their international, regional and domestic situation. For example, after the Pacific War, pursuing neo-mercantilist policies was central to Japan's development strategies. In the 1950s, Japanese markets were protected from entry by other countries; foreign capital was refused; various incentives and subsidies were offered to restructure the industrial base, and Japanese business was encouraged to conquer foreign markets in the 1960s and the 1970s (Cumings 1984). All those policies and actions were made on the basis of analyses of US foreign policies for Japan, and in the face of suspicion towards Japan by other East Asian countries. In addition, there was an urgent need to rebuild the Japanese domestic economy. Having set these goals, the Japanese state had to set out key strategies to attain them.

National comparative advantages should be figured out before all the other measures are carried out. On that basis, national resources are reallocated. For the purpose of maximizing benefits brought by comparative advantages, states need to implement strong measures for protection, including tariff policies or import restrictions for nascent industries. Such protection might risk impoverishing the economy due to the failure of local industry in pursuing efficient development (Korhonen 1994: 97). At the same time, state policies guide and support national firms to access and learn new technology (Ray, Ida et al. 2004: 464). States are expected to take reasonable action to adopt and import advanced foreign technologies for further facilitating the expansion of its industries.

Moreover, to solve the problem of a shortage of capital, it is imperative for states to take important measures in making favourable policies to attract FDI from MNCs, such as lowing tariffs and duty drawback.[8]

National states are responsible for providing public goods no matter which stages states are at. Clarida and Findlay proposed that the interference of governments in education, transportation and telecommunication and other relevant social public facilities would essentially improve the efficiency of private companies. They explained that this hinged on the 'free-rider problem' and the non-exclusivity of public facilities, which make private companies lose motivation in providing public facilities and services, and yet these are also crucial for the operation of private companies (Clarida and Findlay 1992). The consequences of all the above policies and actions occur mainly within the state. Once states determine to start or expand exports, bilateral or multilateral negotiations on trade, FDI and technological cooperation are needed beforehand or along with various economic transactions. Whether general consensus can be reached directly affects the form of production networks. In a sense, production networks involve a group of countries with competitive relationships, though that group of countries has common agreements on the directions of their economic interactions (Korhonen 1994: 95). However, not all common agreements are made under completely fair conditions, because of differences in national power. Based on the institutional arrangements on growth stimulation in open market capitalism, the state with more power spreads the growth stimulus that includes the dissemination of technology, knowledge, skills, market information and demand, to its closely aligned cohort of countries that are at

[8] Duty drawback (or rebate) systems reduce or eliminate the duties paid on imported intermediate goods or raw materials used in the production of exports. When a firm imports an intermediate product for use in the production of an export good, tariff payments on the imported intermediate good are either waived (duty drawback) or returned to the producer once the final product is exported (rebate). These incentive systems are often justified on the grounds that they tend to correct the anti-trade bias imposed by high tariff levels (Olarreaga, Cadot et al. 2001).

lower stages of development (Ozawa 2003). In a sense, production networks illustrate the particular characteristics of their constituent states, since globalization has not lessened the significance of national distinctions that are based on ownership and originality (Borrus, Ernst et al. 1999).

Once production networks are established, they can be motivators for states to make relevant adjustments to their domestic policies and to improve the relationships among countries. Moreover, the development of regional economies can also be stimulated in such circumstances. For example, the networks between Japan-Asian NIEs and the US essentially promoted an upward trend of economic tides in both the Asian NIEs and the Japanese economies (Ginzburg and Simonazzi 2003).

As Cumings's detailed discussion (in which Cumings replaced the flying geese paradigm with the production cycle since he believed they are same) indicated, industrial development in East Asia should not be regarded as an individual phenomenon but as a regional phenomenon, in which 'tripartite hierarchy of core, semi-periphery and periphery was created in early 20th century and then slowly recreated after World War II' (Cumings 1984: 38). Cross-national economic activities are inevitably influenced by political relationships among countries, and an economic system results from such political relationships among countries. To be specific, political relationships brought by cross-national economic interaction essentially impose limits on the freedom of nation states, while such political relationships also exert an influence on the division of economic resources between countries.

For example, one of the particularly important features of East Asian Economic

Regionalism is that complex, market-based imperatives of international specialization are key driving forces. Meanwhile, transnational, particularly Japanese-based, firms and regional business networks become its carriers (Hurrell 1995: 39). However, as Hurrell said:

> There are no natural regions … It is how political actors perceive and interpret the idea of region and notions of regionness that is critical, all regions are socially constructed and hence politically contested. (Hurrell 1995: 38-39)

Economic regionalisation can be understood in terms of a convergence of interests between state elites and firms, in response to changes to international economic structures (Hurrell 1995: 58). Governments play roles in this process, not by dictating where firms should sell their goods, but by allowing firms to conduct business with their own natural partners (Thomsen 1994). In brief, natural economic territories imply that economic entities need to cut across political boundaries 'combining resources, manpower, capital, technology and managerial skills; in addition, taking advantage of the reciprocal capacities of adjoining territories' (Scalapino 1999). Such natural economic territories can be realized only when political barriers between countries are lowered and cross-border trade and investment grow.

Although every state in a given region plays a crucial role, any possible exclusion of the state might directly lead the state to 'defensive or reactionary strategies whereby they attempt to create their own intra or extra regional groups' (Rajan 2005). However, the fate of smaller countries is easily controlled by more powerful states with disproportionate resources, and thus regional economic integration has at its heart questions of leadership (Lincoln 2004: 231). In such circumstances, it is not difficult to understand why the catching-up states in East Asia remain vigilant while getting involved in the process of economic regionalism, particularly those that were colonized by Japan in the past. As a result, it is much more difficult for East Asia to have a specific leader. However, in spite of the lack of a specific leadership in East Asia, governments there still make use of various regional platforms to 'discuss issues of mutual interests, to enhance familiarity and personal networks among government officials, and to create some bilateral and sub-regional free trade areas' (Lincoln 2004: 232). That is what essentially drives regional cooperation at all levels and creates an even more favourable regional environment for RPNs.

3 Theories of Business and Production Networks

States are not the only players in production networks. As a matter of fact, businesses, as the executors of national policies, play an equivalent, if not even more important, role than states do. Radical theorists highlight that the changing cooperation strategies of transnational capital drove the shift in authority from states to markets (Fawcett and Hurrell 1995: 57). When an industry in the state evolves into its mature phase, it confronts increasing production costs including more expensive labour, sluggish domestic demand and intensified competition from the late-developed countries (Dowling and Cheang 2000: 447). The businesses in the industry are supposed to reconsider their business strategy and start to reallocate their production overseas, to countries that have advantages in cheaper production costs or larger markets. In a sense, production networks essentially are about intra-firm cross-border production sharing and sophisticated combinations of intra-firm and arm's length transactions (Kimura and

Mitsuyo Ando 2003).

Businesses can be generally defined as companies pursuing profits by buying and selling, merchandizing and marketing, R&D and other relevant economic activities. Like states, businesses can be grouped as giant MNCs and small and medium enterprises (SMEs) depending on their scales and corporate strength. Apart from the particular businesses in special industries that are involved with national security, such as military and coinage, most businesses do not have any limitations on the choices of their production basis. As a matter of fact, driven by business profits, companies typically relocate their business activities around the world wherever production costs are the lowest. Thus, immense markets and resources are more easily accessed (Ernst 1999). In short, transaction costs are 'key determinants of the optimal form of industrial organization' (Borrus, Ernst et al. 1999).

Businesses, especially those MNCs that operate their business activities across national borders for the sake of maximizing business interests, have much more influence on production networks than small enterprises. Since production costs dominate businesses operations, it is crucial for large MNCs to seriously consider whether their production is labour-intensive or technology-intensive, especially those MNCs that tried to expand the business activities that have been broken down into a variety of subsections (Kimura and Mitsuyo Ando 2003). On that basis, large MNCs make decisions about the locations of production sites wherever they can be implemented most effectively; wherever MNCs can have more accesses to resources, capabilities and knowledge; wherever they need to facilitate the penetration of important growth markets; and how to make production networks work better for them (Ernst 1999).

Both intra-firm and inter-firm transactions and their forms of coordination coexist in production networks. This helps to connect parent companies, their affiliates, joint ventures and their partners in strategic alliances (Ernst 1999). MNCs indeed facilitate the intra-regional economy through a sequential transfer of industrial activities among national economies along the regional hierarchy, by driving systemic industrial relocation among national economies. This process essentially helps to restructure the economies of both the home and the host states (Kasahara 2004).

The specific characteristics introduced by different business operation styles in production networks determine the direction of production networks. Changes in those MNCs' general business development strategies lead to changes in the patterns of production networks as a result of investment allocation. In return, those changes give rise to further changes in MNC business development strategies. For example, in the 1980s and the 1990s, when US and Japanese electronics firms were trying to explore their cross-national production networks in Asian economies, there was intensified and fierce competition between the two kinds of production networks. One was cross-national production networks built by the US firms and characterized by being 'open, fast, flexible, formal and disposable'. The other was the cross-national production networks established by Japan's firms and distinctive because they were being 'closed, cautious, centralized, long-term and stable' (Tan 2001).

A key element in MNC economic activity is the flow of FDI. FDI that runs along with MNC business activity is regarded as a channel for recycling comparative advantages between developed countries and less developed countries. FDI brings advanced technology and introduces a large amount of investment into host countries. Meanwhile, manufacturing sites or overseas affiliates are established (Dowling and Cheang 2000: 446). As Vernon's production cycle theory suggests, when unskilled and semi-skilled labourers take the place of the decisive roles played by R&D activities or management skills after a new product matures and becomes standardized with technologically stable production skills, FDI drives the production locations to move to low-wage developing countries. During the entire processes, the comparative advantages of such a matured product are believed to be shifted (Kojima 2000).

On the one hand, FDI is believed to be complementary to the capital situation of receivers (Ray, Ida et al. 2004: 471), and to improve and promote the development of local economies. On the other hand, however, one of the major characteristics of FDI brought by MNCs is that it is 'footloose'. In other words, resource-seeking FDI is likely to flow to other places where cheaper labour, natural resources or R&D resources can be accessed more easily (Ray, Ida et al. 2004). In such circumstances, unless FDI-receiving countries can successfully upgrade to higher value-added stages in a given industry (Ray, Ida et al. 2004), the FDI-receiving countries might confront the challenge of positional changes in production networks. In sum, FDI brought by MNCs is a double-edge sword. It can help to improve local economies and lead national economies to become involved in production networks. At the same time, it also results in changing the positions of national economies in production networks, or even takes national economies out of the production networks. In a word, FDI facilitates structural changes to production networks (Ozawa 2001).

Driven by market forces, the structure and operation of production networks are mainly shaped by the leading firms (Borrus, Ernst et al. 1999), which make business development strategies to minimize transaction costs and maximize profits. The business activities of those leading firms not only affect the styles and characteristics of production networks, but also impact on other participants' national economies in the production networks. On the one hand, the development of local economies is promoted; on the other hand, the dependence of local economies on FDI brought by MNCs results in the fact that the growth trajectory of local economies will be mainly shaped by foreign capital instead of indigenous capital. That is the basis of the formation of RPNs (Ray, Ida et al. 2004).

As has been shown, driven by the national economic priorities and the maximization of business profits and minimization of transaction costs, both states and businesses play a crucial role in production networks through orienting policies and by adjusting business development strategies. Considering the different positions taken by the state and businesses, the overall policy environment and the contents of the negotiations among national economies are particularly important for businesses (Kimura and Ando 2003). MNCs usually import key parts and components from their home countries or other major production sites in the world when the host countries do not have a favourable environment for production networks, such as limitations on incoming FDI and high trade tariffs. However, once favourable policies are formulated for production networks, such as removing or lowering trade tariffs, MNCs in the region can obtain substantial advantages on cost reduction (Kimura and Ando 2003). In a sense, states provide a favourable environment for businesses in an institutional form, such as domestic institutional reform, relevant adjustment on policies and regulation, bilateral or multilateral agreements, or economic regionalism. At the same time, states' national priorities directly affect how they make policies and regulations which also affect and limit businesses' activities.

Businesses, for the benefits of their own activities, drive states towards making adjustments on policies and regulations and reallocating resources not only within national economies but also across countries. In a way, businesses not only act as trailblazers by promoting the formation of production networks that are based on business activities, but also try to orient states' domestic policies and foreign policies.

E. Methodologies

By reviewing all previous significant policies and institutional changes, and efforts made by the Chinese central government both domestically and regionally, the research approach to this thesis utilizes a historical approach for understanding the growth route of China's ICT industry. It is important to use a historical approach particularly when analysing institutional changes, as most institutional arrangements are the results of evolution over a long period of time (Putnam 1993). By recognizing the crucial role played by the Chinese central government in making policies and regulations, it is necessary to have as much historical knowledge as possible about changes in the Chinese government's efforts. For this reason, the thesis gathers as much relevant information as possible about all previous significant 'Institution Reforms' and 'Industry Plans'. China's government introduces these reforms and plans with the intention of accelerating and strengthening the ICT industry's development. The historical approach is also applied to analyse the Chinese central government's intentions at the regional level, which show the Chinese government not only strengthens ICT industry development within domestic governmental and institutional levels, but also tries to create a favourable regional environment for ICT industry development at a regional level by official diplomatic means. All relevant evidence including policy changes, institutional changes and new elements in industry plans have been carefully collected from the Chinese Government's 'White Book', 'Year Book' and official governmental websites. Information about Chinese active behaviour at regional and international levels derives from official declarations, official agreements and publications on various official websites. Moreover, personal interviews were conducted to obtain more detailed information in addition to that in official publications.

A dialectic approach is taken for exploring the impact of China on EARPNs with specific reference to the ICT industry. The dialectic approach to this topic emphasizes the process-led character of understanding the changing process of China's ICT industry as well as the changing role of a rising China. In this dynamic mixture, it cannot simply be assumed that the tremendous impact brought about by a rising China would lead to the result that China has already undoubtedly become a leading goose in East Asia. Moreover, the relationships between China and other East Asian countries cannot be understood by looking at the two individually. To analyze the impact brought about by a rising China necessitates looking at both China's intentions and other East Asian countries' responses. In addition, other factors include changing international economic backgrounds and interference from the US. In short, the relationships between a rising China and other East Asian countries that transcend the sum of the two individuals' motivations, actions and behaviour.

Both qualitative investigation and quantitative analysis will be used in this thesis, with a stronger reliance on qualitative investigation. Qualitative analysis will be applied when it comes to evaluating the impact of the Chinese government's regional intentions and the Chinese ICT enterprises' overseas behaviour in EARPNs. Quantitative analysis will be used to understand the current situation of East Asian ICT trade and investment, some of which will be shown in graphic figures or tables.

Several methods were applied to collect qualitative and quantitative data from both the primary and secondary sources. Apart from relying on literature reviews, governmental and policy documents, and official websites, the analysis in this thesis was made by means of statistical material and other secondary data. That contributed to produce the descriptive and analytical core of this research. The Chinese Customs authorities, the Ministry of Industry and Information Technology and the Ministry of Commerce are major sources of data in this thesis. This thesis also refers to data from the ASEAN official website and the WTO. Considering the fact that China's final official statistical data are reported level by level, there will be a certain degree of deviation when local governments are over-concerned about the performance of local officials. Therefore, this thesis also refers to second hand data which was provided by interviewees; however, that could possibly contain respondent bias.

All people who have been interviewed are closely related with the ICT industry, and were selected to cover all possible stakeholders. Officials from government agencies work in relevant ministries and informed me about the formulation and applications of policies. The interviewees in cases studies were selected because they are working or worked as key roles in the relevant Chinese ICT enterprises that represent the key sectors of the ICT industry. They were selected also because they have personal experiences in the ICT enterprises that are unknown but represent the situation of very small ICT enterprises, which can help understand the current ICT manufacturing pattern in China. Information provided through the above resources is authentic and the veracity of the information can be proved. I have tried to make all interviewees understand the process in which they were to be engaged, the research objectives and how the data they provided would be used. With the purpose of protecting the interviewees and sources from any possible unfavourable results from the research, most interviewees in this thesis are anonymous and named by the Roman alphabet based on the initials of their family names (for example interviewee D, Z etc.).

With the purpose of better understanding the growth route of indigenous Chinese ICT enterprises, this thesis also investigates thoroughly the MNCs' role as a general background. That is important because MNCs not only had great influence in the initial development stage of Chinese ICT enterprises, but also continue to be integrated into the development of the Chinese ICT industry. The rise and the fall of MNCs reflect the rapid growth of Chinese indigenous ICT enterprises that developed by being integrated into RPNs. Meanwhile, the sources of MNCs also show whether and how Chinese indigenous ICT enterprises grow against the background of EARPNs.

Case studies are undertaken to address the processes through which Chinese businesses grow from production bases: from simple imitation and catching-up to actively going abroad. Changes in trade and investment cooperation brought by ICT enterprises will be a focus, considering FDI and strategic alliances between enterprises in the East Asian region will play a major role in promoting technology transfers and joint technological development (ASEAN 2002). This thesis will address five case studies in three main fields of the ICT industry. The complicated classification of the ICT industry and varying degree of Chinese ICT enterprises going abroad encouraged the selection of a number of case studies in this thesis. A choice was made in this thesis to select a range of ICT enterprises in various fields of the ICT industry in the interest of providing a cross-section of Chinese ICT enterprises' activities with a regional dimension.

The first two case studies in the first main field concern Chinese ICT equipment manufacturing; the second two case studies in the second main field look at the development of the Chinese software sector in the ICT industry; while the last addresses the operation of Chinese monopoly telecommunications enterprises. In order to provide a cross-section of the growth route of Chinese ICT enterprises, the five case studies manifest concerns over ICT manufacturing that represents low- and middle-end production of the ICT industry; R&D for ICT software that represents China's ICT industry is trying to get rid of serious dependence on low-end production and trying to have self-owned R&D capabilities; and the telecommunications service that represents China tries to strengthen its role as a big power in providing ICT services while becoming a world famous factory, respectively. These five case studies essentially show the development of Chinese ICT enterprises for different aspects of the ICT industry.

The types of enterprises chosen for case studies range from state-owned enterprises, to private enterprises and joint-venture enterprises. The five case studies involved in this thesis illustrate three main groups of enterprise types in current Chinese ICT enterprises, and reveal the characters of each sector in the ICT industry. The cases of Huawei and ZTE illustrate that most Chinese ICT equipment manufacturers are privately owned, while only a few of them could have been directly supported by government, except for enterprises that grow with strong government backing. The cases of Neusoft and UFIDA show that parts of Chinese software R&D enterprises are still fairly dependent on external support—FDI involvement. Several software enterprises, which are called 'National enterprises with Chinese brand names', are still ranked as low or middle software R&D product manufacturing. As for the monopoly China Mobile, a typical state-owned enterprise, its development and operation to a large extent came from the support of the government. Although the monopoly telecommunications service enterprises already has the capability to go abroad to explore overseas markets, there is still a lack of a clear and specific blueprint because of excessive government intervention.

The format of each case study analysis is relatively consistent. In each case, analysis is divided into three sections. In the first of these sections, a brief overview is provided as a background to show the growth route and the changes of the enterprise. Then the work will map their overseas expansions. The last part analyses these overseas expansions and their significances both domestically and regionally. The second and the third sections of these case studies constitute the primary concern of the thesis. Specifically, this section seeks to map how these ICT enterprises intentionally or unintentionally, voluntarily or driven by government, explore their overseas markets, particularly the East Asian market. This section also serves to provide an explanation as to why some ICT enterprises successfully develop overseas markets. Analysing these case studies examines whether Chinese ICT enterprises have developed according to the model described by a modified flying geese paradigm. Meanwhile, these case studies also show whether Chinese indigenous ICT enterprises have already impacted on the modified flying geese paradigm.

It is unavoidable to have personal bias from interviewees and myself because of objective and subjective reasons. Meanwhile, unreliable data resources and the skills of the researchers also limit the research, although these flaws were minimized as much as possible.

F. Summary of This Chapter

This chapter has attempted to provide a theoretical basis for the following discussion of this thesis. It has built a theoretical framework to address the central problem of this thesis: how are EARPNs impacted when tremendous changes occurred to a given powerful state? Several points have been made in this chapter. As noted in the very beginning of this chapter, different approaches have been applied to RPNs with reference to East Asia. RPNs are not immutable and changes happen along with time. This explains why the flying geese paradigm has been continuously improved and refined. The theory of production cycle, the theory of comparative advantages and the further development of the flying geese paradigm make up the limits of the original flying geese paradigm to varying degrees. However, the application of the flying geese paradigm runs into difficulties because of the remarkable changes brought by the New Economy that is characterized by the rise of the ICT industry and the emergence of an even stronger China. Instead of challenging the flying geese paradigm, this thesis argues that the theory of international production networks may be used to fill the gaps that the flying geese paradigm left behind. That means that every country in RPNs has chances to take a leading role in international production networks by jump and leap because it can more easily and cheaply take advantage of the most recent technology rather than have to use the outdated technology that its competitors have bought. However a country that can use this advantage is still involved in a catching-up process since not every country can simultaneously rise to the same tier either in terms of entire industries or in terms of parts of production networks.

Moreover, apart from FDI, trade and technology transfers that are emphasized by the flying geese paradigm, it is necessary to figure out the key players in RPNs to understand how the flying geese paradigm operates. In the latter part of this chapter, the roles of the state and businesses were specifically addressed. The state plays a significant role with regard to the direction of RPNs. Businesses ultimately decide how diversified and energetic the process of RPNs are. RPNs imply the types of relations between states and businesses; and state-state relations. Only focusing on one of the two relations would result in superficial analyses of RPNs. RPNs in East Asia are essentially driven much more by national interests than business interests. For a better understanding of EARPNs, the next chapter will address the RPNs within East Asia and the relationships between the EARPNs and the ICT industry. In addition it will discuss changes that have happened in EARPNs with regard to the rapid developments in the ICT industry that occurred because of China's rapid growth.

CHAPTER TWO: EAST ASIAN RPNs AND THE ICT INDUSTRY

This chapter contextualizes and briefly outlines the use of the terms 'EARPNs' and the 'ICT industry' in this thesis. It is not a simple task to explain the relationships between EARPNs and the information and communications technology (ICT) industry. The rapid changes in the industry make it difficult to pinpoint and explain. Almost all aspects of industries and all parts of our lives involve ICT. ICT is defined differently in different countries, which means that the task of addressing the relationships must begin with a thorough examination of what we mean when we talk about such concepts in particular situations. Moreover, it is also important to understand how the relationships between EARPNs and the ICT industry are constructed and how there will be changes in such relationships in different contexts. Meanwhile, for the purposes of the current study, it is necessary to figure out what changes happen to EARPNs when rapid changes in the ICT industry coincide with a rapidly growing China. This chapter attempts to address these issues.

There are three key sections in this chapter. The first section seeks to elaborate what exactly production networks mean in this thesis, and how their key roles have impacted on the changes in the development of EARPNs. The second section provides an overview of the ICT industry, with specific reference to the region of East Asia; this section also focuses in particular on the rationale that connects EARPNs with the ICT industry. The third section tries to concentrate on the rationale of how changes in the ICT industry in one country can essentially affect EARPNs.

A. Explaining Production Networks

Production networks refer to 'the nexus of interconnected functions and operations through which goods and services are produced, distributed and consumed' (Henderson, Dicken et al. 2002: 445). It means that all final goods are produced in stages in various countries; vertical specialization is regarded as a crucial part of this production (Hummels, Ishii et al. 2001). To be specific, based on components specialization, production networks spread throughout the region and allow components to be manufactured and product assembly to be conducted according to the dictates of comparative advantage. The entities in production networks are mutually affected and can be only understood through their relations and connectivity to other entities (Law 1999; Henderson, Dicken et al. 2002). As a matter of fact, not only firms or parts of firms, but also national states were integrated into these complicated 'horizontal, diagonal and vertical links forming multi-dimensional, multilayered lattices of economic activities', through the development of diverse forms of equity and non-equity relationships and comprehensive calculations of well-being, respectively (Henderson, Dicken et al. 2002).

One of the essential points of production networks is the vertical relationship between parent and affiliate, which implies that the parent and the affiliate are mainly linked by the flow of goods between firms (Hanson, Mataloni et al. 2003). The nature and the extent of the inter-firms relationships are highlighted in production networks, which bind a number of firms into larger economic groupings (Sturgeon 2001). Foreign direct investment (FDI)is regarded as a crucial factor for production networks. Because of FDI, all those economic activities, including R&D, input production and input processes, and multinational activities spreading around the world, can be realized (Hanson, Mataloni et al. 2003).

As one of the distinctive characteristics of production networks is its firm-centred nature, which makes production networks more complex. This is because such firm-centred production networks are essentially embedded within concrete socio-political contexts. The interests and conflicts between national states influence socio-political contexts that are more territorially specific (Henderson, Dicken et al. 2002). Every country formulates trade expansion and growth policies according to national priorities. Little or no co-ordination of policies among countries exists, considering that growth and industrialization are typically planned at national levels (Arndt 2001: 1). Cross-border harmonisation of national policies seldom occurs (except in institutionalised contexts like the European Union). When the growth targets pursued by the countries of the region are similar, a particular state where firms are based will make national policies to pursue particular strategies that will advantage the firms. Such strategies will therefore hold considerable competitive elements (Arndt 2001). The next section will concentrate on how to understand production networks in the context of a region.

1 What Are RPNs And Economic Globalization?

Production networks can happen within a country, a region, or across regions. Production networks imply that a discontinuous territorial structure will be created across states boundaries, in spite of those limitations on the regulatory and non-regulatory barriers (Henderson, Dicken et al. 2002). The space and distance with reference to production networks should be seen in spatial fields and relational scopes of influence, power and connectivity (Murdoch 1998). Four main different styles of production networks have been identified (Knox and Agnew 1998).

First is centralized global production. It means that goods are deeply linked with the location of resources, which makes relocation impossible. In other words, production can only take place within one nation or one region and the global market will thereafter import from the nation or the region (Knox and Agnew 1998). Second is regional production. This occurs where products have high distribution costs or where some kind of well-known manufacturing technology is needed. In such situations, the manufacturing of some goods usually concentrates on the size of the production system that is related to the size of the regional market (Knox and Agnew 1998). The third is regional specialization. This involves a spatial division of production, based on the theory of comparative advantage. Each region only engages in manufacturing a specific item that the region is skilled in making, and imports what it requires from other regions (Knox and Agnew 1998). The fourth is vertical transnational integration. This is actually another variant of specialization. Different stages of production occur at different locations where the best comparative advantages can be offered. For example, manufacturing of raw materials will be only established in those locations where they are the most accessible; in the meantime, depending on the types of product or the stages of their manufacturing, assembly will be arranged in the regions that have low labour costs or high levels of expertise (Knox and Agnew 1998). This style of production network is usually used to describe economic globalization.

As previously mentioned, there are no actual geographic limitations on production networks. The above four styles of production networks vary in terms of the width to which they expand. Trade liberalization and innovations in communications and transportation technologies essentially drive the current wave of globalization; and they have played essential roles in facilitating cross-border sourcing and offshore production of parts and components. For example, production costs and transportation costs were greatly reduced by innovations in communications and transportation technologies, which further encouraged MNCs to explore the world for ideal manufacturing bases. Cross-border sourcing based on comparative advantage confronts obstacles from trade and other policy barriers; in addition, communication and transportation costs tend to be higher between rather than within nations (Athukoral P. and J. Menon 1997). In such situations, for the sake of raising efficiency, reducing production costs, increasing competitiveness and gaining market share for all the region's players, from which national interests will eventually benefit, nations start to move away from national models of industrialization policy towards more regional, collaborative approaches. In other words, regions take the place of states as production bases, and parts and components of production are spread around the region in accordance with the comparative advantages of each state (Arndt 2001). The result is that production networks become both organizationally more complex and increasingly global in terms of their geographical extent, which is usually called globalization (Henderson, Dicken et al. 2002).

Globalization refers to the process in which the interaction and interdependence among societies and states throughout the world are being broadened and deepened (Cohn 2000: 10). According to some observers, the world is gradually developing into a single economic, communications, social, cultural and political unit (McGrew and Lewis 1992; Salehi-Sangari and Foster 1999: 760). Revolutions in transportation and communication brought about changes to the process of globalization to varying degrees. Apart from bottom-up businesses activities, government policies vis-a-vis the liberalization of trade and FDI can be decisive and much more significant; and technological innovations to a large extent determine how far production networks can expand (WTO 1995).

In sum, based on component specialization and according to the dictates of comparative advantage, production networks allow components to be manufactured and product to be assembled. It has been shown that once an individual country gives up the idea of manufacturing all products at home, regional specialization will lead to new opportunities to explore scale economies (Krieger-Boden 2000). As a result, scale economies in theory are more accessible, and cost competitiveness will be further enhanced if production based on components specialization is structured in larger regional dimensions (Krieger-Boden 2000). Because of decreasing production costs throughout the region, producers in the region become more competitive in world markets. In such circumstances, the appearance and development of production networks bring changes to the global economy.

Regional production networks (RPN) certainly are not incompatible with cross-national production networks. As a matter of fact, they coexist with complementarities. Because of proximity, specific characteristics including favourable policies, attractive labour costs and rich resources in some particular region, participants in cross-national production networks do not tend to spread their activities globally (Malmberg and Maskell 1997); rather, they tend to cluster regionally to a considerable extent.

Among all regions, production networks seem to be more extensive in East Asia than in other regions, based on intra-region trade flows and FDI. The following section will focus on East Asian RPNs.

2 East Asian RPNs

EARPNs are often referred to as the East Asian flying geese pattern of regional economic integration (Ozawa 2003), or the East Asian flying geese style catch-up model (Xing 2007). Japan initiated the export-led development model in the region, followed by the Four Dragons, Taiwan, Singapore, Hong Kong and South Korea(also called Newly Industrializing Countries, NICs). The Four Tigers, Malaysia, Thailand, the Philippines and Indonesia came after the Four Dragons. Late-industrializing countries, including China and the ASEAN countries constituted the fourth generation to adopt this model. A tiered pattern of development thus resulted in complementary capabilities across countries, which were highly conducive to the emergence of the EARPNs (Borrus, Ernst et al. 1999).

Despite the fact that the terrible memory of war was still imprinted on most East Asian countries, the priority of most post-war East Asian governments was to reconstruct national economies. When Japan rapidly realized economic recovery with support from the US and started to explore overseas markets, East Asia came to be Japan's top choices. After all, this was the region for Japan's overseas colonial expansion Whilst vigilant over possible threats to their national sovereignty, the attraction of the immense US market and the development of export-oriented economic strategies, as promoted by Japan, meant that most East Asian economies sequentially recovered and gradually climbed up the development ladder (Romm 1992). Regional economic structures have been further improved since the 1980s (Liu and Regnier 2003). In the process, East Asian economies went through a huge shift in which their industrial structures ascended the developmental ladder from labour-intensive industries to capital- and technology-intensive industries, then further to information- and knowledge-intensive industries.

The international division of labour brought about a transformation in domestic economic structures, and affected domestic political economies (Henderson, Dicken et al. 2002). At the same time, the growing interdependences driven by such labour division further exerted a deep influence on governments' calculations of where their interests lay and how these interests should be best pursued. Many governments concluded that to a large extent there was a need to cooperate, in order to reduce transaction costs and lower trade barriers (Ravenhill 2001). Such economic interdependence was further deepened because of intentional cooperation among countries at government level (see below).

Trade and flows of FDI are significant indicators of such interdependence among countries (Ravenhill 2001: 24). As mentioned above, external trade came to be the key pillar of East Asian economies. In the meantime, whether a particular partner is important in a country's transactions can be seen from the country's investment in that partner (Petri 1993). Foreign investments from Japan, the US and other developed countries started rapidly flowing towards East Asian economies. In such a background, the East Asian regional labour division was further deepened. The economic development of East Asia has traditionally depended on 'the dual-track approach' comprising import-substituting industries and export-oriented industries (Kimura and Mitsuyo Ando 2003). Since the 1960s, such a development strategy provided the platform for East Asian economies to achieve a remarkable record of high and sustained economic growth during an incredible and long-lasting period. Such astonishing economic achievements were considered by the World Bank as 'the East Asian Miracle' and exemplified as the East Asian economic development model.

East Asian countries still varied in the level of their economic development. Countries at different income levels brought about cross-national differences in the prices of factors and geographical advantages, which were effectively utilized in the formation of vertical production networks (Ando and Kimura 2003). With more and more transnational trade and investment flows within the region, such disparities among countries helped all relevant countries create stronger relationships and formed the hierarchical structure of economic development, known as the famous as the flying geese paradigm. To be more specific, during the whole process, trade volume continually increased both in terms of intra-regional trade and inter-regional trade (see Chapter Three for detail figure). FDI continuously flew within the region through economic production networks either by establishing manufacturing bases or by constructing technology supporting services centres; consequently, industrial cooperation strongly accelerated the development of the regional division of labour (Liu and Regnier 2003). Chapter Three and Chapter Four will provide detailed statistics to illustrate this.

In sum, the EARPNs emerged in a dense and highly elaborate form based on varied production capabilities and thus a high degree of intra-regional complementarity (Borrus, Ernst et al. 1999). The development of such RPNs in East Asia is characterized by vertical specialization and horizontal cooperation. One of the outstanding aspects of the East Asian economy was that production was constituted by several sequential production processes and these distinct production processes were located within a country or across several countries (Hiratsuka 2008). During the entire process, the US virtually took the role as capital pool provider and exports absorber, while Japan played the leading goose that transplanted manufacturing overseas and took the position of structural inter-mediator. Other catching-up countries made relevant adjustments in policies to become part of the upgrade processes of sequential industries (Ozawa 2003). In short, rapid growth in East Asia has been unique as it was clustered so intensively within the particular region. FDI and trade flows played crucial roles in the development of EARPNs. As mentioned early in this chapter, those with key roles in a region also have significant impacts on the development of RPNs. The role of Japan in the EARPNs will be the focus of the next section.

3 The Role of Japan in the EARPNs

The persistence and support of the Japanese government was of paramount importance to the emergence of the EARPNs (Furuoka 2005), which was also related to the international environment of the time. In the 1950s, Japan contributed to developing export-oriented industries including textile and food by focusing on labour-intensive sectors. At that time, the textile industry constituted a significant proportion of Japanese exports. After the 1960s, Japan concentrated on supporting capital-incentive industries including the heavy chemical industry, such as steel, shipbuilding, chemical, automobile and mechanics. The development of heavy chemical enterprises is regarded as a key result of Japan's rapid economic development, while it was also an important accelerator for Japan to realize rapid economic growth. In other words, Japan's rapid economic development in the 1960s depended primarily on the growth of the heavy chemical industry (Fujita and Tabuchi 1997).

Along with the strengthening of the heavy chemical industry in Japan, the exports of heavy chemical enterprises exceeded textiles and food exports. Japan started to transfer these labour-intensive industries, such as textiles, to Asia's Four Dragons. By taking advantage of the opportunities, the Four Dragons developed industries according to their local advantages and propelled the development of key areas, which promoted the economies in the Four Dragons (Romm 1992).

The Japanese yen rapidly appreciated after the Oil Crisis and the 1985 Plaza Agreement. As a result, more and more Japanese MNCs tried to move manufacturing bases abroad and to explore overseas markets. The Oil Crisis and the Plaza Agreement were two key factors that drove Japan to increase industrial transfers quickly to Asia's Four Dragons and other ASEAN countries (Munakata 2004; Ernst 2006). During this time, Japan prioritized knowledge- and technology-based industries, while gradually transferring all resources-related and energy-consuming industries to the Four Dragons. In the meantime, the Four Dragons put more emphasis on capital-intensive industries including the heavy chemical industry while transferring labour-intensive industries such as textiles and small electronics that had already lost comparative advantage in these countries to China, Thailand, Malaysia and other ASEAN countries. Consequently, China and the ASEAN countries actively absorbed foreign capital from Japan and the Four Dragons, which were related to labour-intensive industries transferred from the Four Dragons. As a result of such successful transfers, the economies in China and other ASEAN countries made great strides forward (Furuoka 2005). As Saravanamuttu noted,

> Thus, the pattern of Japanese trade, aid and investment in ASEAN reveals an overall Japanese strategy of penetration in the region which generates ever greater economic dependence of ASEAN on Japan. The fact too is that the ASEAN countries, including Malaysia, have already turned to Japan for at least a decade during which Japan had rapidly established its economic hegemony over the region vis-à-vis other major economic blocs. (Furuoka 2005: 4; cite Saravanamuttu 1988)

In the late 1980s, against a backdrop of intensifying economic globalization and deepening regional economic cooperation, instead of supporting Mahathir's East Asian Economic Caucus (EAEC), Japan insisted on the involvement of the US in the region, with the purpose of avoiding the creation of closed regionalism in East Asia.[9] Japan always intended to establish an economic cooperation mechanism with openness between Japan, the Four Dragons and other ASEAN countries. Without clearly

[9] East Asian regionalism is open, not introverted. In some situations, regions without geographic proximity can be interlinked based on particular relationships. That is to say, intra-regionalism and inter-regionalism interact and shape each other (Vayrynen 1997).

proposing a formal declaration of Japan's intention to form and lead East Asia, Japan has been trying to establish the flying geese paradigm in which Japan is the leading goose (Hook 2002). This demonstrated the Japanese ambition in seeking East Asian economic regionalization that is centred on Japan. With the intention of pursuing this paradigm, Japan had further accelerated its overseas FDI to other East Asian countries since 1993. Amounts of FDI from Japan to East Asian countries jumped in 1993-94, and was followed by relatively stable movements of what, which showed that East Asian countries increasingly became the preferred FDI destination for Japanese firms (Nakamura and Oyama 1998: 6-7). On the one hand, this was because of the stimulation from a cumulative stock of investment approaching a value of USD 800 billion, and overall Japanese FDI reached USD 50 billion in 1995 (Farrella, Gaston et al. 2004). On the other hand, it was also because of the appreciation of the yen's exchange rate against the US dollar and because of the liberalization of FDI by East Asian countries (Nakamura and Oyama 1998). However, due to Japan's economic recession, Japanese domestic industries were not being upgraded in due time. As a result, Japanese FDI in other East Asian countries was still mainly concentrated on manufacturing including labour-intensive and capital-intensive industries (METI 2002). For example, the average share of Japanese FDI in manufacturing industries accounted for 27 per cent in 1984 and 26.8% in 1998 of total Japanese FDI (Farrella, Gaston et al. 2004).[10]

The development of the EARPNs was essentially promoted as a key part of Japan's national strategy in the 1980s, and the Japanese government took a significant role as the crucial leader (Korhonen 1994). According to an elaborate plan made by the

[10] In which the author calculated from Ministry of Finance, Annual Report of the International Finance Bureau (Okurasho Kokusai Kinyu Kyoku Nenpo), December issue, various years, Tokyo. Figures published in US dollars and for Japanese financial years (e.g., 1995 refers to the period from April 1995 to March 1996). From 1996, statistics of Japanese FDI are published only in yen; they were converted at the FY 1998 interbank rate of ¥128.03

Ministry of Economy, Trade and Industry (METI), Japanese enterprises implemented the plan and became the integral part of EARPNs (Hara and Nakanishi 2004).

Japan's Corporation Networks

During the entire cyclical process, Japan's corporate network played an important role (Tachiki 1999; Fukao, Ishido et al. 2003). As mentioned above, Japan had started transferring outdated industries and sectors to other East Asian countries at the beginning of the 1960s. Japanese enterprises were motivated to make these transfers to lower production costs and increase exports to Japan. In addition, the Japanese enterprises were seeking to enhance local demands for the products produced by Japanese affiliates.

Japanese enterprises succeeded in implementing cost-saving and profit-maximizing measures by relying on sequential entry and expansion over time (Chang 1995: 384) and horizontal coordination among operating units (Aoki 1990: 3). Along with businesses expansion, Japanese enterprises first created a few distribution networks for their own products that were exported from headquarters located in Japan. Production bases were subsequently established to take advantage of local cheap labour and resources. However, Japanese enterprises still had to import large numbers of components and parts from their headquarters in Japan, since local factories were not capable of producing the necessary components and parts. Once these local manufacturers were qualified to manufacture these components and parts, however, Japanese enterprises took steps to establish them as affiliates, keeping close relationships with local manufacturers. By relying on this model, Japanese enterprises rapidly expanded their businesses and established stable networks with local manufacturers (Ernst 1997). Along with successive industries and sectors transferred from Japan, these stable networks gradually evolved from basic production and distribution networks to technology alliances and outsourcing contracts (Urata 1996).

As Wintelism shows, the manufacturing of one product can be divided into several segments, which brings more countries of a region into the manufacturing of one product. In the case of East Asia, interdependence among more countries became further intensified. The development of telecommunications technologies and improvements in transportation provided Japanese enterprises with an opportunity to divide an entire production network into several subsections and plan the production of each subsection for the purpose of fully utilizing local advantages and maximizing profits (Ernst 1999). As a result, several different countries often became involved with the production of one product. Thus, increasingly intra-regional interdependence was gradually enhanced and strengthened.

Based on the above, we can see that the changes in the structure of the EARPNs were deeply related to a continuous technology transfer. Only by such continuous technology transfer can a hierarchical structure be kept in a stable situation within a beneficial cycle. It is essentially a vertical division, which is characterized by high dependence on countries that are located at higher tiers. The vertical division stimulated the successive economic take-off of economies in these East Asian countries (Fukao, Ishido et al. 2003). Especially in the late 1980s, Japan strengthened its connections with other East Asian countries on trade and investments, which contributed to industries' upgrade in these economies (Isogai and Shibanuma 2000; Koike 2004: 146). Moreover, the continuous expansion of trade connections between Japan and other East Asian countries prompted western countries to recognize the significant potential in East Asia and to bring more FDI to this region (see Chapter Four).

In sum, along with the improvements in the Japanese economy following the yen's appreciation, the Japanese government continued to make adjustments to the domestic economic structure and updated domestic enterprises to higher level sectors and industries. As a result, a group of manufacturing sectors and industries was sequentially transferred to other East Asian countries, and EARPNs characterized by the development ladder were finally formed. The Japanese government attempted to clearly define the division of labour in East Asia through the flying geese paradigm, by which Japan expected to make other East Asian countries deepen their dependence on Japan. As Peng notes,

> The regional production network in East Asia is a form of informal economic integration. It involves no formal institution or intergovernmental agreement but works according to a transnational logic. (Peng 2000: 177)

As a result, the EARPNs were established, which was believed to be a solid foundation for the anticipated mature mechanism of East Asian economic regionalization. As mentioned in an earlier section, the US was crucial by providing a pool of capital for the EARPNs, which contributed to the significance of the US in the EARPNs.

4 The Role of the US in EARPNs

After the Pacific War, US policies on Asia were centred on Japan. The Kuomintang government lost one battle after another in mainland China, and the US government needed to establish a capitalistic sphere of influence that would be led by Japan (Nester 1992: 121). With such a capitalistic sphere of influence, the US would be able to more effectively contain China. In the spring of 1947, the US government proposed to help Asia recover from war by fully taking advantage of the potential of Japan's industries (Nester 1992: 121). Instead of the Marshall Plan that was implemented in Europe to recover from the Pacific War, the US government intended to make Japan the key object of support in hopes that the Japanese economy would drive the economies of other Asian countries.

To meet the needs of the Cold War, the US government not only provided military protection, but also took various measures to revive Japan's economy. With the help of the US government, Japan was able to turn to the international economic system, including the International Monetary Fund (IMF) and General Agreement on Tariffs and Trade (GATT) (MOFA 2004). Moreover, US markets were fully opened to Japan and US government officials, including Eisenhower, appealed to American consumers to buy more Japanese products. In 1953, Japanese products were allowed freely to enter the American market, while US products in a few categories including primary products, technology and resources qualified to enter the Japanese market (McClenahan 1991). At the same time, a few categories of products did not constitute competition to Japanese products.

In addition to those points mentioned above, the US government also assisted Japan in exploring the overseas market. Besides supporting Japan's success in the Southeast Asian market, the US government also signed a series of trilateral agreements with Asian and European countries to agree on tariff concessions on the condition that these countries would agree to tariff concessions and market openness to Japan (Forsberg 2000). With full support from the US government, then, the Japanese economy exceeded expectations and took off as the leading goose in East Asia. By 1967, the Japanese economy was already the second largest economy, following the US (MOFA 2004).

In brief, US post-war Asia-Pacific foreign policies to a large extent determined the connection between Japan and Southeast Asia. Although the US government did its best to assist with Japan's take-off with market openness and technology support, Japan still needed other markets and resources within East Asia for the purpose of cost-saving and productivity. However, as a result of the Cold War, the US government was devoted to establishing a buffer zone to defend against Communist China, Russia and North Korea, both militarily and economically. Therefore, the US government established close connections only with those East Asian countries that belonged to the American camp (Forsberg 2000). Japan and other East Asian countries did not create economic connections among themselves, but they were brought together as the result of US economic policy.

Through continuous military assistance to Southeast Asian countries and large amounts of economic aid to Japan, the US government increased economic aid and loans to Southeast Asian countries and increased imports from Southeast Asian countries, by which an original triangular trade system was successfully established. Meanwhile, the Japanese government also eased some of the anguish of Southeast Asian countries through war compensation, assistance, trade and investment (MOFA 2004). At that time, except for China, all other East Asian countries had already been included in the triangular trade system in which Japan was the regional leader, while the US actually had the right to make the final decision.

Under the East Asian economic system during the Cold War, in terms of war compensation, capital and technology assistance and overseas FDI, Japan naturally chose East Asian countries (except China before bilateral relationships were formalized) as its key targets. From 1954 to 1963, Japan paid approximately USD 1.15 billion to ten East Asian countries (MOFA 1985). Because of this large amount of war compensation, over 30 per cent of Japanese overseas FDI flowed to East Asian countries until the middle of the 1960s (MOFA 1985). From 1967 to 1971, overall overseas aid accounted for USD 7.07 billion, while 23.2% went to Southeast Asian countries (MOFA 1985). This was far greater than the amount that flowed to other regions. For example, in 1972, the overall overseas aid reached USD 1.03 billion, among this aid, 3.42% went to Indonesia; and 9.4% went to Taiwan. Thailand, the Philippines, Korea, Malaysia and Singapore received the most aid (MOFA 1985). Eight countries including Thailand, the Philippines, South Korea, Malaysia, Singapore, Indonesia, Taiwan and Brunei accounted for over 80 per cent of Japanese overseas aid (MOFA 1985). In 1966, Japanese investments in ASEAN were less than one quarter of those of the US; while in 1976, Japanese investments in ASEAN were one third greater than America's (MOFA 1985). At this point, based on these numbers, Japan gradually took the position of the US in East Asia. Moreover, Japanese overseas aid essentially helped these East Asian countries establish the export-oriented development model in their countries, which became a key developmental model for their later economic take-off.

In sum, the US Asia-Pacific foreign policies and geopolitical strategy were crucial for the establishment of the EARPNs led by Japan. In terms of the Flying Geese model and in terms of members, the US played a vital role in the evolution of the EARPNs.

B. The ICT Industry

Two key factors brought changes to the increasingly extensive EARPNs. The first factor was the ICT industry boom that led to significant changes in international production networks; the second one was the emergence of a rising China and its integration into the EARPNs. Both factors essentially affected the operational modes of EARPNs to varying degrees. The next section will focus on the impacts from the boom of the ICT industry around the world.

1 The Boom of the ICT Industry around the World and In East Asia in Particular

Many commentators have observed that the ongoing tremendous changes resulting from the rise of the ICT boom would be likely to bring changes to the Flying Geese paradigm (Ginzburg and Simonazzi 2003). Some believed that East Asian economies would not develop according to this paradigm, but rather, the developmental model of great-leap-forward would replace the original model of gradual industrialization (Ozawa 2005).

Since the 1980s, with the emergence of specialized ICT companies like Intel and Microsoft, the production of computers and subsequent telecommunications sector has become increasingly modular. In other words, computers, servers, and internet-routers can be assembled from standard components including chips, operating software, disk-drives, modems and displays units, which can all be bought on the open market to be assembled and configured in various ways depending on the requirements of different competitors (Luthje 2004: 2). This vertically fragmented production system has been characterized as the 'Silicon Valley System' or the 'horizontal computer industry'(Luthje 2004: 2; cite Grove), which is also called 'Wintelism'(Borrus and J.Zysman 1997). This concept was fully explained in Chapter One.

Production in the ICT industry in the global arena has rapidly transformed from traditional forms of Fordist mass-production, dominated by large vertically integrated corporations, towards vertical specialization in product development, markets and manufacturing (Luthje 2001). The patterns of internationalization have profoundly changed from integrated transnational production to network-based forms of organization called global flagship networks (Ernst 2002). The global production networks in the electronics industry are typically characterized by a concentration on electronics contracts in manufacturing and services (Luthje 2004: 1).

The IT revolution led to new markets for electronics products, and in these markets the microprocessor-based system converged with the cost-effective, technological foundation of networkable systems (Borrus and Zysman 1997: 16). Market competition can occur at any point of the production value chain, including components, subsystems, system assembly, operating software and applications software These traditionally belong to an integrated system and are tightly vertically and hierarchically controlled by traditional powerful corporations (Tan 2001: 2). Some components and software made and designed by small companies from NICs have become real market standards (Borrus and Zysman 1997: 16). Strategies to set and control the evolution of standards have also been developed (Borrus and Zysman 1997: 17). In brief, those who have advantages in the design of products, and those who set standards in specialized and separate markets may be very successful. Vertical specialization has come to be the main characteristic of international production networks and as a result the development of such RPNs in East Asia is characterized by vertical division, vertical specialization and horizontal cooperation.

2 The ICT Industry in East Asia and EARPNs

As a region with rapid industrialization, sustained economic growth and considerably improved social indicators brought by the flying geese paradigm (Harvie and Lee 2002: 130-131), East Asia witnessed the formation of an international production network on an extraordinary scale (Kimura and Mitsuyo Ando 2003). In East Asia, the international production network is a shifting process from Northeast Asia to China, the NICs and a few ASEAN countries to other countries of the region. Simultaneously, it is moving from those businesses in the EU and the US to countries that are believed to be the most effective and most productive. Differentiated from the original patterns and trajectory of the flying geese paradigm, Japan was no longer the only 'leader'. Korean *chaebol*, Taiwanese PC-related products and components producers, and network suppliers based in Hong Kong, Taiwan, Singapore and China brought about new production networks that were characterized by a continuous and rapid technological upgrade (Ernst and

Guerrieri 1997). Broadband technology and applications can be easily found in those emerging innovation clusters in South Korea and Singapore; while clusters for mobile communications and digital consumer devices were present in Korea, Taiwan and China (Ernst 2006: 32). In such circumstances, some countries from the second or third tiers did not need to climb the rungs of the economic ladder step by step, due to latecomer advantages, especially in the 1980s and 1990s when drastic changes occurred in development strategies (Ando and Kimura 2003).

The EARPNs, with diverse and differentiated economies, are accompanied by complex divisions of labour among economies which are at different stages of development with different technical and economic capabilities (Borrus and Zysman 1997: 22). Clearly, provided that you have advantages in at least one part of an international value chain, 'you do not have to be a giant' to achieve success in international production networks (Borrus and Zysman 1997). However, for those economies lacking in basic infrastructure and technological power, the path to success is not as straightforward. As low labour costs and rich natural resources were emphasized in the original EARPNs, strong research and development (R&D) capabilities have come to be stressed, along with the changes in international production networks.

Some countries still follow the traditional mass production model that is typical of the flying geese paradigm. As a result of the IT revolution, the EARPNs, in which both horizontal intra-industry trade and complicated intra-firm cross-border production-sharing coexist, are deeply influenced by the changes in international production networks (Kimura and Mitsuyo Ando 2003).

The modified EARPNs helped East Asia recover from the 1997 Asian Financial Crisis. Simultaneously, the flying geese paradigm was further improved with new changes in ICT. Under the modified RPNs, the countries previously in the second or the third tiers gained more opportunities and were quickly elevated to a higher tier. China in particular became the centre of attention with its spectacular economic development supported by its mass market and remarkable performance during the last decade.

C. The ICT Industry and China

1 A Rising China with Specific Reference to the ICT Industry

The economic rise of states is believed to be a process that is tightly linked to the emergence, maturation and decline of particular industrial sectors (Cumings 1984). The new economy, which increasingly depends on the latest ICT, provides an incredible opportunity for China to become an IT powerhouse in East Asia, not only in terms of China's large market, but also based on its gradually stronger innovative capabilities. Moreover, as one of the crucial parts of political power is technological capability, the ranking of political powers in a region is essentially determined by the technological hierarchy that is based on various technological capabilities. Thus, the rise of China, based on its tremendous development of ICT, embodies changes in the power relations in EARPNs; in other words, it exemplifies the key changes in the shape of the original flying geese paradigm.

China has grown rapidly and become the largest market in the world for advanced computers, telecommunications and consumer electronics and network infrastructures

(Luthje 2004: 4). A large labour force with low wages is one of the crucial factors for continuously expanding manufacturing in China. According to the Ministry of Industry and Information Technology (MII), the value of China's electronic information products has grown from USD 20 billion in 1999 to more than USD 85 billion in 2005, and its output of several categories of domestic electronic and information products has been ranked first in the world. As a result, China has become the world's second largest consumer electronics market after the US (MII 2005). End-user IT spending in China passed USD119 billion in 2005, which includes all ICT spending as reported by ICT providers (Popkin 2006). Though its penetration rate is low, China has strengthened its telecom industry phenomenally during this last decade. China now has the world's largest telecom network and the second largest number of Internet users, and may possibly become the largest Internet market in terms of users (Popkin 2006). It would not be unreasonable to conclude that China's domestic ICT industry will be much stronger in the future as China continues to upgrade its telecom infrastructure towards the global level of productivity in industrial output (Popkin 2006).

The network of the global electronics manufacturing services industry based on this Wintelist structure established an environment for East Asia to grow as the central region for advanced manufacturing, both in the production and the location of its headquarters (Luthje 2004: 4). China is usually regarded as an ideal country to which low-end, labour-intensive mass products manufacturing should transfer. However, by continuously upgrading its products portfolio, China has become an ideal place to mass produce products with high complexity and high standards of quality (Luthje 2004). The continuous upgrading of processes is also accompanied by steadily improving R&D capabilities. Several Chinese ICT companies, such as Huawei, ZTE, Lenovo and TCL, have already taken their first steps in exploring the overseas market by relying on independent advanced ICT technologies (Luthje 2004: 7). Chapter Four will give examples in detail.

Compared with other East Asian countries, China has an advantageous position in a strategic role for an integrated upgrade in the ICT industry (Luthje 2004: 14). The ICT industry in China has received a significant amount of investment and favourable economic policies from all levels of the Chinese government (Popkin 2006). With government support, China shows great economic potential for continuous growth and rapid innovation in the ICT industry, while such significant economic potential is lacking in many developed countries (Luthje 2004). Moreover, the growing ICT R&D power helps China to establish a critical position both in East Asia and in the world. Supported by enormous investments and favourable policies and regulations on ICT R&D, China has been capable of setting independent standards, which will be key market access barriers for other countries that would like to enter China's market and gain a market share. This very important factor will be examined in detail in Chapter Three and Chapter Four. Once a standard becomes global, it suggests that the country having this standard would have an incomparable bargaining chip (ChinaDaily 2006; cite Stiglitz). The Chinese consider that only under such circumstances can countries enter the global bargaining game on a relatively equal basis (ChinaDaily 2006; cite Stiglitz).

As we can see, China has been making a systematic effort to develop and push indigenous technical standards: Time Division-Synchronous Code Division Multiple Access (3G TD-SCDMA); WLAN Authentication and Privacy Infrastructure (WAPI);

Internet Protocol Television (IPTV); and Advanced Audio-Video Coding/Decoding Standard (AVS). The Chinese central government has realized that economic leadership will be driven by technological capability rather than by natural resources power, though such power has deemed China as 'the World's Factory' (see more in Chapter Three). The competition for international standards essentially implies a conflict over business profits among national enterprises and the competition of different countries' national strategies. As the Chinese central government officially announced, to develop indigenous technical standards should be regarded as a priority in China's national strategy, more details on which can be read in Chapter Three. All in all, the Chinese central government believes that having independent global standards will lead to a more important role in the world economy.

The EARPNs have been deepened by China's integration into the network. With the vitality and energy in China today, the dynamism of East Asian economies has been further intensified and economic interdependence within East Asia has been deepened (Gaulier, Lemoine et al. 2007: 45). It is worth pointing out the noticeable changes that occurred in the trade flows within East Asia after China entered the international production networks. As mentioned above, China made great achievements in its economic take-off during the process of economic 'Reform and Open Door',[11] which helped China become the centre of the East Asian manufacturing networks. The significance of trade between China and other East Asian countries shows a marked rise, and China has already become the centre of East Asian trade expansion. According to trade statistics (see Chapter Three), along with an increase in intra-regional trade, trade

[11] In December 1978, the Central Committee of the Communist Party of China held an historic meeting in Beijing, at which two important decisions were made. One was to open China's door to the outside world and the other, to invigorate the national economy through reform. As it turned out, the meeting marked a new page in the annals of China. Since then, China has embarked on a gradual switch from the planned economy to what we now call the socialist market economy. Retrieved from http://www.xinhuanet.com/politics/ggkf30zn/ on 16th August 2009

volume between other East Asian countries and China has markedly increased. Based on the statistics, one can see that China has been a key trading partner with other East Asian countries and seems poised to take over the leading position of Japan. The previous EARPNs, led by Japan, which were characterized by a vertical transfer of investments and technology seems to be shifting towards a regional model of ‘bamboo capitalism’ or ‘parallel development’ (Xing 2007).

As Japan successfully established overseas business networks, the economic development of China has mainly depended on the overseas business networks that are called ‘bamboo networks’ (Weidenbaum 1996). Bamboo networks have contributed tremendously to the development and transition of China’s economy, especially after China launched the ‘Reform and Open Door’ policy. The members of bamboo networks are usually expatriates who left China for East Asian countries (the overwhelming majority of expatriates settled in these countries) or other regions in the world before 1949 and usually have established relatively mature businesses that are traditionally run by relatives. As they gradually grow in strength and expand to become conglomerate businesses, ‘close-knit and formidable business spheres’ have also been formed among these entrepreneurs (Weidenbaum 1996: 45). After 1978, these entrepreneurs were the first who went to China, bringing giant investments and relatively mature overseas business networks. Especially in the initial period of ‘Reform and Open Door’, along with the establishment of Special Economic Zones (SEZ) and High-tech Zones, in addition to a series of investor-friendly policies and regulations, expatriates of bamboo networks turned out to be a valuable part of the foreign investors. These expatriates have not only made a great contribution in promoting local economic development but also drove those SEZs and Hi-tech Zones become more integrated into overseas networks that were established by expatriates before they entered China's markets. Overseas Chinese FDI further deepened China's integration in EARPNs and contributed to strengthening China's influence within the region.

Along with continuous flows of FDI, the key factor in building EARPNs are the horizontal networks of trade and capital, in which a large amount of economic interaction on parts, components and other intermediate products occurs all the time among countries that lie in different tiers of RPNs. This model is gradually replacing vertical division and hierarchical exchanges (Cheow 2004: 3-4).

2 Debates about the Nature of EARPNs

The EARPNs were considered to be crucial to East Asian inter-regional trade growth and the East Asian Miracle (Gill and Kharas 2007). In the last two decades, the RPNs developed at an unprecedented scale in East Asian economies, accelerated by vertical production chains extended across the region and throughout the world (Kimura and Mitsuyo Ando 2003). It is undeniable that all East Asian countries have been in effect tightly connected because of economic interdependence based on the flying geese paradigm. On the one hand, the path of development in countries of the region implied differences in labour costs and income levels. The complementarities among these countries offered considerable opportunities for economic interaction, including trade and FDI among nearby countries. On the other hand, geographic proximity brought low transport and trade costs and, to some extent, contributed to the growth of the EARPNs. Moreover, favourable policies including duty drawback and encouragement on export-oriented FDI should be regarded as the main stimulus for increasing the growth of the EARPNs, which were believed to be 'more extensive than other regions' (Gill and Kharas 2007).

The EARPNs have been a substantial component of each country's economy in the region. Each country's manufacturing activities and trade can no longer be discussed without the networks (Ando and Kimura 2003). Almost all countries in each tier eventually came to specialize in manufacturing components and intermediate inputs for MNCs from countries at the higher tiers, such as Japan, Korea, Hong Kong, Taiwan, Singapore, or countries including the US and in Western Europe. Dynamic changes occurred in economic relations among leading and catch-up countries. In the meantime, relationships between different countries in a regional hierarchy tightened, because development transferred from one country to another (Hiley 1999). During the entire process, both relevant policies and markets played their respective roles, which made the process more stable and sustainable (Hiley 1999). Through such a circular process, a catch-up country can successfully industrialize and complete its industrial upgrade by continuously developing in an open market, when its external relations with leading countries continue in harmony (Hiley 1999: 81).

Geographically, the EARPNs have never been fixed and tangible networks. The emergence of the EARPNs is rooted in a special historical background, while their development is closely related to complicated international and regional economic and political relationships (as stressed in Chapter One). That will be further explained in Chapter Three. After the onset of the 1997 Asian Financial Crisis, a new regionalism emerged in East Asia. Both the rapidly changing external environment and the need for expanded intra-regional economic cooperation among the economies of East Asia brought new elements to the interpretation of the emerging features of EARPNs.

Because of tremendous changes in ICT, it is possible for latecomers to quickly become new leaders; consequently, the original catching-up model by learning step by step and vertical transfer does not work in East Asia, particularly in the ICT industry (Tung 2003). Along with the changes of industrialization in every country, the proportion of manufacturing gradually decreased in the countries that have completed industrialization and been located to the second tier of the production networks. These countries, such as the Four Dragons that usually served as a 'transfer station' that transferred incompetent sectors or industries to China and other ASEAN countries while absorbing competent sectors, industries and technologies from Japan, started to gain the advanced sectors, industries and technologies directly from the US and European countries. Meanwhile, the Four Dragons were concentrating on specific industries or sectors that would help them become more independent. The Four Dragons gradually became more like service centres for China and other ASEAN countries (Shen 2001; Dai 2003). With the strengthening of the ICT industry, the original production networks within East Asia transferred to production networks that were directly linked to the rest of the world.

China, as a country that was deficiently behind the average economic development level of the world, did not follow the steps of the Four Dragons, but directly learned from the experiences of these countries and Japan, the US and Western Europe. By learning from other countries, China comparatively took a shorter period of time of 30 years to achieve the second tier or a higher tier in the EARPNs. It became widely known that 'A panda breaks rank of Flying Geese Paradigm by manufacturing low-end products and high-end products simultaneously' (Economist 2001).

After successfully transforming from being a 'big power of manufacturing' to a 'big power of investments', Japan came to be trapped in a long-term and seemingly endless economic recession and complicated domestic institutional crisis. Although Japan continues to take the role of the leading goose, Japan must face the reality of lacking capabilities to perpetuate its leading role. According to the Ministry of International Trade and Industry (MITI, Japan), the era of Japan as lead goose has ended, while East Asia enters into an era of immense competition (MITI 2001).

Based on vast size of its market and unbalanced development levels within its internal boundaries, China is capable of developing cooperation with its neighbours that lie at different layers both horizontally and vertically (Gaulier, Lemoine et al. 2007). Meanwhile, cooperation can be established either in terms of an entire economy or a specific industry. The rise of China creates rivalry among countries for global market share, as East Asian countries still heavily depend on exports. However, China also imports to a significant degree from other East Asian countries, which is believed to contribute to the East Asian intra-regional trade and cooperation and more details which will be shown in Chapter Three. Apart from the overseas Chinese networks that have been believed to have contributed to the development of EARPNs (Katzenstein and Shiraishi 2006), indigenous Chinese enterprises are also reputed to have growing power that contributes to the ongoing changing EARPNs, which will be discussed in more details in Chapter Four. Therefore, China's astonishing performances based on such realities have led academics to draw the conclusion that China has already taken Japan's leading position in the EARPNs (Xing 2007). However, bearing in mind the elaboration in Chapter One, the discussion in the following chapters of this thesis will show that it is premature to come to this conclusion at the moment.

3 Key Factors Influencing ICT and China

Internet access, PC and telephone ownership have expanded so rapidly in a very short term, because a large amount of money had been invested in ICT expenditure to boost demands for ICT equipment, software and ICT and e-commerce services (Vaile 2002). All these changes are deeply and directly related to government support, gradually improving regional and domestic regimes and legal environments, reducing equipment tariffs, and increasing FDI (Vaile 2002). To be brief, both internal and the external factors have had a significant influence on the astonishing achievements of the ICT industry made by East Asia. In other words, domestic government support with regard to the continuous improvements over relevant policies and regimes and foreign investments brought by overseas MNCs make the profound changes in the ICT industry possible. The general frameworks for this support will be examined here, with reference to the whole region. The particular role of the Chinese government will be examined fully in Chapter Three.

As mentioned in the previous section, ICT is believed to be the fastest growing technology that will bring a promising future to national economies either through production or consumption (Kraemer and Dedrick 1996a). In view of that, according to Kraemer and Dedrick, almost every country in the world has been trying to enhance its development of the ICT industry, with the aim of strengthening its economy through the production and the use of ICT (Kraemer and Dedrick 1996b). Under these circumstances, national policies for development strategies are crucial for the developmental trajectory of the ICT industry. In other words, relevant policies and strategies have already been proved to be very effective in terms of protecting the ICT industry from fierce competition and accelerating it into further development, particularly policies on innovation promotion that will deeply enhance the power of the ICT industry (Kitagawa 2005). For example, the Clinton government in the US clearly announced ICT policies to enhance the establishment of the 'ICT Highway' in 1992 and the plan for National Information Infrastructure (NII) was carried out in 1993. These plans were important in promoting the economic development of the US and the all-round development of the information economy in the world (NIST 1994). In sum, industrial support for the ICT industry from government level holds an incomparable position in terms of industrial protection and promotion. However, because of the differences in innovation conditions in each country, certain policies might produce varying results in different countries with varying degrees of effectiveness.

ICT, according to Sein and Harindranath, amongst others, can be grouped into different categories: as a commodity; supporting development activities; as a driver of the economy; and directed at specific developmental activities (Sein and Harindranath 2004). In the first category, the conceptualisation of ICT as a commodity enables it to be considered as a production factor that has great impacts on the skill and productivity of labour (Mody and Dahlman 1992). On the one hand, as a production factor, ICT can help in attracting more FDI inflows because it may contribute to the improvement of an advanced infrastructure and lower production costs. On the other hand, as a production factor, it is also necessary for governments to make great efforts with regard to trade promotion to strengthen the comparative advantage of their country. This explains why developing countries have changed their attitude and shifted from controlling high tariffs and containing FDI to encouraging export-oriented trade and the inflow of foreign investment (Gholami, Lee et al. 2006).

As ICT can lower transaction and production costs, ICT to a large extent increases the inflows of FDI to developing countries. In the meantime, the development of the ICT industry has also been deeply enhanced because of those FDI flows. Addison and Heshmati have proved that developing countries can gain opportunities, including exports promotion, capital accumulation, access to much larger markets, and skill and technology transfer because of FDI inflows (Addison and Heshmati 2004). FDI also brings challenges to developing countries, such as market monopoly, fewer chances for local indigenous enterprises and deep dependence on FDI-providing countries. However, for those countries keen to develop their economies while lacking capital and technology at the very early stages of development, FDI has indeed made positive contributions to their economic growth (Addison and Heshmati 2004). For the same reason that ICT stimulates economic development and enhances national productivity and competitiveness (Mody and Dahlman 1992; Mody 1997), almost all countries have launched encouraging policies concerning FDI. In recent years, restrictions on liberalizing FDI have been gradually released; incentives to attract more FDI have been gradually provided, such as improvements on infrastructure and human capital, low wages and political stability (Gholami, Lee et al. 2003: 59). All these factors are important for attracting the MNCs that pursue low costs and high profits all around the world.

As emphasized above, ICT can be a powerful instrument under favourable conditions.

ICT can be very effective for increasing productivity, generating economic growth by facilitating trade, transport and financial issues, thus creating jobs and improving the quality of life for all (PDD 2004: 85). However, not all countries are capable of providing the favourable conditions for making ICT effective. For example, governments may be short of the budget needed for infrastructure, connectivity and qualified personnel that are required by ICT; and the outdated intellectual property rights' protection and the absence of effective laws and regulations can present significant obstacles to MNC involvement (PDD 2004 : 87). In such circumstances, regional cooperation in the ICT industry can come to be essential and meaningful: it can provide an even bigger market and increasingly strengthen comprehensive ICT innovation capabilities. That helps understanding why governments engage in RPNs with great effort.

The ICT industry has been put in the position of a 'pillar industry' in China's economic development. This can be seen from official publications at all levels of Chinese governmental institutions and demonstrated from the fastest and the largest telecommunications build-out programme in the world (Lovelock and Ure 1998). All relevant governmental institutions and organizations have not only launched detailed policies and regulations for supporting the ICT industry but also carried out these policies and regulations, which are regarded as one of the critiques to evaluate governmental performance (Wang 2007). For example, the index of informationalization was an important evaluation criterion for the assessment of cadres in Guangdong province. The information office of the State Council then published its evaluation on the performance evaluation on the Chinese government's website portal. The details of this point will be examined in Chapter Three. As economic reform went further, while still shouldering the investment burden, the Chinese government also encouraged entrepreneurial initiatives (Xinhua 2009). These to a large extent promoted the increasingly rapid development in the ICT industry, both in terms of diversity and in terms of strengthening the ICT industry in a very short period. Such support at all levels, particularly from government, essentially led to more FDI flowing to China, which played critical roles in the growth of the manufacturing sector of the ICT industry (Hou 2006). This will be examined in detail in Chapter Four. However, such support also made foreign governments and businesses face much more confusing situations, in which they had to compete with other rival MNCs on relevant resources. In the meantime, they also had to compete for the establishment of possible alliances with Chinese partners at different levels of the political and geographical hierarchy (Lovelock and Ure 1998). In brief, government interference, businesses involvement and FDI flows are all crucial for the development of the ICT industry.

Both the development of the ICT industry and China's ICT industry development are deeply influenced by the factors mentioned above, including internal factors of government support, external factors of FDI flows which bring capitals and make possible technology transfer and regional cooperation in the ICT industry.

D. Summary

The central theme of this chapter has been to define 'EARPNs' and the 'ICT industry', as well as the relationships between the two. As mentioned very early in this chapter, different countries and different scholars with various backgrounds already gave these two different definitions. This chapter has tried to demonstrate the changing implication of the relationships between the two definitions. Changes occur in EARPNs, as well as in specific countries or specific industries. Next chapter will examine the key factor that helps to understand the application of the flying geese paradigm with reference to changes in the ICT industry in a specific country: the roles of governments both domestically and regionally.

CHAPTER THREE: CHINESE GOVERNMENT AND EARPNs

Government policy is like the moon. It is different in the middle of the month than it is on the first day of the month. Government policy is also like the sun. When it shines on you, you flourish. Chinese proverb (Saxenian 2003)

The development of a flourishing and rapidly growing industry reflects the extent of government policy support in the industry (Wu and Loy 2004). The high rates of capital accumulation especially in ICT manufacturing has resulted from the shift in policies towards decentralization, privatization and the 'Open Door' policy around the 1980s that established an institutional setting, and other factors such as the presence of a wide 'Chinese Diaspora' (Gu and Lundvall 2006). Although China has committed to reducing government intervention in economic activities, the role of the state has been emphasized as much as possible because of the market economy with Chinese characteristics. As the 2005 CCID report said, because of the intense focus of the Chinese central government, China has become a leading power of global ICT products manufacturing by exploiting its comparative advantages and effectively carrying out global production transition (PeopleDaily 2000). The ICT industry is characterized by high labour intensiveness, hi-tech content, the high cost of R&D, high investment risks and high dependence on talent (Qiang 2007). Practical, effective, systematic and integral policies and regulations are necessary for making the rapid development of the ICT industry (Nicol 2003).

One of the reasons for deep governmental commitment is because the development level of the ICT industry has already become a crucial criterion for evaluating the economic complexity of a country (Li 2005). Meanwhile, the developmental level of the ICT industry also implies the economic potential and future competitiveness of a country (Wong 2002). In other words, national governments intend to play key roles during the entire process of ICT industry development because the ICT industry brings about pervasive impacts on competitiveness and economic development on all aspects of life both in developed and developing countries (Nicol 2003). Moreover, the success stories of amazing prosperity brought by the rapid increase in the export of ICT services and products from various groups of countries such as Singapore, India, South Korea, Malaysia, and China have inspired the world (Hanna 2003).

As a matter of fact, the deep commitment of governments to the development of the ICT industry cannot be overemphasized. The role of government is crucial for ICT capacity no matter how distinctive the economic and political situation in countries and regions may be. For example, the development of the ICT industry in the US has been mainly supported by government procurement from the initial stage. The US also formulated the NII, GII, I2 and IT2[12] as significant government ICT initiatives (Chen 1999: 50; Nicol 2003). The White House also announced the Millennium Program on 22nd April, 1998. The Japanese government serves as 'guider and supporter' by formulating policies to guide the ICT industry and directing government procurement. The e-Japan strategy was believed to help ICT have a positive impact on the national economy (Obi and Iwasaki 2004). Following e-Japan and u-Japan, i-Japan was recently proposed by Japanese government as an updated version of the national information strategy. Along

[12] In anticipating the fast-paced changes in digital telecommunications technology which has had profoundly changed every aspects of lives, the Clinton Administration made impressive lead in coordinating the country's national information infrastructure (NII). While continuing the NII efforts, the Clinton administration led its way to the global information infrastructure (GII) development again. With a mission to further the US leadership in research and higher education and accelerate the availability of new services and applications on the Internet, the Internet2 project was born (Chen 1999: 55). The Clinton's administration calls for a increase of USD366 million dollars of new money for the FY 2000 multiagency Federal IT R&D initiative. This initiative known as the Information Technology for the Twenty-First Century (IT*2) (Chen 1999: 59)

with economic globalization, the continuous upgrade of industrial structures through the ongoing ICT revolution is believed to have been an effective way to strengthen national competitiveness (Obi and Iwasaki 2004). Thus, many countries such as Brazil, Malaysia and India have developed specific national ICT development strategies and policies (Hanna 2003: 2).

China is now working towards becoming exceptional in all categories of the ICT industry; namely, hardware, software, services, telecommunications and semiconductors. States usually strive to be the leader in one to three categories, but, with the exception of the US, few countries can be exceptional in all categories (Popkin 2006). Therefore, it is believed that whether China can possibly rank among the world's elites in the ICT industry to a large extent depends on how the Chinese government manages economic activities and the R&D capabilities of entrepreneurs in the area of ICT (Popkin 2006). Simultaneously, China needs to focus on seeking the right timing to connect China's economic characteristics with trends in the global economy (Popkin 2006).

It is necessary to clarify the relationships between the central government and local governments in China, for the purpose of better understanding the significant role played by the state in China's ICT industry development. After the Third Plenary Session of the 11th Central Committee, a series of policies on 'decentralization of power and transfer of profits' have been formulized, which was the major task of the reform at that time. The measures taken during this period were mainly to explore how to set up a mechanism for stimulating the motivation of the two sides including the central government and local governments.

Local governments usually did not have too much flexibility, compared with the responsibilities undertaken. Since then, local governments started having more and more autonomy to decide and deal with the administrative areas of political, social and economic affairs. At the management level of governance, Chinese central government gradually delegated financial authority and economic management to local governments. On the basis of the later tax-sharing reform, enthusiasm was brought to the local governments, which further stimulated and enhanced economic vitality and local governments' awareness in local governance. By this means, the central government's macro-control pressure was shared by local governments. Moreover, it also helped coordinate objectives of the central government and goals of local governments.

Under this circumstance, overall development of the national economy has been effectively promoted and economic reform has been further promoted. For example, as the main method of modulate the economy and society, local finance played a key role in the economy and society development. Under the mechanism of socialism market economy, local finance took more roles on the development of local economy and had a basic effect to the comprehensive balance of local economy. In word, by standardizing the functions and powers of the central government and local authorities according to law and properly handling relations between the departments directly under the central government and the local governments, local governments indeed have more flexibilities and play more important roles in promoting local economic development.

It is crucial for those ICT enterprises that are still at the very early stage of development. That is because local governments will guide these enterprises directly in terms of creating favourable environment, under the unified leadership of the central authorities.

To sum up, because of the transfer of powers from the central government to local governments, Chinese central government becomes the regulator and decision maker on the macroeconomic policies stimulating domestic demand and strengthening national economy in light of overall national situations; while local governments grow to be the executors of policies or regulations in implementing corresponding macroeconomic policies in light of actual needs at local level.

This chapter has two sections. The first section shows who has been involved in strengthening the ICT industry and how relevant policies and regulations might be eventually carried out with the purpose of accelerating the rapid development of the ICT industry. Research has shown that the Chinese government helped the ICT industry during its initial stage and accelerated the development of the ICT industry by offering a better domestic environment. The second section gives reasons why Chinese government contributed to integrating into RPNs with regard to ICT industry by means of analyzing trade statistics in detail. This section also demonstrates that the Chinese government provided a good international economic environment, especially a favourable regional environment, for strengthening the domestic ICT industry.

A. The Role of the State — Domestic

1 Government Players and the ICT Industry in China

It is easy to see the great progress made in China's ICT industry, and it is also easy to understand that Chinese central government must have put big efforts in promoting the development of the ICT industry. It is very complicated to describe the decision and policy making structures related to the development of the ICT industry in China. There are complicated relationships between government institutions and deep-rooted relationships between governments and businesses (Saxenian 2003). Firstly, compared with other countries, the Chinese government's approach to supporting the ICT industry is quite distinctive. Considering that the 'Reform and Open Door Policy' has only been formulated and carried out since 1978, the influence of a planned economy could not disappear quickly. Thus, there is today an uneasy coexistence of planning and market regulation. However, the extent to which the government will exert its power is changing. Secondly, intricate organizational affiliations and opaque inner management mechanisms also make it hard to understand exactly who is involved in the picture, and how (Lovelock and Ure 1998). In other words, it is not easy to see how and which government agency had a major role in the development of the ICT industry. During the entire process, the development of the ICT industry has been deeply influenced by the complexity of bureaucratic conflict, top party leaders and external opportunities and pressures (Fewsmith 1999; Pearson 2001; Feng 2006). Considering political divergences of opinions within the Communist Party and between the Communist Party and other parties, there have been strong opposing opinions on economic transition and internationalization (Bell and Feng 2007). On the one hand, with regard to reform and opening strategies, there are clear disagreements along political and ideological lines because of the party-state (Bell and Feng 2007). On the other hand, the picture becomes even more complicated because of the involvement of a fragmented institutional system represented by a compartmentalized bureaucracy and the special ties between business and the state (Bell and Feng 2007). This section will try to identify the relevant government players with regard to the ICT industry in China.

It is easy to be confused because of the large number of relevant government players. However, historical changes in the institutional reforms of the State Council give us some clues. Previous institutional reforms of the State Council not only tell us why the institutional reforms were introduced; they also show us what exact changes happened in the functions of relevant government players (Sit and Liu 2000). During the entire process, we can also see the significant role of the Central Committee of the Communist Party of China (CCCPC) (UNDP 2004). For that reason, the following section will focus on the previous institutional reforms of the State Council, with the purpose of ascertaining who has been involved in the development of the ICT industry and who has played a major role.

Institutional Reforms of the State Council since the 1978 Economic Reform

As mentioned above, various departments and ministries have been involved in the development of the ICT industry in China. The organizations and functions of these departments and ministries has also changed as a result of institutional reforms that either partly or to a large extent resulted from significant changes in the ICT industry itself. The ICT industry was not established in China and the wave of the ICT revolution did not start its global influence before the end of the 1970s. Therefore, the time period under focus in this section will be mainly on the period after China's 1978 economic reform.

China's institutional reforms originated from both domestic realities and the international environment (Shi 2001). Institutional reform is regarded as a pivotal step in deepening reform (17thNationalCongress 2009). By reviewing institutional reforms, we discover that the ICT industry has gradually become the focal point of the Chinese government in the entire process. From the beginning of institutional reform, the central government has been in a mire of restructuring branches of the ICT industry (Xinhua 2007). By realizing the importance of the influence of the waves of the ICT revolution, the State Council has repeatedly dismantled and merged the related branches of the ICT industry since 1988. The Ministry of Industry and Information Technology (MII) was eventually established in 2008, which indicated an unprecedented focus of the central government on this important area (Tong 2008). By this time, ICT had come to be valued not only as an industry but also as the means to accelerate the upgrade of industries overall (Tong 2008). The following elaboration will focus on several aspects: improving efficient governance; and transforming and clarifying government functions. By reviewing previous institutional reform of the State Council, the purpose of this section is to show clearly who became involved in the development of the ICT industry.

Since the founding of the People's Republic of China (PRC), there have been ten periods of institutional reform: from 1951 to 1953; from 1954 to 1956; from 1956 to 1959; from 1960 to 1965; 1982; 1988; 1993; 1998; 2003; and 2008 (PeopleDaily 2008). Since 1983, the reorganization of government institutions has occurred nearly every five years. Before the 1978 economic reform, there was emphasis on streamlining the administration and making adjustments between central and local governments (Xinhua 2008). The reason that the State Council focused on streamlining the administration and making adjustments between the central and local governments was to improve inefficient governance and reduce the number of players in the decision making of each industry (Gao 2008). Although the goal of several institutional reforms was 'to streamline the administration', both the number of institutions and the number of staff gradually reached their peak as institutional reform continued (PeopleDaily 2008). In 1981, the number of institutions under the State Council was over 100, reaching a the peak since the founding of PRC (PeopleDaily 2008). At that time, overstaffing in government became a big obstacle to efficient governance.

In 1978, the Third Plenary Session of the Eleventh Central Committee of the Communist Party of China (CPC) brought China into a new era with economic reform and the Open Door Policy. From 1982, institutional reform was initially launched by the State Council and processed from top to bottom. The 1982 institutional reform lasted more than three years, and all relevant government departments and institutions were involved. As the economic reform resulted in new needs, institutional adjustment became the focus of the 1982 institutional reform and some parts of departments or institutions were reformed into economic organizations, which were more conducive to further promoting economic reform (Xinhua 2007). The 1982 institutional reform did not essentially affect the highly centralized planned economy and did not realize a major transformation of government functions.

The First Plenary Session of the Seventh National People's Congress started a new round of institutional reform. The key to this 1988 institutional reform was to transform government functions. The economic management department of the government gradually changed from direct to indirect management (Xinhua 2007). An emphasis was put on those organizations closely connected with economic reform (Xinhua 2007). As a result of the 1988 institutional reform, the number of institutions of the State Council was reduced from 45 to 41. Among the 41 institutions, apart from various indirect management institutions, there were six institutions that were directly related to the decision making and policy making of the ICT industry. These six were: the State Science and Technology Commission; the Department of Commerce; the Department of Foreign Affairs and Trade; the Electrical and Mechanical Services Department; the Department of Posts and Telecommunications; and the State Planning Commission. The Department of Posts and Telecommunications was regarded as the key management institution for the ICT industry. The reason that the State Council decided to place the administration of posts and the administration of telecommunications in the same department was because the Chinese economy was still weak at that time and the primary ways of communication were through post and telephone. Therefore, it conformed to the reality of that time. [13] The Department of Posts and Telecommunications did not stop functioning as the chief management agency for ICT until the 1998 institutional reform transferred ICT management functions to the Ministry of Information, which made implications for, and the definition of, the ICT industry in China even clearer (see below).

To keep pace with the development of the socialist market economy, institutional reform was launched in 1993. The core tasks of the 1993 institutional reform were to establish a management model to align with the requirements of the socialist market economy, while promoting economic reform and establishing a market economy (Xinhua 2007). The need to transform government functions and to streamline the administration were again emphasized (Xinhua 2007). The 1993 institutional reform lasted until 1997. During this time, entrepreneurs obtained more decision-making power in operation and management of the enterprise; local governments gained more power in terms of local economic development (Xinhua 2007). Moreover, the economic sectors and related institutions were further reformed to become economic entities, including state-owned

[13] Personal Interview with Z, a senior officer of MII, 25th July, 2006, Beijing

enterprises (SOE) and commercial associations that did not have government functions (Xinhua 2007). The contribution of the 1993 institution reform was, for the first time, to propose that the goal of institutional reform be compatible with the needs of constructing a socialist market economy (Xinhua 2007). This essentially established a favourable macroeconomic environment for various industries including the ICT industry.

However, the 1993 institutional reform was not clear in its real objective, as was evidenced by the reform of the Electrical and Mechanical Services Department (Ni 2008). The combining of the Electrical and Mechanical Services Department was actually a significant result of the 1988 institutional reform. However, as a result of 1993 institution reform, the department was split into two departments, the Department of Mechanics and the Department of Electronics. The initial motivation for the split was to further clarify the relationships between the Mechanics industry and the Electronics industry. However, the interrelated relationships rooted between the two industries eventually led to even more complicated administrative procedures. The 1993 institutional reform directly resulted in the split of the Electrical and Mechanical Services Department, the establishment of the State Economic Commission and the Department for Domestic Trade. As a result, several more government agencies simultaneously became involved in ICT industry management; but no clear management functions were made in these government agencies. In a word, the ICT industry had to overcome problems of overlapping management before it could really focus on 'development' in the still-constructing socialist market economy.

The intermingling of government functions and enterprises has always concerned the central government. In 1998, a new round of institutional reform began and the main target of this institutional reform was to remove such intermingling (Xinhua 2007). The priority of the political agenda was to establish an administrative management model aligned with the requirements of a socialist market economy. Different from the 1993 institutional reform, the goals and purposes of the 1998 institutional reform were entirely in agreement with one another (Ni 2008). The purpose was to drive the development of a socialist market economy, and the goal was to end the system in which special economic sectors directly managed enterprises (Xinhua 2007). The historical progress of the 1998 institutional reform can be seen in the major progress of the transformation of government functions (Zhu and Li 2009). Almost all special sectors of industrial economies including the Department of Mechanics and the Department of Electronics were removed. These special sectors of industrial economy were believed to be the result of a planned economy and were regarded as effective vehicles for the distribution of resources. However, they became obstacles in the market economy because state intervention in enterprises' activities was over and above what the enterprises required. The removal of all these special sectors of industrial economy established the predominant position of enterprise, and overcame almost all the barriers and stumbling blocks of the intermingling functions of the government and the enterprises (Chen 2008). The number of institutions under the State Council was reduced to 29, including 12 institutions for governmental affairs, four macro-control institutions, eight special economic management institutions, and five social security and resource management institutions (Xinhua 2007).

As for the ICT industry, the most influential change of the 1998 institutional reform was the establishment of the Ministry of Information. The reason for the establishment of the

Ministry of Information was rooted in the fact that the telecommunications sector made great achievements in a very short period, which caused the original Ministry of Posts and Telecommunications to be inefficient in performing its duties and functions (Wang 2008). Guided by the Ministry of Information, the 'Scheme of Restructuring and Reorganizing Telecommunications' was successfully launched, which for the very first time created the framework for the Chinese telecommunications sector (Wang 2008). Because of the wave of IT revolution at the end of the 1990s, the role of informationalization became more significant after 2000. [14] As the role of informationalization became more significant in 2000, President Zemin Jiang proposed the development strategy of 'Energetically Promoting IT Application and Using IT to Propel and Accelerate Industrialization' (SCIO 2006). Two years later (2002), then General Secretary Hu brought forward a new approach to industrialization by 'Using IT to Propel and Accelerate Industrialization, and Using Industrialization to Propel and Accelerate Informationalization' (Xinhua 23rd November 2002). From then on, the ICT industry began to hold an important position within the national economy (Xinhua 2007).

The fact that China became a member of the World Trade Organization (WTO) made it urgent for the Chinese central government to establish a highly effective, fair and standardized administrative environment (Saxenian 2003). The plan for the restructuring of departments under the State Council was proposed in the First Session of the Tenth National People's Congress (NPC), which started the fifth extensive institutional reform.

[14] The concept of 'informationalization' was first proposed in China in 1991. Informationalization initially referred to the generation, use and management of information in general, and the process of constructing the information technology environment. Informationalization is essentially expected to speed up the integration of information technology and industrialization and to promote industrialization of the whole community on the new path to industrialization with Chinese characteristics (Yang 2004; Hua 2009). Also see http://www.ciia.org.cn/genfiles/1253766123.html
http://www.people.com.cn/GB/news/1023/2711106.html

Except for the General Office of the State Council, 29 institutions of the State Council were reduced to 28 when the State Economic and Trade Commission and the Ministry of Foreign Trade and Economic Cooperation were combined into the Ministry of Commerce. The goals of institutional reforms were further to transform government functions, make improvements to management methods, promote e-government affairs, improve administrative efficiency and reduce administrative costs (Xinhua 2007).

As one of the key contributions to the 2003 institutional reform on the further transformation of government functions, the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) was established, which was crucial to the restructuring and reform of state-owned enterprises (SOEs). As for the ICT industry, particularly for its large enterprises such as China Telecom, the establishment of SASAC is of historic significance. One of SASAC's key functions was to direct further reform and the reorganization of SOEs and specifically to ensure that any activities related to the transfer of, and changes in, property rights of enterprises should not be carried out without SASAC approval.[15] This clearly showed Chinese central government's will to protect state-owned properties, that is, SOEs. It also explains in part why state-owned China Mobile and China Telecom were given so many more favourable conditions (see Chapter Four).

In 2005, Premier Wen specified the need for 'energetically developed high- and new-tech industries, the IT industry in particular, and vigorously promoted IT application to our national economy and society' in the *'Report on the Work of the Government*'. The significance of the ICT industry was further emphasized in the report to the 17th National Congress of the CPC (15 October 2007):

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[15] Personal interview with D, a senior officer of SASAC, 22nd July, 2006, Beijing

> We will develop a modern industrial system, integrate IT application with industrialization, push our large industries to grow stronger, invigorate the equipment manufacturing industry, and eliminate outdated production capacities.[16]

From the official documents mentioned above, we can see that the ICT industry already has a very significant position in the Chinese national economy. Since the 1950s when the '12-Year Programme for The Development of Science' was launched,[17] the ICT industry has grown in China from its infancy, start-up and strengthening, to its rapid but steady development. So far, the Chinese ICT industry has developed from being a technology follower for low-end processing to independent innovation and creation (Qiang 2007). According to official publications of the Ministry of Industry and Information Technology (MII), the scale of the ICT industry has been continuously expanding; in the meantime, its industrial structure has successfully become rationalized and optimized. From 2001 to 2007, the compounded annual growth rate of ICT profit was over 26 per cent, which is far greater than the growth of GDP in the same period. Of this total, the growth rate of the software industry was over 50 per cent (MII 2007). China is now known as a global centre of ICT manufacturing and R&D. After 30 years of economic reform, China is now at a very critical stage of making sustainable development by continuous industries upgrade, and the ICT industry is regarded as the core supporting industry in China and has become the pillar of the national economy (Xinhua 2005). As a result, the existing institutional frameworks were inadequate for the new situation, and a new round of institutional reform was called for.

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[16] Source: Full text of Jintao Hu's Speech at the 17th Party Congress http://news.xinhuanet.com/english/2007-10/24/content_6938749.htm

[17] In the period 1956-1967, this was completed by 1962. And subsequently there was a 10-year programme.

In 2008, the first Session of the Eleventh NPC reached an agreement on the *'Scheme for the Restructuring of Departments under the State Council'* (Xinhua 2007). The current system was believed not to be meeting the needs of the market economy. With so many ministries, there were many coordination problems and inter-agency conflicts of interests. There was an increasing realization that Chinese officials were spending a significant amount of time balancing interests between arms of the bureaucracy and leaving little time to solve major issues (Liao 2003). As China sought to improve a system that had difficulties in responding quickly to shifting economic and social demands, the major tasks of the 2008 institutional reform have been to establish 'super ministries' with integrated functions and to address the problems of overlapping organizations and functions and conflicting policies from different departments (Xinhua 2007). The major tasks of the 2008 institutional reform can be concluded as follows: to establish a super ministry to consolidate bureaucracy through combining regulators into a smaller number of more-powerful ministries; to achieve rational functions of macro-control departments; to strengthen institutions for environmental administration; to integrate and to improve industrialization and the application of ICT technology; and to make improvements for people's livelihoods (Xinhua 2007). The overall effect on the ICT industry was the streamlining of administrative procedures because of the establishment of a super ministry for the ICT industry, namely, the Ministry of Industry and Information Technology (see below). Moreover, the 2008 institutional reform further strengthened the role of the ICT industry in the Chinese national economy by clearly proposing 'to integrate and to improve industrialization and the application of ICT technology to make improvements to people's livelihoods'.

As a result of the 2008 institutional reform, the establishment of the Ministry of Industry and Information Technology in that same year was significant for the ICT industry. Its establishment clearly demonstrated the significant role of the ICT industry in the national economy, which implied the integration of the ICT industry, information technology and traditional industry (Cao 2008). The priorities of the previous Ministry of Information mainly focused on supporting and monitoring the ICT industry; while the new Ministry of Industry and Information Technology placed more emphasis on the application of information technology and the upgrading of traditional industries (Cao 2008). In other words, as a result of the establishment of the Ministry of Industry and Information Technology, the conditions are even more favourable for 'energetically promoting IT application and using IT to propel and accelerate industrialization' (Xinhua 2007). The role of ICT is now pushed to a position of historical record, not only in terms of the ICT industry, but also in terms of the application of ICT technology (Liao 2008). Since then, the focus of work of Chinese governments at all levels has concentrated on: the acceleration of industrial development and production of information technology; the application of ICT technology in rural production and society; the application and integration of ICT technology in the flow of business management and manufacturing; the application of ICT technology in social and cultural undertakings; and the application of ICT technology in governmental administration (Hua 2009). An interesting example here is that chief information officers (CIO) are very popular job posts in many enterprises and government institutions.[18] Specifically, it was also clarified by the Ministry of Industry and Information Technology that China will be more focused on the high-end sectors of the ICT industry, after successfully becoming the worlds' biggest ICT producer (Xinhua

[18] Personal interview with J, a senior staff member in the China branch of a Finland electronics company, 9 November 2008, Beijing

2007).

In reviewing institutional reforms since 1982, the reduction of government intervention, the transformation of government functions and the streamlining of government administration have always been crucial. The previous institutional reform of the State Council mainly aimed at decentralization and privatization (Wu 2003). Decentralization and privatization essentially focused on the following four aspects. The first is bureaucratic decentralization, which means firms have more autonomy in decision making for production planning, investment and acquisition of technology, marketing, pricing and personnel; meanwhile, local governments also gain more autonomy in financial, budgetary and administrative issues (Gu and Lundvall 2006). The second aspect is on ownership, which implies that the restrictions on township and village enterprises were loosened in the early 1980s and later the limitations on private initiatives were also extended in the mid-1990s (Gu and Lundvall 2006). The third aspect of decentralization and privatization is that local governments gained more freedom in promoting the local accumulation of capital (Gu and Lundvall 2006). The fourth aspect is on incremental reform that means the ownership structure of industrial enterprises would be rapidly changed (Gu and Lundvall 2006). Centred on these four aspects, more transparent and coherent rules were introduced: reforms on taxation, the banking system and the governance structure of SOEs were initiated; and Special Economic Zones for FDI-related investment with various favourable regulations were created (Gu and Lundvall 2006). With these favourable policies, more FDI flowed into China, which mainly came from the diasporic networks of Chinese overseas (Gu and Lundvall 2006). Along with decentralization and privatization, traditional institutions that are mentioned above and the CCCPC is still making the key decisions, however, driven by the goal of economic growth that is the cornerstone of China's social stability, businessmen and academics are also helping to shape policies (Zweig and Bi 2005). (See below for more details).

As for the ICT industry, the meaning of institutional reform of the State Council lies in the following aspects. First, wrangling in bureaucracy has been reduced and a sounder macroeconomic environment more easily created. In the meantime, duties and responsibilities of each ministry were gradually clarified, and coordination and cooperation among the existing specialized agencies gradually improved (Shi 2001). This can be shown by the continuously decreasing number of relevant institutions that have practical power in the decision making of the ICT industry. It can also be seen by the establishment of the MII, whose functions have been defined more clearly. Second, government intervention, particularly central government control in economic activities, declined and enterprises gained more independence. As a result of previous institutional reforms, more opportunities and autonomy have been provided to Chinese enterprises, especially those small and middle enterprises and private enterprises (Chinaorg 2008). This can be proved by the continuously increasing number and booming growth of private enterprises (see Chapter Four). However, SOEs have not enjoyed as much autonomy as those private enterprises, as will be shown in the next chapter. Third, the evolution of the Department of Posts and Communications, the Ministry of Information and the Ministry of Industry and Information Technology showed that the position of the ICT industry gradually became more specified and more important to the national economy (Chinaorg 2008).

In short, the institutional reforms of the State Council essentially show how central government made arrangements for all relevant agencies in the country with the purpose of getting the most from them by making them attach great importance to supporting the ICT industry (Zhang 2000). As a recent article in *The Economist* said, the leading role of China partly resulted from co-ordinated government action (Economist 2006). In other words, significant institutional arrangements truly played a role. Such continuous institutional reform has helped the Chinese centralized economy to have the advantage of 'pouring resources into some projects' and 'directing the development of entire industry', giving access to the technological resources of the state to burgeoning firms (Shi 2001). That was exactly what the governments in Japan and the NICs did when they stayed at the lower tiers of the flying geese model.

In summary, after the ten periods of institutional reform mentioned above, with the intention of streamlining the administration, reducing government intervention and transforming government functions, the number of ministries directly involved with management of the ICT industry was reduced, and the functions of ministries were even specified. The CCCPC has the right of final decision on all policies related to the ICT industry. The MII is the ministry with the right of direct management to organize the implementation of industrial planning, policies and standards; monitor the daily operation of industrial sectors; promote the innovation of major technical equipment; supervise telecommunications; guide the construction of informationalization; and maintain National Information Security. At the same time the MII is significant in proposing motions related to the ICT industry. The Ministry of Science and Technology (MOST) takes the lead in developing science and technology development plans in general, and the drafting of relevant laws and regulations. Unlike the MII, the MOST is not directly in charge of the ICT industry. Moreover, the Ministry of Commerce becomes involved for dealing with trade and investment-related matters in the ICT industry. The Ministry of Foreign Affairs plays the key role in dealing with the ICT industry at government level.

2 Understanding the Chinese Government's Supporting Policy System

Institutional reform essentially provides and creates an improved and favourable macro-environment for the development of the ICT industry at the administrative level. Specifically, by separating government functions from enterprise management and streamlining government departments at all levels, government functions were further transformed and clarified. Furthermore, the significant position of the ICT industry has been established by the adjustment of government functions. In the meantime, along with institutional reform, a series of policies and regulations at all levels have been put forward to support and foster different aspects of the ICT industry (Lovelock and Ure 1998). This section will focus on the government supporting policy system including laws and regulations, industrial plans and plans and strategies at national level (CEOCIO 20th February 2008), by which we can see more clearly how the relevant government players get involved in the decision and policy making of the ICT industry.

According to pronouncements made by the Central People's Government of the PRC, policy is made by central government, local government, and all other relevant departments for the purpose of realizing tasks and goals for a specific historical period.[19] Policy is a collection of laws and statutes, regulations and rules and measures.[20] Based on the definition of policy shown above, two major parts are related to the development of the ICT industry in the Chinese government supporting policy system: laws and regulations; and industry plans.

Laws and Regulations

The continuous deepening of economic reform has driven continuous improvements in relevant laws and regulations. A series of significant and major reforms have been made, such as separating enterprise from government; separating posts from telecommunications operations; and restructuring and reorganizing telecommunications enterprises. Therefore, corresponding adjustments were made to the regulations and laws, but only after a series discussions and negotiations. For example, several significant discussions have taken place in the National Congress[21] about restructuring and reorganizing the telecommunications sector, which was critical in accelerating the intensifying the competition of all related businesses at the 3G stage. These discussions were essentially made to accelerate the growth and development of the ICT industry and increase the profits of the ICT industry, as well as to balance interests among various agencies.

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[19] Sources: Laws and regulations, Retrieved from http://www.gov.cn/flfg/index.htm on 20 December, 2008

[20] Sources: Laws and regulations, Retrieved from http://www.gov.cn/flfg/index.htm on 20 December, 2008

[21] The National People's Congress (NPC) is the supreme organ of state power in China. It meets once a year, usually in spring, and delegates are elected every five years. In practice, important decisions are made before the meeting. In the past two decades the NPC has been pivotal at least as a symbolic part of leadership changes in the People's Republic of China. Functions and Powers of the NPC include: to amend the Constitution and oversee its enforcement; to enact and amend basic laws governing criminal offences, civil affairs, state organs and other matters; to elect and appoint members to central state organs; and to determine major state issues. http://www.npc.gov.cn/englishnpc/Organization/2007-11/15/content_1373013.htm; http://www.npc.gov.cn/englishnpc/Organization/node_2846.htm

In China, laws and regulations are situated in three categories: laws, administrative rules and regulations, and rules made by ministries and departments. As the previous section has shown, after several institutional reforms, the CCCPC, the State Council, the Ministry of Industry and Information Technology and other related departments have a deep involvement as policy makers in ICT policies. Continuously improved national rules and regulations have helped to establish a legal framework that shows the significance of the ICT industry in the national economy and the legal dimension for the ICT industry's development.[22] For example, '*The provision of communication engineering quality supervision and management'* mainly intended to ensure the quality of communication engineering. '*The Notice on strengthening the management of foreign investment as value-added telecom businesses'* was to avoid illegal value-added telecommunications business in China (MII 2006).

As for the Chinese ICT industry, the changes in regulations bring about uncertainty (Yu, Suojapelto et al. 2008). So far, the transformation of regulations regarding the ICT industry have affected the whole industry because of the absolute control by Chinese central government over the ICT industry (Yu, Suojapelto et al. 2008). Meanwhile, changes in key regulators' decisions directly resulted in differences. For example, the structure of the telecom operators is going to be totally changed by releasing the 3G license. The MII is the agency that is directly in charge of the development of the ICT industry, but is not the final decision maker-maker. After rounds of negotiations with relevant institutions, based on the motions proposed by the MII, the final crucial decisions with regard to the significant development of the ICT industry will be

[22] Sources: National Technology Planning, retrieved from http://www.gov.cn/test/2005-09/23/content_69568.htm, on 20 December 2008;
Science and Technology Policy and the laws and regulations, retrieved from http://www.gov.cn/test/2005-09/25/content_69956.htm, on 20 December;
Laws and Regulations, retrieved from http://www.miit.gov.cn/n11293472/n11293832/n11294042/n11302345/index.html, on 12 January 2009

eventually made in the NPC, led by the CCCPC. For example, the MII makes decisions on which telecommunications operator will be appointed as the major telecom operator. The MII also decided that the whole country should be divided into two regions for the four telecommunications operators that have absolute monopolies in each sub-region (Yu, Suojapelto et al. 2008). In brief, the changes in regulations and laws from the key regulators essentially determine the framework of the entire Chinese ICT industry.

As mentioned in the previous section, the ICT industry has become the pillar industry in China, not only in terms of manufacturing volumes of low-end products but also in terms of increasingly improved industry structures (See Chapter Four). Under such circumstances, laws and regulations had to be improved and revised to steadily improve the structure of the ICT industry. For example, software and information services have already stopped being entirely dependent on foreign aid and started being more independent. For example, China had zero output of integrated circuits and hi-tech display technology 30 years ago but is now one of the most important production bases in the world. (MII 2008). On the one hand, it is because of the influences of changes coming from international and regional production networks since the Open Door policy was launched. On the other hand, it was because the Chinese central government intentionally formulated a series laws and regulations to protect and promote the development of the Chinese ICT industry. To be brief, it was crucial to establish a gradually improved legal framework to protect and stimulate the development of the ICT industry that had very small origins.

Along with the rapid changes in the ICT industry's development, the industrial regulatory and supervision system has been gradually built and enhanced. That is because it is important to regulate market behaviour and to create a favourable environment to implement the 'new road to industrialization' (Yi 2008). A series of rules and regulations for industry management have been put forward (mainly by MII) to standardize market access, construction of the telecommunications infrastructure, fees adjustment, internet information security and wireless management (Yu, Berg et al. 2004). For example, the '*Decision on Maintaining Internet Security*' at the Nineteenth Meeting of the Standing Committee of the Ninth National People's Congress, the '*Regulations of the People's Republic of China Concerning Telecom Services*' and the '*Procedures for Internet Information Services*' have been issued. The '*Telecommunications Law*' and the '*Regulation of Wireless Management*' are now under discussion. All those relevant laws and regulations regulate the market and essentially help to establish a more healthy and orderly environment for the ICT industry, according to one interviewee.[23] Indigenous enterprises benefit from laws and regulations, which provide protection, including the system of refunding tax and limitations on foreign investment by market access.[24] Moreover, key enterprises with an excellent performance gain direct support from the State Council.[25] For example, foreigners had been officially prohibited from participating in any telecommunications businesses in China before 2001. It was only in September 2008 that foreigners were allowed to have no more than 49 per cent shares in basic telecommunications businesses and no more than 50 per cent in value-added telecommunications businesses.[26] So far, foreigners are still officially prohibited from wholly owning Chinese telecommunications companies (MII 2009). In a sense, the major motivation for the formulation of these regulations and laws was to generate more FDI inflow, as well as to

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[23] Personal interview with Z, a senior officer of MII, 25th July, 2006, Beijing

[24] Personal interview with R, a senior staff member of China Mobile, 20th November 2008, Beijing; and Personal interview with ZH, a previous senior staff member of China Branch, Nokia, 21st November 2007

[25] Personal interview with W, a senior staff member of IDC, 19th November, 2007, Beijing

[26] Personal interview with Z, a senior officer of MII, 25th July, 2006, Beijing

provide more support and protection for indigenous Chinese ICT enterprises. In short, for the purpose of conforming to the new phenomena in the ICT industry, it is necessary for adjustments to be made.

With an improving legal system, the ICT market in China is gradually becoming standardized. Apart from these regulations and laws, Chinese central governments and local governments at all levels, and relevant ministries and departments have also formulated a series of 'plans' and 'strategies' in order to specify how the ICT industry should be promoted in practice. For example, Chinese government recently clarified the central government's aims by proposing the following approaches and guidelines: '*A New Approach to Industrialization*'; '*Energetically Promoting ICT Application and Making Good Use of ICT to Propel and to Accelerate Industrialization, While Industrialization will Further Contribute to the Development of the ICT Industry*'; and '*ICT is the Industry with Priority*'. To help these guidelines and approaches be carried out in practice, relevant industrial plans and strategies are made and implemented by Chinese central government, relevant ministry and governments at local levels.

Industry Plans

Industrial plans are the programmatic documents for the development of an industry (SDPC 2009). They are eventually formulated on the bases of comprehensive information from relevant departments and ministries in conjunction with some key industrial actors. Industrial plans stress the priorities and the new approaches of an industry (SDPC 2009). Considering the fact that industrial plans have been made at different levels of government, the elaboration below will assess various levels of input.

Five-Year Plan at National and Ministry Level

As addressed in previous sections, the ongoing market economy in China has not lessened the influence of the central government on ICT, and its goals remain key motivators to drive the ICT industry (MII 2009). Five-year plans in China are of significance for the orientation of the market (SDPC 2009). Five-year plans directly tell an industry what targets to reach every five years (SDPC 2009).The formulating and planning of the five-year plan takes place essentially at national and ministerial levels. Based on the history evolution of the previous institutional reforms, the ICT industry was not considered by central government to be a complete and independent unit in the national economy until the 1990s. Therefore, the focus of this section will be on the time period after the 1990s.

The five-year plan has played critical roles on all aspects in China and the ICT is no exception. For example, there was no market for Chinese mobile equipment manufacturers in the early 1990s (Steinbock 2005), and China was still an inconspicuous participant 20 years ago. China's ICT goods in the global trade were only worth USD 35 billion in 1996 and represented an inconspicuous proportion of trade at that time (OECD 2005). Moreover, there was serious an imbalance among different ICT sectors. The proportion of industrial output of investment, consumption productions and basic products reached 16:53:31 before the 1990s (MII 2009). The main motivation for the proposal of the national plans and industrial plans that followed was to rid the Chinese ICT industry completely of its backwardness and to help it become more integrated into international and regional production networks (MII 2006).

During the Eighth Five-Year Plan, the pattern of 'fully depending on TV products' appeared in the ICT industry. This pattern was not improved until the Ninth Five-Year Plan (1992 to 1998), during which it was planned that China's basic telecommunications infrastructure would be built as a high-ranking network. This extraordinary developmental speed set the foundation for China to become a giant IT product manufacturer (PeopleDaily 2000). During that period, the annual growth rate of China's ICT manufacturing and services appeared three times that of the GNP (PeopleDaily 2000). Meanwhile the percentage that ICT contributed to GDP increased from 1.79% to 4.8%, while the scale of the ICT industry expanded seven times from RMB 476.29 billion to RMB 3.74 trillion (PeopleDaily 2000).

The Tenth Five-Year Plan period outlined the framework of informationalization, in which all other sectors would be driven by the ICT industry, and the percentage of the ICT industry in GDP would be over seven per cent (Pei 2001). Since 2000, China has contributed to adjusting the structure of the ICT industry, with the purpose of transformation from simple manufacturing to the co-evolution of manufacturing, software and the information service industries (MII 2009). During the Tenth Five-year Plan, both the software and integrated circuit industries made great strides. For example, the software industry increased by 30 per cent annually, and more chips were developed by China with ownership of intellectual properties. The success of R&D on 3G has already attracted significant global attention (Yu 2006). Apart from that, with the intention to strengthen its capabilities of innovation and creation, China has been making great efforts to build up its standards-setting system. In this way, it is believed that China could eventually become to be a real ICT power (Basu 2006). To date, China already has a series of independent standards: TD-SCDMA、EVD、IPv6、AVS、WAPI

(Basu 2006). China is now 'growing into the innovation centre of Asia from the workshop of Asia' (Steinbock 2005: 6). (As for the significance of standard setting, see Chapter One and below).

In the latest plan, the Eleventh Five-Year Plan, three of seven major hi-tech projects planned for 2006-2010 are related to the ICT industry, including integrated circuits and software, new-generation network and advanced computing (Xinhua 2006). Moreover, the ICT industry is among the 11 key areas of national economic and social development in the general plans of 'State Plans for Medium- and Long-Term Development of Science and Technology'. Sixteen major projects in total are arranged, including core electronic devices, high-end transistors and basic software, large-scale integration (LSI) and new generation telecommunications. Twenty-seven frontier fields of science and technology in eight technology fields have been emphasized, and the basis of science should be stepped up to strengthen the development of ICT technology. The Eleventh Five Year Plan explicitly stipulates that the acquisition of equipment manufacturing and the intellectual property rights of the core technologies of the ICT industry should enhance the overall competitiveness of China's industries. It also highlights the importance of industrial cluster development for the ICT industry and the necessities for the coordinated development of the industry. The significance of the Eleventh Five-Year Plan is that it further established the position of the ICT industry in the national economy. To explain how these projects came to be included, the electronics equipment sector is taken as an example here. According to the proposals '*to revitalize the equipment manufacturing industry*' and '*several opinions of the State Council on speeding up the revitalization of the equipment manufacturing sector*' at the 17th CPC National Congress, and based on the situation of domestic electronic equipment and a good environment for development in the world, in order to further promote the development of the sector, the MII conducted extensive research and had opinions from all sides including ICT enterprises, local governments and academics. After that, the MII drafted guidance documents that established an important foundation for 'the special plan for electronic equipment and instruments in the Eleventh Five-Year Plan' (MII 2008).

According to the requirements of the five-year plan at national level, every department and ministry should make a five-year plan based on the individual situations of each industry. The five-year plan at ministry level should usually be in accordance with the five-year plan at national level. As previous sections on institutional reforms showed, the five-year plans at ministry level were changing all the time along with different functions and combinations of relevant government agencies. For example, at ministry level, during the Tenth Five-Year Plan period, the National Development and Reform Commission (NDRC) placed 'the integration of science, technology and economy and the enhancement of independent innovation capability' at the top of the agenda of economic development (NPC 2006). Based on those guidelines, the then Ministry of Information, together with the NDRC, issued 'the Eleventh Five Year Plan of the ICT industry' in 2006. According to the Eleventh Five Year Plan this was to be a critical period for China to become a dominant ICT country in the world. As the plan said:

> We will promote development by relying on enhancing independent innovation capability, take it as a national strategy and shift economic growth from relying on the input of capital and substance factor to relying on science and technology advancement and human resources. … In the 11th Five-Year

> Plan period, we will implement the strategy of rejuvenating our nation through science and education and take science and technology advancement and innovation as a major driving force of economic and social development. We will give more strategic importance to developing education and fostering high-quality talented personnel who are endowed with capability and integrity, deepen system reforms, increase input, accelerate the development of science, technology and education, and make great efforts to build an innovation-oriented nation and a strong nation with abundant human resources (NDRC 2006).

In brief, industrial plans at ministerial level have to conform to the overall national industry plan and contribute to formulating specific measures for the implementation of national industrial plans. It usually takes several years for the MII to develop related research projects for the final industrial plans at ministerial level. The whole planning process includes preliminary studies, planning drafts, collecting opinions, revision and improvement, submission and consideration and final ratification (MII 2008). During the whole process, the elite and businessmen of the ICT industry have to play key roles in the process of collecting opinions (MII 2008). As Lou (2008) said, the final industrial plan is the result of the wisdom from all stakeholders.

The overall plans, such as five-year plans at national level and ministry level, essentially provided general guidelines with directions for the overall national economy and a specified industry. However, more practical plans and strategies were still needed for specific industries.

The Torch Plan And the 973 Plan

Along with five-year plan at national and ministry level, the central government also contributed to seeking other ways to support hi-tech industries including the ICT industry. In 1988, the State Science and Technology (S&T) Commission initiated the Torch Plan, which included establishing Science and Technology Industrial Parks and Innovation Centres, and also taking charge of the high and new technology industrial development zones (HNTIDZs) (Steinbock 2005: 3). The Torch Plan is regarded as a plan for hi-tech industries.

During the process of the Torch Plan, China launched another similar programme named the 973 Plan in 1998. Both plans aimed at strengthening innovation, giving way to the supporting role of technology in an accelerating economy. These two plans were created particularly for key industries including the ICT industry. The following section will only focus on the parts of these plans that are relevant to the ICT industry.

The principles of the two plans are 'goals set by the central government, organized by local governments, and guided by the market'. Directed by such principles, the favourable environment of hi-tech zones and business incubators[27], attracted venture funds and MNCs to establish production bases. As a result, a large number of hi-tech enterprises have achieved rapid growth by utilizing the favourable conditions provided in the environment of hi-tech zones and business incubators, venture fund and

[27] A business incubator is a new kind of socio-economic organization. It refers to a centralized space where enterprises are supported by capital, management and other facilities in their initial phases. The purpose of a business incubator is: to develop high-tech achievements, and science and technology businesses; and to promote cooperation and communications. As a result, businesses can eventually develop to be 'bigger' enterprises.
MOST, 'Technology Business Incubator (Hi-tech Innovation Service Center) identification and management methods'; 'Chinese science and technology business incubators. Eleventh Five-Year Development Plan' Retrieved from http://www.chinatorch.gov.cn/dxal/notice/200804/7339.html on 12 July 2007,p16

production bases. To date, there are a total of 54 hi-tech zones and Suzhou Industrial Park, which contributed 7.1% of the GDP, and 8.3% of industrial value-added (SIPAC 2009). The gross output value of the entire software park accounted for almost 66 per cent of the Chinese gross output value of software. Moreover, more than 600 incubators have been established in China since the first incubator was established in Donghu, Wuhan. Among those, Zhongguancun in Beijing has become a world renowned ICT area, and considered as China's Silicon Valley. Suzhou Software Park, a software industry base under the Torch Plan, attracted numerous established ICT enterprises including Acer, NetEase, and Alibaba. The number of enterprises in Suzhou Software Park has increased from 106 in 2001 to 250 thus far. The Suzhou Software Park is considered China's national team in terms of software outsourcing (SZSP 2009).

Moreover, based on these favourable policies in these hi-tech zones and business incubators, more development and design parts are being moved to China especially from Singapore by off-shoring and outsourcing in the production chain (Ernst 2006: 30). Moreover, the highly intense ICT clusters made it possible for low-cost production and massive scale manufacturing. Until now, the four most established ICT clusters in China (Pearl River Delta, Yangtze Delta, Bohai Sea and Midwest Area) have distinct advantages in different parts of the production chain (Keng 2001: 605). In light of the fact that China still has advantages in cheap labour, China has essentially successfully established an entire production chain within the country. As a result, China is able to absorb enormous imports and investments from abroad.

One of the key achievements made by the 973 Plan and Torch Plan was to help a number of leading enterprises such as Huawei, ZTE, Fangzheng, Lenovo, and Haier to own the intellectual rights (see below). Moreover, the Chinese government contributed to developing a group of Chinese MNCs in ICT industry and strengthening its independent standards setting system (See Chapter 4 in details). Foreign MNCs with FDI bring capital and management experience to China, and assist the booming Chinese economy. However, after more than 20 years, Chinese government clearly understands that it needs to develop nationally powerful MNCs to gain real power, rather than just being a low-end global production network (Steinbock 2005). Dangtang, China Mobile, China Unicom, and TCL have always been the centre of focus when it comes to fierce international competition in the ICT industry. Details on Chinese MNCs will be examined in the following chapter.

The problem of capital has always been a key problem for the development of an industry. Along with the operation of these two plans, a large volume of funds called special funds have been invested in relevant projects as part of very effective financial and industrial policies (Linton 2008), Special funds are a substantial financial input set up to support technological innovation and industrial development as a whole.[28] Special funds indeed have contributed to promoting the development of the core fields of the ICT industry, increasing R&D capabilities, supporting key entrepreneurs, accelerating the upgrade of traditional industries, and driving the regional development of electronics and information entrepreneurs (MOST 2009). So far, over RMB four billion has been invested, and over 2,000 projects have been assisted. Local governments, financial institutions and entrepreneurs have been driven to pump over RMB 20 billion into relevant projects.

[28] The most important special funds with regard to the ICT industry include the Industrial Fund for Electronic and Information Products, the 863 Special Fund, the Hi-Tech Development Fund, the Fund for Industrial Technology and R&D and the National Fund for Key Programmes for Science and Technology Development of China.
See more on http://program.most.gov.cn/page/pds/mian1_AA.htm?planId=AA ; and http://program.most.gov.cn/page/pds/mian1_CB.htm?planId=CB

Apart from favourable policies, venture funds and a sound environment in high-tech parks or zones, the Torch Plan and 973 Plan stressed talent, especially overseas returnees with advanced technology and management experiences. China committed to improving its system of higher education, thus continuously providing sufficient manpower with excellent capabilities. The competition of the ICT industries between countries is essentially a competition of intellect and manpower, which depends on the development of education (Mu and Lee 2005). China's basic education is renowned in the world. However, China is weak in applied sciences, a crucial factor for influencing the core competitiveness of a country. In 2000, national universities started to establish software colleges to train and develop software professionals. In the meantime, global enterprises launched projects with local Chinese institutions to train qualified personnel. For example, IBM set up the first Asia-Pacific IBM-ACE training centre with the Xiamen Software Industry Investment and Development Co. Ltd (Yu 2002). According to the agreement, IBM will train over 300 certified teachers and 5,000 qualified software personnel for Xiamen. However, it is not realistic to expect that China can make great improvements in the educational level of the entire nation in a short period (Kwan). That is regarded as one of the key reasons that drove the Chinese central government to pay more attention to the cooperation and collaboration on ICT innovation and creation both at regional level and at global level (Li and Gao 2003) (See below). Supported by these two plans, so far two million software developers, 5.86 million engineering graduates and a large number of people with IT talent and excellent overseas academic or professional backgrounds have been accelerating China's ICT industry by establishing businesses in hi-tech parks and by implementing their R & D achievements (Chan 2004).

The Big Corporation Strategy and the Going Out Strategy

The Chinese government's active role is not only manifested in creating a favourable domestic environment for the ICT industry and for foreign investors, but also illustrates participation in international cooperation at all levels. The improving domestic investment environment in China drove the increasing influx of FDI, which helped lay a good foundation for China to be the workshop of the world and give an impetus to deepening cooperation among countries. China has developed friendly relations with many countries in the world since opening up, which will be described in more detail in a later section. Most well known ICT products manufacturers and operators have established different types of joint ventures and solely foreign funded enterprises and R&D centres in China, by which the Chinese government expected the power of a number of big domestic corporations could be supported and strengthened.

However, China is still not considered as a leader in terms of capabilities in innovation and creation, and most of its ICT products are low-end and low value-added. In addition, few Chinese brands are internationally competitive (Gilboy 2004). 'Big but not powerful' is a true picture of the current state of China's ICT industry (Ni 2008; Jia 2009). Therefore, according to the guiding principles of the Sixteenth Congress of the CPC and the Third Plenary Session of the Sixteenth Central Committee, the big corporation strategy was put forward in the ICT industry, giving rise to the pattern in which big enterprises serve as the mainstay to lead the development of medium and small enterprises (MII 2006). In China, the big corporations are expected by the government to be the main vehicles of constructing a dominant ICT country, while national competitiveness is reflected in the competitiveness of the big corporations (MII

2006). Against a background of fierce competition from developed and other neighbouring developing countries, the big corporation strategy was made to maintain rapid and sustained development in the ICT industry by taking more opportunities brought by the changes of international production networks.

Goals of the big corporation strategy aim at supporting several key corporations in the ICT industry, in which at least four would be ranked in *Fortune 500*; leaping up to first place in world-class main products; and achieving the clustering capabilities of big corporations. The detailed emphases of the big corporation strategy include a number of elements. The first is to improve the comprehensive competitiveness of ICT enterprises. The second is to further realize international operations and strengthen the level of outward investment, which means the business profits from outside China should be over 40 per cent of company revenue and global market penetration of central products should be over five per cent, through fully taking advantage of the international capital market, technology market and human resources. The third is to improve innovation and building up a framework for scientific and technological renovation which is dominated by enterprises. The fourth is to increase cooperation and coordination between ministries and departments, including giving full play to corporate mechanisms between ministries in terms of policy support for the system of clawing back exports duty and for ongoing R&D efforts. The fifth is to improve technological innovation, increase financial support at all levels and render financial support for projects. The sixth is to strengthen administrative legislation for the purpose of creating a more favourable market environment (MII 2006).

Along with the big corporation strategy, in 2000, Chinese central government put forward the strategy of ‘going out’ as an important measure to get rid of passive experiences in international cooperation, in which MNCs usually took control. The ‘going out’ strategy plays an important role in China’s economic development and the cooperation between China and foreign countries. As a result, outbound investments, contracts for overseas projects and labour cooperation programmes have been rising since 2000. According to Chinese official publications, the going out strategy was expected by central government to help to fully develop bilateral and regional cooperation at all levels; thus a favourable platform of international cooperation has been built for the purpose of implementing ‘going out’ (Chen 2008). However, it is not so simple in reality. This important point will be examined in Chapter Four.

In short, the goals set by the Chinese government played important roles in stimulating the development and expansion of domestic ICT industry enterprises. Meanwhile, the follow-up policies that were formulated on the basis of these goals encouraged Chinese ICT enterprises to go abroad and promote the sustained, rapid and healthy development of China’s national economy (Chen 2007).

The Strategy of Endogenous Innovation

> One of the advantages China has of being a large economy is that you can set your own standard. If they want to come in to China, they have to pay you. And if you have a global standard, you then have a bargaining chip in the global debate that says ‘OK, maybe we won’t use our standards, but if you don’t accept a lower fee, we will go to our own standard.’ This is a part

> of globalization today and it is only by having independent innovation, will you be able to enter into this global bargaining game on the basis of some degree of equality. (Chinadaily 2006; cite Stiglitz)

Innovation is a crucial part of production and investment activities, while having independent standards is regarded as a significant achievement of innovation. Once a standard becomes a global one, the country having it has a bargaining chip (CCER 2006; cite Stiglitz). The Chinese government has never stopped emphasizing the significance of technological capability in the process of ICT development, which can be seen in previous institutional reforms, industrial plans at all levels, the Torch Plan and the 973 Plan. However, China had always depended on a wide open innovation system, characterized by enormous inflows of technology in the form of international capital goods and FDI (Gu and Lundvall 2006: 22). During the entire process, international exchange in technology and knowledge took a crucial position. The development of the ICT industry benefits tremendously from such a strategy. Benefiting from such a strategy, accompanied by the export-oriented development strategy for years, China rapidly leapfrogged, particularly in the processing and assembling dimensions of the ICT industry. However, it was not enough for developing a comprehensive set of capabilities in terms of core technology and R&D. This is widely believed to be one of the key reasons for the structural problems in the Chinese economy (NDRC 2006).

The situation did not change until the second half of the 1990s. At that time, Chinese economic development was in a bottleneck because of long-term dependence on large scale manufacturing of low-end products and resource-intensive production (Gu and Lundvall 2006: 25-26). The booming ICT revolution in the late 1990s also brought huge changes to international production networks. In the context of that time, the dynamic effects were shown as a result of deregulation and radical technical changes, which also stimulated the Chinese government to rethink accession to the WTO (Gu and Lundvall 2006: 26). Against such a background, as the result of the 2003 institutional reform, the *Scientific Outlook on Development*[29] was proposed (Xinhua 2007). The background for the formulation of *the Scientific Outlook on Development* was the increasing pressure of the long-term economic and scientific dominance by developed countries and even fiercer international competition (Xinhua 2005). In the meantime, the needs of balancing domestic development and opening to the outside world were greater than ever (Xinhua 2005). As China was still in the primary stages of economic reform, the reason for the formulation of the *Scientific Outlook on Development* was to meet new requirements of development by analyzing China's own practices and by drawing on the experiences of other countries in development**,** thus to further accelerate the development of the hi-tech industries (Xinhua 2005).

The Communist Party and the State Council later declared the need for 'enhancing technological innovation, developing high technologies and promoting commercial production of S&T achievements' (NDRC 2006). To further fulfil these Chinese government guidelines, the CCCPC and China's Government (CCCPC 2005) stipulated the Guiding Vision for the Eleventh National Economic and Social Development Programme (2006-2010) in October 2005. This guiding vision explicitly clarified the urgency to upgrade the economic structure and strengthen innovative capability. Among

[29] China's economic growth largely relies on substance input and its competitive edge is to a great extent based on cheap labour, cheap water and land resources and expensive environment pollution. Such a competitive edge will be weakened along with the rising price of raw materials and the enhancement of environmental protection. Therefore, independent innovation capability should be vigorously enhanced and the contribution of science and technology advancement to economic growth should be notably increased. This is a solution put forward to address the bottlenecks of science and technology and human resources China encounters in economic and social development. Source: Full Text of the Scientific Outlook on Development at http://theory.people.com.cn/GB/40557/68137/index.html

all the measures mentioned in the guiding vision, endogenous innovation (*zizhu chuangxin*) was officially regarded as the key to realize the ‘guiding vision’ (PeopleDaily 2006). Endogenous innovation essentially refers to enhancing innovative capability, striving to master core technologies and key technologies in order to transform scientific and technological achievements and to upgrade the overall technological levels of industries. It is intended to: vigorously develop technologies that have leading roles in strengthening economic and social development; support the development of major industrial technologies; and develop key technical standards to build the technical basis of independent innovation (PeopleDaily 2008). In a word, the Chinese central government is endeavouring to strengthen its competitiveness in the R&D capability for the purpose of strengthening national ICT power. Clearly, innovative capability has already been placed as the top priority of the national development strategy and the development of indigenous technical standards is considered a strategic priority by China’s government.

Since then, the Chinese government has been increasingly aggressive in promoting domestic technology standards as a significant part of the strategy of endogenous innovation, such as 3G mobile communications (TD-SCDMA which is now widely applied and adopted in China), audio video coding standard (AVS) and wireless LAN (WLAN) in recent years. It was widely believed in China that owning technology standards represented Chinese confidence in strengthening China’s competitiveness in core technologies and underlining the growing desire to reduce reliance on foreign technologies (Hu 2006). However, some of these technology standards are not compatible with international standards. Thus, there will be more expenses required to make possible international or regional cooperation in this field. For example, in

January 2009, three different 3G licenses were finally formally issued. Since then, China entered 3G times with three different 3G standards: TD-SCDMA which is domestic standards; WCDMA and CDMA2000.

China is the first case of a developing country to have originated and successfully negotiated a telecommunications standard (Whalley, Zhou et al. 2009). It is also believed that China's future development strategy is likely to rely on product and process upgrading in manufacturing (Whalley, Zhou et al. 2009). However, three different 3G standards co-exist in one country, which is the only such case in the world (Zhao 2006). Most countries have only one standard, and few countries have two standards, although the South Korean government arbitrarily issued two, in order to help domestic manufacturers. Chinese central government takes a very strong position towards its TD-SCDMA standard, which essentially helps domestic enterprises gain competitive advantages. China's standard-setting policy was believed be politicized but ultimately pragmatic, because excessive costs on the economy were avoided (Linden 2004). However, such government action leads to artificial barriers against possible cooperation in this field. In the meantime, it also increases extra costs in infrastructure construction (PeopleDaily 2009). Meanwhile, the co-existence of three different 3G standards indicates that the Chinese government does not have enough confidence in its domestic standard, otherwise, WCDMA and CDMA2000 would not be necessarily included.[30] It remains to be seen whether the Chinese domestic TD-SCDMA can live up to expectations.

Based on enormous investments in R&D backed by its large economy, China is becoming increasingly important in terms of technological development. China is

[30] Personal interview with W, a senior staff member of IDC, 19th November, 2007, Beijing

capable of setting standards that in turn become barriers to market access. Besides all efforts that Chinese government made to strengthen ICT power, using the large domestic market as leverage is a very effective measure to support indigenous ICT standards. Time is still needed to prove whether this indeed helps to further establish China's leading position in both RPNs and the world economy. However, subsequent adverse impact can be seen in increasing tensions and complaints from other countries.

It would be difficult for MNCs to gain a market share in China unless they were willing to pay or agree to the cooperation model decided by China. According to a Chinese government public announcement, only under these circumstances, can countries enter into the global bargaining game on a relatively equal basis (Sun 2004). However, one of the reasons that China may try to develop its own standards that might not be compatible with current international standards is to make entry into China's market more difficult for foreign companies that have intellectual property rights in core high technologies, since the Chinese central government has expected to change the situation in which Japan, some EU countries and the US are always the ones that grasp the advantages by being first movers. For example, Intel had an unpleasant experience in 2004 due to China's new declaration that all chip vendors' technologies should comply with China's newly issued Wireless Authentication and Privacy Infrastructure (WAPI) security standard for Wireless Local-Area Network (WLAN) technology, otherwise they would be banned from the market. As a result of this sudden declaration, Intel's popular Centrino chips needed to be adjusted or withdrawn from China's market since they are not compatible with newly issued standards. Although China temporarily suspended the new standard because of international pressure, mainly from the US, this still shows that China has the capability to exert influence on the operations of any of the corporate giants such as Intel (CEOCIO 2008). Another example is about the 3G standard, which has already emerged as a public issue. Although the Chinese government finally decided to carry out three kinds of 3G standards at one time, companies like Siemens had already decided to conduct R&D on the Chinese TD-SCDMA standard mobile while manufacturing their standard mobile phones. It would be premature to conclude that companies might have poor performance in a global market that would be gradually defined by Chinese indigenous standards after failing to follow Chinese standards. However, it is a situation for the MNCs that pursue for market share and business profits to make every effort to avoid in the foreseeable future (CEOCIO 2009).

The intervention of the Chinese government is in practice contrary to its initial goals of strengthening the power of the market and making markets the driving force. In the case of the ICT industry, the strategy of endogenous innovation has more relevance in terms of political and economic interests than for technological superiority (Yan 2007). The competition on international standards essentially implies conflicts of business profits among national enterprises and competition among different countries' national strategies (Whalley, Wang, et al. 2009; cite Stackelberg). It is hard to overlook the fact that China is now in practice taking advantage of its massive market and regarding economic growth as a very effective lever both economically and politically. In the standards war that has been newly launched by China, China takes full advantage of its massive market and tremendous economic development potential as leverage for having more market control**.** Considering the large and rapidly changing market in China, fewer global ICT industry companies can afford to ignore the current actions of China's government in promoting its indigenous technology standards. All companies, no matter how powerful they are, have to face the reality that the market dictates everything.

Companies that fail to follow these new rules and standards will finally find that they are locked out of the world's largest growing market. Moreover, using the domestic ICT market as leverage to strengthen indigenous ICT power essentially created artificial obstacles for other countries that might have more easily accessed the Chinese ICT market. In other words, it might not be possible for the participants of EARPNs to have support when they are in need of both market and technology.

As mentioned above, one of key reasons that indigenous Chinese ICT standards have been rather controversial is because of the huge size of the Chinese ICT market. It is true that China made great progress in ICT technology, but China still lags far behind the US, Japan and western European countries in terms of overall advanced technological level, as noted above. Meanwhile, compared with a broad array of ICT standards that are currently applied in ICT manufacturing, what China has made is indeed over-exaggerated. It is premature to conclude that China is already capable of continuously providing and transferring advanced ICT technology to other East Asian countries. As a matter of fact, China still depends to a large extent on Japan, Taiwan and Singapore in terms of advanced ICT technology (see more details in Chapter Four). Moreover, China is currently having a problem in continuously upgrading its ICT industry. The issue of the ICT industry upgrade is worrying the Chinese central government, and that explains why the ICT industry was identified as one of Ten Major Industries to be revitalized. Fundamentally, without solving this ICT industrial upgrade problem, China would not only lose its comparative advantage in cheap labour, but would also confront the bottleneck of technological progress. All of these indicators suggest that China has a long way to go to be an advanced technology provider.

The Latest Adjustment and Stimulus Plans for Ten Major Industries

Because of the general background of economic recession and downward export prospects in the latest global financial crisis, the executive meeting of the State Council reviewed and approved 'The Adjustment and Stimulus Plans for Ten Major Industries' including the ICT industry on 18th February, 2009 (Xinhua 2009). One of the two major points for the selection of these ten key industries is the significance of the industries (Xinhua 2009). These industries have much influence on economic development and are important pillar industries in the Chinese economy. According to CCCPC, these industries are main contributors to the value of industrial output and government revenue, key channels for employment and the main industries for driving GDP growth (Xinhua 2009). The second major point is that these industries have problems including excessively rapid expansion of production capacity, oversupply, low-level and obsolete construction, irregular product mix, low-end products with heavy energy consumption and serious pollution (Xinhua 2009).What is more, these industries have been greatly affected by the global financial crisis due to their reliance on exports (Li 2009).

As a result, 'the Plan of reviving and readjusting the ICT industry' was discussed in executive meetings that started from January, 2009 and convened by Premier Wen on 18th February, 2009. In this plan, the ICT industry is specified as a national pillar industry which has a strategic and frontrunner role in the national economy (Wen 2009). This clearly shows that the central government is striving to develop the ICT industry to revitalize China's national economy. According to the discussion of the executive meetings, during the global economic recession, reviving the ICT industry requires a number of conditions to be met. Alongside the strengthening of innovation and the improvement of industrial development, there is a need to accelerate the integration of informationalization and industrialization, to concentrate on major projects likely to make technological breakthroughs, and to promote industrial development through new applications (PeopleDaily 2009).

For the purpose of better implementation of the revitalization of industry, four trillion Yuan in total will be invested for the stimulus plan for the ten industries. The following table (Table 3_1) shows the structure of the specific capital flows.

Table 3_1 Investment Flows and Composition, Four Trillion Yuan to Expand Domestic Demand

Investment Flows And Composition, Four Trillion Yuan To Expand Domestic Demand	
	Unit: one hundred million Yuan
Direction of Investment	Investment Estimated
Total	40,000
Low-rent housing, squatter settlements, housing reform	4,000
Rural water circuit, gas room and so on livelihood projects and infrastructure	3,700
Railways, highways, airports, water conservancy and other major infrastructure construction and urban power grids	15,000
Health care, education, culture and other social undertakings	1,500
Energy-saving emission reduction and ecological construction projects	2,100
Independent innovation and industrial restructuring	3,700
Post-Wenchuan Earthquake Restoration and Reconstruction	10,000

Source: the National Development and Reform Commission Website
http://www.sdpc.gov.cn/xwzx/xwtt/t20090521_280383.htm

Investment relevant to the ICT industry is mainly reflected in ‘independent innovation and industrial restructuring’. According to the State Development and Planning Commission, the investment has been issued on 222 important revitalization and transformation projects that are relevant to the ICT industry. The stimulus plans has critical implications for industrial upgrade and structural optimization, which are expected by Chinese central government to be key drivers for further economic development (Li 2009). This stimulus plans further show that the Chinese government has great high expectation that the Chinese economy will expand by phasing out low productivity, encouraging technical innovation and merging and integrating enterprises (Li 2009).

In summary, Institutional reform and industrial plans at national and ministerial levels may still be regarded as a sign of the central government's intention to accelerate domestic ICT industrial development. But the influences of the going out strategy, the big corporation strategy and the endogenous innovation strategy are not totally within the national dimension. Moreover, Institutional reform and industrial plans at national and ministerial levels including Torch Plan and 973 Plan are essential efforts made by Chinese Central government for the purpose of creating a more favourable environment for the development and growth of ICT industry. Those efforts, as described above, mainly happened in 1980s' and 1990s' when Chinese ICT industry was in the primitive accumulation at the early stage. As for 'going out strategy' and the big corporation strategy, they were proposed at the turn of the century when most Chinese ICT enterprises, especially those ICT manufacturing enterprises, started going beyond the primitive accumulation stage. The reason why Chinese central government proposed such strategies at that time is to drive Chinese ICT enterprises in looking for bigger overseas market opportunities and possibly building international /regional images. The strategy of endogenous innovation and the latest adjustment and stimulus plans for ten major industries intended to encourage Chinese ICT enterprises to go beyond the initial labour-intensive stage and go further to the value-added stage. That accelerated Chinese

ICT enterprises in strengthening R&D capability and self-standards making for the purpose of climbing up to higher tiers of production networks. Led by Chinese central government and supported by local governments, all relevant reforms, policies and strategies are basically in accord with the real situation of ICT industry development. In this sense, Chinese central government made relevant efforts on the basis of various historical development stage of ICT industry.

Intentionally or unintentionally, China's growing domestic market and its increasing share of ICT products and services contributed to the increased importance of China in the flying geese model from being a passive participator to an active role with initiative (Li and Gao 2003). This will be further illustrated by the following section on trade statistics and China's involvement in cooperation at regional and international levels.

B. The Role of the State—Regional and Global

Just as it is hard to know for sure exactly who is involved into the development of Chinese ICT industry, it is also difficult to clarify intentions of the Chinese government in promoting its regional and global influence. However, clues can be gleaned from the trade patterns between China and other countries and the attitude of China's participation in the cooperation at regional and global levels.

The Chinese government is keen to develop trade with the outside world, especially with countries that are located in its surrounding area, because manufactured goods, especially low value-added products, have been the key contributors to China's fast expanding exports, even in China’s fast-growing ICT product sector (Kwan 2002). That reflects where Chinese competitiveness lies. Based on the trade statistics shown below, it is not difficult to see that China is barely capable of competing with Japan and the trade relationships between China and other East Asian countries are more complementary than exclusive. This is because the overall levels of economic development are still key for the positions of East Asian countries in the EARPNs, which is central to the comparisons of trade structures between the countries (Kwan 2002).

One more reason for the Chinese central government to take a role in establishing cooperation and collaboration with East Asian countries is the problem of increasing trade conflicts. As far as China’s neighbours are concerned, rapid industrial upgrade and technology-intensive industry initially began to take shape in the Four Dragons. The output of the ICT industry was a significant proportion of their national GDP for most East Asian countries. In 2002, the output value of the ICT industry was over eight per cent of national GDP in Indonesia, Malaysia and Thailand; the proportion was over ten per cent in the Four Dragons (Wattanapruttipaisan 2008). In Singapore, the proportion was over 16 per cent (Wattanapruttipaisan 2008). The export of ICT products indicates the significance of the ICT industry in most East Asian countries. Over 53 per cent of Singapore’s exports were ICT products; over 60 per cent of Malaysia’s exports were ICT products (Wattanapruttipaisan 2008). From this, one can see that the ICT industry has been the main driver of the entire East Asian economy. As has been shown in previous chapters, the rapid economic development in East Asia mainly depended on exports. Against such a background, rapidly increasing Chinese ICT exports, particularly low-end and middle-end ICT products, intensified trade conflicts between

China and other East Asian countries that were on the same tier of the flying geese model as China (Holst and Weiss 2004). For the purpose of easing regional trade tension, it has been necessary for the Chinese central government to seriously consider the possibility of cooperation and collaboration at regional level and at global levels.

On the other side of the coin, the countries located in the surrounding area of China endeavoured to strengthen cooperation and collaboration with China (Abeysinghe and Lu 2003). On the one hand, during the 1997 Asian financial crisis, Japan's leading role in East Asia had been declining due to Japan's domestic unstable political situation and continuous economic recession. A Japanese government report (December 2001) stated that Japan's economy continued to deteriorate, and industrial production and enterprise profits were in a slump (METI 2002). Everything pointed towards a gloomy prospect for Japan's ability to continue taking its role as lead goose. On the other hand, the enormous market in China could not be ignored by any economic entity in the world. Since the 1990s, the increase of China's GDP has accounted for 40 per cent of East Asian countries' overall GDP (Hu 2002). As China's markets are expanding, the country has the potential to accelerate improvements of East Asian intra-regional industrial networks. Apart from domestic institutional reform and supportive laws and regulations, in order to adhere to WTO requirements for membership, the Chinese government made adjustments to its original protection of the ICT industry after China entered the WTO (DeWoskin 2001; Suttmeier and Xiangkui 2004). Foreign investments could establish joint enterprises in Beijing, Shanghai and Guangzhou without limits in value-added services, including electronic data exchange and time-series data processing and value-added fax services. However, the ratio of foreign investments was not permitted to be over 30 per cent. In 2001, this policy expanded around the country, and the rate of foreign investment was limited to 50 per cent.[31] Intra-firm and intra-regional trade has gradually increased along with further production fragmentation and international specialization (Haddad 2007; Kui 2007). For all East Asian countries that intended to maintain the stability of their ICT industries, it was meaningful to strengthen cooperation with China and to be part of China's informationalization and export markets (Koo and Fu 2002). For example, Singapore's government has a big share in the Suzhou Industrial Park (SIP), and numerous Singapore enterprises are located in the Suzhou Industrial Park. Please see the following table (Table 3_2) on the significant development background and relevant statistics. (See next page)

[31] Personal interview with ZH, a previous senior staff member of China Branch, Nokia, 21st November 2007

Table 3_2 Fifteen Years History on Sino-Singaporean Cooperation, Suzhou Industrial Park

<table>
<tr><th>Time</th><th>Participants</th><th>Event</th></tr>
<tr><td>Spring, 1992</td><td>Deng Xiaoping</td><td>Deng Xiaoping's famous 'Southern Talk' proposed that China should learn from Singapore's experience</td></tr>
<tr><td>May, 1993</td><td>Lee Kwan Yew</td><td>Singapore Minister Mentor Lee Kuan Yew visited Suzhou. China and Singapore had formal talks on the construction of Suzhou Industrial Park, and signed a primary cooperation agreement to develop the Suzhou Industrial Park. Both sides expected the SIP to be an efficient Singapore-style industrial park in Suzhou where MNCs would be attracted to set up the branches or headquarters</td></tr>
<tr><td>February, 1994</td><td>the State Coucil</td><td>the State Council issued 'Approval on the Development and Construction of Suzhou Industrial Park (1994_9), which agreed to jointly developed Suzhou Industrial Park with Singapore</td></tr>
<tr><td>May, 1994</td><td>Jiangsu Province government</td><td>In the full support of the Jiangsu provincial government, after the first training mission finished training in Singapore, Suzhou Industrial Park was officially launched its first phase of construction.</td></tr>
<tr><td colspan="3">Way of cooperation</td></tr>
<tr><td>Share of Singapore government</td><td>Initially 65 per cent cent, then down to 35 per cent in 2001</td><td rowspan="2">1994 to present, the Joint Coordination Council has been convened ten times. The State Council issued significant documents specifically relevant to SIP seven times. These documents are on the targets planning, management and authorization, policy support for major issues such as giving direct guidance and specific assistance. The State Council also clarified that anything that meets the direction of reform can be implemented in the SIP first.</td></tr>
<tr><td>Share of Chinese government</td><td>Initially 35 per cent , then up to 65 per cent in 2001</td></tr>
<tr><td colspan="3">Implementation situation</td></tr>
<tr><td>to the end of 2000</td><td colspan="2">Singapore's statutory boards and government-linked companies have invested USD 147 million in the park. Accumulated losses since 1994 of USD 90 million</td></tr>
<tr><td rowspan="4">to the end of 2008</td><td colspan="2">RMB 100.15 billion was reached as the GNP of SIP zone,the general revenue for the local budget was RMB 9.51 billion.</td></tr>
<tr><td colspan="2">Total volume of imports and exports reached USD 62.5 billion, with exports USD 31.1 billion.</td></tr>
<tr><td colspan="2">The new registration of foreign investment reached USD 3.02 billion, and foreign Investment paid-up reached USD 1.8 billion. 79 world top 500 enterprises invested 126 projects in the SIP.</td></tr>
<tr><td colspan="2">One of most important National Electronic Information Industry Base; The country's first international electronic trading base</td></tr>
</table>

Evaluation	
China side	Premier Wen Jiabao: Suzhou Industrial Park has not only become the new highlight of cooperation between China and Singapore, but also had become a model for China's Industrial Park
Singapore side	Singapore Minister Mentor Lee Kuan Yew: Singapore is quite proud of choosing Suzhou Industrial Park as Singapore brand. The Suzhou Industrial Park is the right choice for both sides.

Sources:
1, http://15th.sipac.gov.cn/swnlc/200904/t20090424_42475.html###
2, http://www.sipac.gov.cn/zjyq/yqgk/200807/t20080718_28695.htm
3, http://www.js.chinanews.com.cn/news/2009/0829/10207.html

The SIP project is regarded as a successful case for the cooperation between China and Singapore. The information provided in the table helps to explain how and why this project developed and why both the Chinese and Singapore governments paid so much attention to this project. From this point of view, EARPNs became even more embedded and strengthened (Kui 2007).

Due to continuous industrial upgrade and industrial transfers among countries, most East Asian economies have maintained high economic growth rates. However, a crucial problem confronted by most East Asian economies is the size of the market, which still falls short of that required for successful East Asian economic development (Lu and Wang 2005). That is because most industrial upgrades and transfers in the ICT industry occurred in such a short cycle that products for exports also upgraded very quickly in a short period. As the economic entity with the fastest growth rate, China has closely followed the development of the new economy and seized opportunities based on its large potential network market and rapidly increasing e-commerce in recent years. Although China has impressive ICT exports to other countries including those in East Asia, China’s demands for intermediate products and advanced technology are very attractive to the countries that are trying to find an expanded market for their own products (Kui 2007; Yusuf 2008: 2). Therefore, China is rebuilding the pattern of global and regional trade in terms of both supply and demand. It is very difficult to compete with a country that has such a huge market, cheap labour and tremendous investment opportunities with favourable policies and environment. At the same time, it is also hard for countries to ignore the business opportunities in this rising market. Previous years of large volume exports and the 'Made in China' labels around the world illustrate the strong supplying power of China. On the demand side, China has created a large market that is developing with the core role in intra-regional trade (see below for detail figures).

1 Understanding the Pattern of China's ICT

To better understand the role of the Chinese government, it is necessary to examine China's imports and exports. As a significant part of the continuous and stable Open Door policies is on trade and investments, the Chinese government, like most East Asian governments, took import-substitution and export-orientation policies to encourage the liberalization of trade and increase amounts of FDI inflow. That indeed fostered ICT transfer and diffusion (Baliamoune 2002: 5), which made a great contribution to rapid economic growth (Koo and Fu 2002). That also helped China successfully seize the opportunities brought by international and regional production networks and become one of the key players in the East Asian economy. By quickly taking advantage of the fragmentation of the value-added chains between different countries and the development of firms' cross-border production networks, China achieved economic expansion in a very short time (Borrus, Ernst et al. 1999).

The ICT industry is a highly globalized industry. It was fostered and accelerated by the US both in the spread of ICT technology and in the establishment of global ICT technology networks (Borrus 1997). The ICT industry in East Asia is characterized by being rapidly integrated into global production networks by receiving advanced ICT technology from the US (Yeung 2009). With the ICT boom in the 1990s, the US increased its investments in ICT manufacturing and introduced more advanced ICT technology to East Asia, in order that East Asia could be used as a large ICT manufacturing basis for the US (Borrus 1997). Along with this process, imports and exports played crucial roles as carriers of ICT technology inflow and as the key motivators for improvements in ICT technology in East Asia.

US companies set up manufacturing bases for the purpose of reducing production costs, and therefore it makes the situation look like intra-industry trade. American companies continuously took advantage of low-cost East Asian manufacturing bases, while making full use of the advanced domestic ICT services in the US. Such strategies essentially helped US companies strengthen their international competitiveness through cost cutting. In the 1970s and 1980s, such strategies fostered the rise of the ICT industry in East Asia. Because of the tiered flying geese model in East Asia, intra-regional trade in East Asia grew rapidly, which made intra-regional trade more important than ever (Isogai, Morishita et al. 2002). As a result, intra-regional trade rapidly increased.

The US was the main destination for East Asian exports and the main origin of East Asian imports. Approximately two-thirds of overseas sales of semiconductor companies in California were to East Asia, while California had 38.1% of USD 16.14 trillion of US ICT exports (Bardhan, Jaffee et al. 2004). The export of ICT products to East Asian countries made up a large proportion of exports of American ICT products (Yeung 2009). Moreover, a large number of computer systems are assembled in East Asia. Seeking to save production costs and become even closer to markets, most US companies located the factories for the production of computer components in East Asia, especially in the 1970s and the 1980s (Yeung 2009). In the 1990s, outsourcing became the fastest growing part of global IT production (Maskell, Pedersen et al. 2005). The massive outsourcing led to a large volume of ICT imports and exports with the East Asian region, which was a very significant motivator for the rise of the East Asian economy in the 1990s and early 21st. century (Ahn, Fukao et al. 2008).

China's trade in ICT products initially occurred mainly within East Asia. The general exports to China from the region's economies increased from 24 per cent in 2000 to nearly 30 per cent of total intra-regional exports in 2004, and trade with China has accounted for most of the growth in intra-regional trade in recent years (Zhuang 2006). In 2006, based on statistics from China's Customs authorities, both by imports and by exports, ASEAN countries were in the number one position, and China's exports to the ASEAN members were worth USD 700 million. In contrast, China's imports from the ASEAN countries were worth USD 750 billion (MOFCOM 2006). If we take a glance at the statistics from the ASEAN states, China also appears as the fourth trading partner of ASEAN in 2006. As for trade between China and Japan, China is the largest trading partner of Japan, while Japan is the third largest partner of China (MOFCOM 2007). As for trade between China and South Korea, China is the largest export market and the second largest imports market for South Korea. Based on 2006 statistics, trade between China and South Korea reached USD 1.3 trillion in 2006, and South Korea has maintained a surplus position with China since 1992 (MOFCOM 2007). These statistics were only for general trade and not specific to ICT, but we still have clues from these statistics since ICT trade accounted for almost one-third of overall Chinese trade with other countries. For exports of China's ICT products as a whole, the US is the largest export destination and exports with the US reached USD 35.961 billion (MOFCOM

2007). Within East Asia, Hong Kong was China's largest exports partner with exports volume reaching USD 35.608 billion (MOFCOM 2007). Exports to Japan and Singapore were worth USD 10.357 billion and USD 8.049 billion, respectively (MOFCOM 2007).

Trade Structure

The export structure of China's ICT products shows that China's ICT exports are mainly made up of TV and radio broadcasting equipment, audio equipment and TV and camera products and their main destination is the US (MOFCOM 2007). In the meantime, the exports of TV and radio broadcasting equipment, audio equipment, and TV and camera products to East Asian countries reached USD 25.927 billion, which was a little higher than the exports to the US which reached USD 23.072 billion (MOFCOM 2007). This shows that the exports market within East Asian countries is larger than the exports market to the US. The following table (Table 3_3) is on the trade balance of 'telecommunications and sound recording and playback device equipment' between 2002-2006.

Table 3_3 Telecommunications and Sound Recording and Playback Device Equipment, Trade Balance by Region, 2002-2006

Unit: USD

	2002	2003	2004	2005	2006
USA	653,056,093	9,887,135,620	15,971,200,685	22,916,833,143	29,557,024,850
ASEAN	151,747,074	1,642,915,157	3,017,229,760	3,505,976,844	5,586,313,088
JAPAN	106,643,994	823,304,547	1,416,356,626	1,639,817,878	1,193,716,515
KOREA	-346,330,220	-2,461,743,135	-1,311,597,548	-1,234,215,721	-1,234,816,848
TAIWAN	-72,798,624	-777,553,052	-932,218,534	-675,089,753	117,479,253
HONG KONG	482,681,442	7,625,251,522	12,096,767,751	20,901,256,385	29,345,381,391

Source: MOFCOM statistics on No.76, 'Telecommunications and sound recording and playback device equipment', 2002-2006

As the table shows, China had trade deficits with South Korea and Taiwan in 'telecommunications, sound recording and playback device equipment' for five consecutive years. The deficits occurred because China took the place of the ASEAN as the centre of processing and manufacturing in this category of goods after the upgrading of the industry. China imported large quantities of parts and components from Taiwan and South Korea, while exporting final products to the US, Japan and other East Asian countries. This can be regarded as key evidence that China is still on the bottom tier of the EARPNs (see more detail on Appendix Table One 'Import and export on telecommunications and sound recording and playback device equipment').

Trade on 'office machines and automatic data processing equipments' also lend evidence on this point, as shown in the table below (Table 3_4).

Table 3_4 General Trade Structure, Office Machines and Automatic Data Processing Equipment, 2001-2008				
				Unit: USD
	Processing Trade		General trade	
	Import	Export	Import	Export
2001	5,463,026,609	22,843,940,075	5,129,063,559	289,398,288
2002	8,714,216,689	34,754,886,580	5,451,885,983	380,427,487
2003	12,169,694,276	60,174,076,935	6,361,157,037	639,877,284
2004	14,910,581,267	83,582,712,849	6,435,783,464	927,834,006
2005	17,751,737,247	106,285,898,381	6,780,575,821	1,372,335,864
2006	19,376,306,258	128,999,689,845	7,187,850,056	2,066,453,633
2007	20,184,046,134	139,950,277,025	7,430,618,587	2,793,449,429
2008	16,264,085,199	126,372,792,000	6,345,184,192	2,945,684,390

Source: MOFCOM, statistics on No.75, Office machines and automatic data processing equipment, 2001-2008

The above table shows that the processing trade constitutes a majority of China's trade in 'office machines and automatic data processing equipment'. At the same time, trade in this category mainly concentrated on intra-regional trade within East Asian, as seen in the table (Table 3_5) below.

Table 3_5 Office Machines And Automatic Data Processing Equipment, by Country, 2008		
		Unit: USD
	Import	Export
EU (25)	1,284,873,473	38,552,045,539
USA	1,664,632,402	33,058,179,661
ASEAN	14,254,938,253	8,196,042,291
Japan	3,437,843,036	8,907,521,958
Korea	3,476,735,889	4,062,261,363
Taiwan	1,748,974,997	1,864,409,133
Hong Kong	158,825,160	26,736,162,787
Sum EA	23,077,317,335	49,766,397,532

Source: MOFCOM, statistics on No.75, Office machines and automatic data processing equipment, 2008

This again demonstrates that the market within East Asian countries is larger than the market to the US, particularly in these low grade products.

China's exports in telecommunications equipment, integrated circuits and electronic components have gradually risen. As for the trade in telecommunications equipment, China was the largest exporter to the US (MII 2009). From 1995 to 2001, the annual growth rates of China's office equipment and telecommunications equipment are 26.5% and 14.1%, respectively, which were higher than the annual growth rates of other countries within East Asia (MII 2002). Between 2001 and 2005, the value of exports of integrated circuits and electronic components reached USD 36.215 billion, which accounted for 33.73% of China's total ICT exports (MII 2006). The increase in the value of exports of integrated circuits and telecommunication equipment showed that the upgrade and improvement of China's ICT industry. In other words, the position of China in the EARPNs was promoted to a higher tier with regard to the improvements and upgrade in ICT structure.

Because of the rapid development of the ICT industry, parts and components, and service outsourcing took a great proportion of overall trade volume. According to a Boao Forum report, parts and components and other intermediate products accounted for more than 45 per cent of Asia's overall trade (Zhuang 2006). The countries or regions that stayed on higher tiers of RPNs, including South Korea, Japan, Singapore and Taiwan, gained comparative advantages by relying on the large trade volume in integrated circuits and electronic components (WTO 2006). Japan, South Korea, Malaysia, Taiwan and the Philippines were the main imports partners of the US in integrated circuits and electronic components (Rausch and Hill 2007). As for ASEAN, ICT products trade with the US mainly focused on integrated circuits and electronic components, and showed clear characteristics of an intra-industry trade (ASEANSEC 2007). Taiwan, Japan and South Korea became the main providers of integrated circuits and electronic components for China. Imports from these three areas reached USD 52.455 billion, USD 36.446 billion and USD 30.93 billion, respectively (MOFCOM 2007). The imports of integrated circuits and electronic components from Malaysia, the Philippines and Singapore reached USD 27.256 billion, USD 19.782 billion and USD 11.354 billion respectively (MOFCOM 2007). By comparison, imports of integrated circuits and electronic components from the US reached only USD 12.826 billion (MOFCOM 2007), which was far lower than imports from other East Asian countries. These statistics show that intra-regional ICT trade was crucial for China's ICT industry both in imports and in exports, and the importance of the intra-regional ICT trade is as important as the trade with the US.

The following table (Table 3_6) 'Trade balance on integrated circuits, by region, 2000-2006' provides specific information on the situation of integrated circuits trade between China and other East Asian countries.

Table 3_6 Trade between China and Other East Asian Countries on Integrate Circuits, 2000-2006

Unit: USD

	2000			2001		
	Export	Import	Trade balance	Export	Import	Trade balance
ASEAN	4,052,555	29,413,136	(25,360,581)	50,277,568	148,599,070	(98,321,502)
JAPAN	4,707,284	393,365,344	(388,658,060)	51,017,646	2,069,384,663	(2,018,367,017)
KOREA	2,293,425	93,295,762	(91,002,337)	29,543,642	432,249,443	(402,705,801)
TAIWAN	893,089	181,072,564	(180,179,475)	5,964,948	935,361,189	(929,396,241)
HONGKONG	6,557,323	15,376,634	(8,819,311)	82,112,828	76,107,581	6,005,247
	2002			2003		
	Export	Import	Trade balance	Export	Import	Trade balance
ASEAN	75,069,284	190,425,704	(115,356,420)	94,917,555	336,181,525	(241,263,970)
JAPAN	56,597,545	2,682,574,680	(2,625,977,135)	97,559,930	4,019,944,596	(3,922,384,666)
KOREA	30,383,215	467,709,685	(437,326,470)	36,799,889	820,497,781	(783,697,892)
TAIWAN	11,256,368	1,230,596,140	(1,219,339,772)	21,250,739	1,319,324,116	(1,298,073,377)
HONGKONG	112,409,911	101,750,515	10,659,396	163,305,061	102,964,379	60,340,682
	2004			2005		
	Export	Import	Trade balance	Export	Import	Trade balance
ASEAN	123,208,591	415,051,334	(291,842,743)	190,679,500	478,598,289	(287,918,789)
JAPAN	157,989,573	6,116,245,340	(5,958,255,767)	274,848,420	5,822,376,407	(5,547,527,987)
KOREA	47,052,055	1,327,122,880	(1,280,070,825)	83,794,076	1,356,489,572	(1,272,695,496)
TAIWAN	45,390,138	1,711,025,897	(1,665,635,759)	55,033,764	1,713,014,902	(1,657,981,138)
HONGKONG	191,869,186	146,971,986	44,897,200	242,529,246	166,360,441	76,168,805
	2006					
	Export	Import	Trade balance			
ASEAN	293,492,117	575,174,003	(281,681,886)			
JAPAN	392,554,767	7,201,384,259	(6,808,829,492)			
KOREA	124,085,532	1,448,240,935	(1,324,155,403)			
TAIWAN	93,898,553	1,949,376,320	(1,855,477,767)			
HONGKONG	339,619,675	158,197,535	181,422,140			

Source: MOFCOM, trade statistics on integrate circuits and relevant technological goods, 2000-2006

The above table further shows the fact that ASEAN members, Taiwan, Japan and South Korea became the main providers of integrated circuits for China, which can be seen from the large trade deficit between China and other East Asian countries (except Hong Kong). The table also shows that Japan took a crucial role in terms of the integrated circuits trade, which can be seen from the fact that total imports volume from Japan exceeds the sum of imports volume from ASEAN countries. This fact proves that China, with regard to the trade of integrated circuits, does not stand on a high tier of the EARPNs. This also shows that the economic growth in these countries is linked in practice to changes in China's imports. Such changes strengthened the increasing trade volume among countries that contribute to enhancing interdependence among East Asian countries, including China. As matter of fat, based on the general statistics of Chinese exports partners, in very early 2001, the exports volume to Asian countries accounted for 52.8% of Chinese overall trade volume, while exports to Japan accounted for 16.9% of Chinese overall trade volume, and 33.3% in terms of exports to other East Asian countries excluding Japan (MOFCOM 2002).

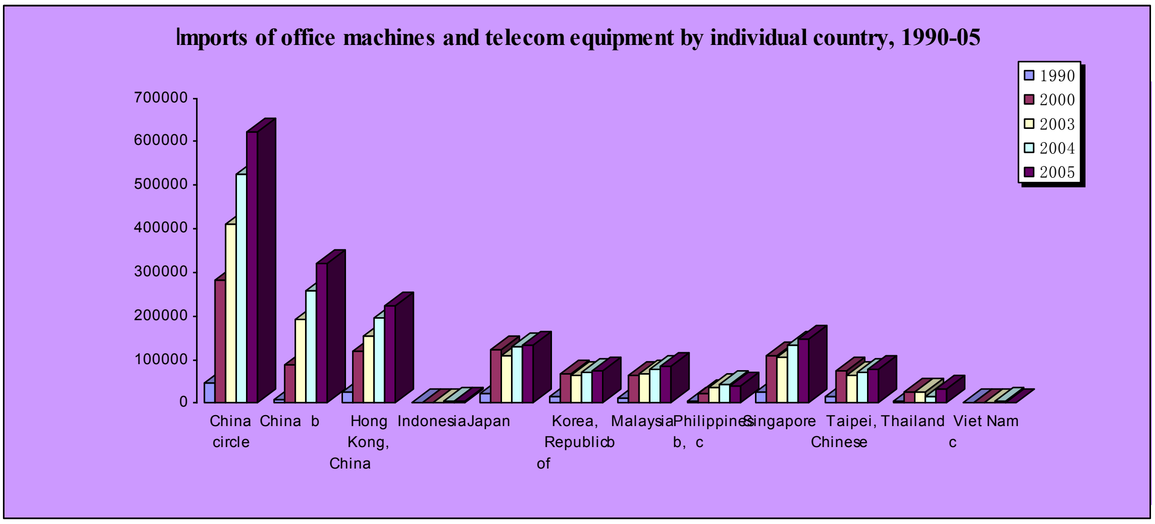
China is capable of absorbing huge amounts of exports from other East Asian countries, among all the huge amounts of ICT goods, the intermediate parts and components from NIEs represented the major part. The proportion of intermediate inputs and equipment for processing and assembly for export rather than domestic use accounted for about 40 per cent of Asian exports to China (Zhuang 2006). They are finally assembled into finished products and re-exported to the US, Japan and other advanced countries. More than 300,000 plants and factories have been established in China by MNCs since the 1990s, most of them involved in the assembly and processing of imported components and intermediate inputs for re-export, particularly to industrialized markets (Zhuang 2006). The reality is that China still depends on US markets because the overall level of the Chinese ICT industry remains at the middle level of international production networks. Because of the traditional vertical division, China imports large amounts of partly-finished products including integrated circuits and electronic components from

East Asian economic entities (as shown in above table), after assembling these semi-finished products into final electronic products, China exports large amounts of finished products to the EU and the US (39.2% in 2004). For example, in the manufacturing of laptop computers, the US is primarily engaged in R&D, product design and CPU chip production, which always places the US at the top of the value chain. South Korea, Singapore and Taiwan produce RAM circuit boards, hard-disk drives and LCD units, placing these countries at the middle of the value chain. By comparison, China mainly deals with processing and assembly, in brief, lying at the bottom of the value chain (Lang 2008). The importance of these statistics is that they showed the current basic ICT trade situation in the region: China has gradually become the major exports destination for other East Asian countries; and China has gradually grown up to be the most significant ICT imports partner for the US market, as other East Asian countries were decades ago. Therefore, the enormous Chinese domestic market and expanding imports volumes do not fundamentally change the fact that most participants in EARPNs still depend heavily on extra-regional trade in final goods (Kui 2007). China is still far from being considered a dominant exports absorber in terms of trade. This entire process is still consistent with Akamatsu's concept of inter-country complementarity (Das 2009: 23).

Trade Deficit

As a catching-up country, the annual growth rate of China's ICT manufacturing has remained stable at 25 per cent, and the export growth rate has kept over 30 per cent (MII 2009). China is now the largest manufacturing base for IT hardware and the largest market for IT equipment. China's output of several categories of domestically-produced electronic and information products is already ranked first in the world. Meanwhile, China has already become the world's second largest consumer electronics market after the US. The market for Chinese electronic information products grew from a value of USD 20 billion in 1999 to over USD 85 billion by 2005. Statistics showed that the total value of processed exports had risen to about 55 per cent of China's total exports in 2005 (Zhuang 2006). For a country characterized by the processing and assembly trade, imports have exceeded exports, especially in terms of trade with Japan, South Korea, ASEAN members and Taiwan (Zhuang 2006). China has emerged as a major destination for assembly, processing and other labour-intensive stages of global production networks (Zhuang 2006). All these contribute to making China become a giant exports receiver from other East Asian countries. The following chart (Chart 3_1) on 'The development of imports of office machines and telecommunications equipment' lends proof on this point.

Chart 3_1 Imports of Office Machines and Telecom Equipment by Individual Country 1990-2005



Source: WTO trade statistics on imports of office and telecommunication equipments of selected economies, 1990-2005

As the chart shown, China became the largest imports country with regard to the category of 'imports of office machines and telecommunications equipment', which demonstrates that China has the capability of absorbing a large quantities of ICT exports from other countries.

Over half of China's imports are from East Asian economic entities. The statistics show that imports from East Asian economic entities increased from 47.9% in 2001 to 50.6% by 2004 (China Customs 2005). Moreover, China has had a favourable balance of trade with the US, the EU and Hong Kong for an extended period, but an unfavourable balance of trade with ASEAN members, Japan, South Korea and Taiwan. In 2002, the unfavourable balance of trade with Japan, South Korea and Taiwan stood at a total value of USD 57.3 billion, which has since continued to increase (China Customs 2003). In 2004, eight East Asian countries had the biggest trade deficits with China. Ranked by the volume of trade deficit, four economies with the highest trade deficit were Taiwan, South Korea, Japan and Malaysia (China Custom 2005). According to statistics from Chinese Customs authorities (2005), between 2001 and 2004, the trade deficit with East Asian economic entities increased from USD 37.1 billion to USD 126.5 billion, doubling in five years. Taiwan has always had the largest trade deficit, which accounted for almost 40 per cent of the China's trade deficit with East Asian countries. The table (Table 3_7) below gives a general view on the trade deficit between China and other East Asian countries.

Table 3_7 China's Trade Balance With East Asian Economies, 2000-2008

Unit: Billion USD

	2000	2001	2003	2003	2004	2005	2008
Japan	0.14	2.16	-5.05	-14.73	-20.82	N/A	-34
Korea	-11.92	-10.87	-13.07	-23.03	-34.42	N/A	N/A
Taiwan	-20.48	-22.34	-31.47	-40.36	-51.22	N/A	N/A
ASEAN	-4.84	-4.84	-7.62	-16.4	-20.07	-19.63	-4.99
Sum	-37.1	-35.89	-57.21	-94.52	-126.53	N/A	N/A

Source, China Customs, various years' general statistics on trade between China and other East Asian countries.

As matter of fact, trade with ASEAN members is the main source of deficit. The table (Table 3_8) below is on the trade statistics between China and ASEAN between 2000 and 2005.

Table 3_8 The General Situation of China's Trade with ASEAN, 2000-2005				
				Unit: Billion dollar
Year	Import and export	Export	Import	Trade balance
2000	39.52	17.34	22.18	-4.84
2001	41.61	18.38	23.23	-4.85
2002	54.77	23.57	31.2	-7.63
2003	78.25	30.93	47.32	-16.39
2004	105.88	42.9	62.98	-20.08
2005 Jan-Oct.	105.24	44.78	60.46	-15.68

Source: China Customs, various years general statistics on trade between China and other East Asian countries.

The above table shows that the trade deficit between China and ASEAN countries had a tendency to rise. The leading area for the trade deficit is in the processing trade and mechanical and electrical products (China Customs 2005). For example, from 2002 to 2004, China's export of electromechanical products to ASEAN countries increased from USD 12.83 billion to USD 23.59 billion, which accounted for over 50 per cent in total export to ASEAN members (China Customs 2005). However, according to statistics from China Customs (2008), China's trade deficit continued to decline after January, 2008. That is mainly because its share of the processing trade gradually declined, while its share in the hi-tech products trade rose steadily. This happened because of the upgrade of the Chinese ICT industry in EARPNs.

Semi-finished products in the manufacturing sector are the root cause of the large trade deficit between China and other East Asian countries (see table below). According to Chinese Customs trade statistics, almost 80 per cent of imports from East Asian countries are semi-finished products and processed materials, while electronics and mechanics also made up a great proportion. In 2001, the top three imported products from East Asian countries were office mechanical equipment, integrated circuits and telecommunications equipment components, as shown in the table below (Table 3_9).

Table 3_9
Ten Major Products Imported from East Asian Countries

Unit: Trillion dollar

SITC	Products	Imports	Imports Proportion (%)
7599	Office Mechanical Equipment	2.87	6.45
7764	Integrated Circuits	2.02	4.54
7649	Telecommunications Equipment Components	1.57	3.53
5138	Polyethylene Carbonic Acid	1.08	2.44
5831	Polyethylene	0.998	2.24
5833	Polystyrene	0.81	1.81
7284	Special Industrial Machinery	0.72	1.61
3330	Petroleum	0.63	1.41
5112	Cyclic Hydrocarbons	0.626	1.41
7768	Piezoelectric Crystals	0.622	1.4

Source: Francis Ng and Alexander Yeats (2003)

As for the statistics particularly on ICT industry, except for electronic consumer products including TV broadcast and audio equipments, TV and camera, trade with other East Asian countries shows as a deficit within the East Asian region. For example, the deficit with South Korea reached USD 33.594 billion, while the deficit with Japan reached USD 33.086 billion. The deficit with Malaysia reached USD 25.441 billion. Despite the improvement and upgrade in China's ICT industry, the large trade deficit with East Asian economic entities resulted from China's shortage of middle- and high-end products, especially high-end products including high-quality electronics. As the statistics shown above, China's ICT exports still concentrated on low grade ICT products. In terms of intra-regional trade in integrated circuits and electronic components (see table on 'Trade between China and other East Asian countries on

Integrate Circuits, 2000-2006'), USD 158.92 billion trade deficits in total happened between China and other East Asian countries, which became the fundamental reason of the trade deficits of China's ICT products. From this point of view, the position of China within the EARPNs has not significantly changed yet. In terms of overall ICT technological level, China has not been powerful enough to be a leader in RPNs with regard to its burgeoning ICT industry. The scientific and technological forces have been far from adequate for quite a long period in China. Although the Chinese government launched the strategy of developing the country by relying on science and education, it is still too early to conclude that China has already entirely got rid of its backward status, characterized by a limited variety of products and low technological level. For this reason, China still imports a large amount of high-end products from East Asian countries, particularly from Japan, Taiwan, South Korea and Singapore. China has indeed tried to build a highly influential role both in the region and in the world; however, it is premature to say that China has replaced Japan or the US as a leader in regional economic development.

This section has shown that no clear evidence proved the emergence of China has changed the original pattern of flying geese. As a matter of fact, the trade pattern between the US, Japan, China, NICs and other East Asian countries demonstrates a clear division of labour (Kwan 2002). The US and Japan still specialize in high value-added products; NICs, China and other East Asian countries still focus on low value-added products with a little overlap in the low-end ICT sector. However, the exports structure of NICs showed that NICs stayed on a slightly higher tier of the flying geese formation (Kwan 2002).

In summary, in the new economic map of the world, China now stands out from the crowd and has become a very significant engine for economic growth**.** The massive Chinese ICT market became a very significant exports absorber for other East Asian countries, especially for components and parts, and semi-finished ICT products. From this perspective, the large ICT market in China did indeed help to improve EARPNs by creating more intra-regional trade and reducing dependence on external markets. However, the growing Chinese ICT market still depends to a large extent on Japan, the US and the EU markets, as China exports the majority of its semi-finished products and final products to those countries. Therefore, the growing ICT market in China did not entirely replace any other country as the final exports destination. As a matter of fact, the ICT market in China only replaced the roles of Japan and the US when the ICT markets for specific ICT products gradually shrunk in Japan and the US. In the meantime, the growing ICT market in China also took the place of the NICs when the NICs had climbed up to higher tiers of the production network. That did not change the essence of EARPNs, except that the order of exports changed. For the purpose of comparison, the original exports order is again shown here: Japan exported parts and components to ASEAN countries and other East Asian countries; NICs and other ASEAN countries imported main production materials from China; and then some part of the semi-finished products and final products were exported back to Japan and the rest were mainly exported to the US.

There are two situations regarding the status of current exports. The first is that instead of directly exporting parts and components or semi-finished products to Japan and the US market, ASEAN members and other East Asian countries started exporting these products to China, and then China exported semi-finished products or final products to the US, Japan or back to other East Asian countries for the final manufacturing stage of the product. In this first situation, China partly replaces the US as the final exports destination for other East Asian countries, which partly helps EARPNs to produce and consume finished goods within East Asia and without over-dependence on the US market. These changes also show that Japan is no longer the only country that drives industrial development in East Asian countries through international trade. For example, East Asian countries had an important role in Japanese imports of manufactured goods including consumption, capital and intermediate goods, while Japan mainly exported intermediate and capital goods to East Asian countries (Gaulier, Lemoine et al. 2005). By comparison, imports from other East Asian countries to China have already exceeded those to Japan in 2003. In the white paper on international trade in 2001, Japan's government admitted that the era in which Japan led the Asian economy had already ended with China taking the role as the engine driving Asian economic growth (METI 2001). The original RPN that used to be led by Japan has been impacted by the China factor.

The second situation is that China directly receives orders from the US or Japanese markets and then exports semi-finished products or final products back to those markets. Some of these products are exported to other East Asian countries for finalizing the products, and in the last stage China imports the final products from these East Asian countries or the US and Japan. In this second situation, other East Asian countries have lost part of their export orders because of the emergence of the Chinese ICT market. As the EARPNs gradually evolved from a purely vertical network to compounded vertical and horizontal networks, China became more involved in regional division at all levels of all industries and all sectors of industry. Since the late 1990s, significant changes have occurred in China's trade structure. Although labour-intensive products are still a great proportion of China's exports, the proportion of technology and capital-intensive exports has started to increase. These changes accelerated the gradual convergence of industrial and exports structures between other East Asian countries and China. As a result, competition and economic conflicts within the region gradually intensified. Such contradictory relationships will further strengthen as China's competition gradually increases in all sectors. This happens in particular in the ICT industry, where competition has already intensified between China and ASEAN countries because of China's increasingly stronger ICT industry. Because of the large market and thanks to being rich in cheap labour, China is a competitor for other East Asian countries, especially for those newly emerging ASEAN countries that are not yet strong enough to be more competitive compared with China (Kui 2007). At the same time, the competition between other East Asian countries, particularly the Four Tigers, and Japan, has also been aggravated. However, these countries also started manufacturing more advanced products. In essence, this suggests that the modified flying geese model still holds, although China is identified in a lower tier of EARPNs.

2 Understanding China's Foreign Policy Guidelines with regard to the ICT Industry

The above description on the Chinese ICT trade pattern of trade statistics helps to understand the key foreign policy guidelines with regard to the ICT cooperation and collaboration at regional and global levels. According to the Foreign Affairs Department of the Ministry of Industry and Information Technology, the main cooperation follows the 'Chinese National Diplomatic Overall Plan' and can be concluded as follows: the big powers are crucial; neighbours are priorities; developing countries are a solid foundation; and multilateral relationships provide China with an important basis to create a peaceful international environment (Chen 2007).

Chinese central government believes that favourable multilateral relations fundamentally help China strengthen its international influence and improve its international position (Chen 2007). That is why China has taken positive attitude in the International Telecommunication Union (ITU), the Asia-Pacific Telecommunity (APT) and other international ICT organizations. However, as a key part of China's pragmatic diplomacy, and guided by the CCCPC, the Foreign Affairs Department of Ministry of Industry and Information Technology makes specific guidelines for the trade and investment partners according to the varying degrees of trade dependence.

The Chinese government does still focus on developing countries, which can be regarded as one tradition of Chinese foreign policies. ICT cooperation is no exception. In 2008, exports to those emerging markets increasingly grew. For example, exports to Brazil and India increased 90.2%, and 43.1% respectively (MOFCOM 2008). As far as the ICT industry is concerned, China and Brazil established the Senior Coordination and Cooperation Committee, to promote cooperation in the digital TV, telecommunications equipment and software industries (MOFCOM 2008). China also focuses on cooperation with Pakistan. China organized several ICT industry delegations to Pakistan to accelerate the construction of the China-Pakistan Software Park and the construction of optical cable between China and Pakistan as well as driving cooperation on consumer electronics and software (Chen 2007).

However, the big powers have been crucial for China at this time. Like other East Asian countries, China's economy to a large extent depends on exports, while the main destinations for Chinese exports are Japan, the US and the EU, as seen in the trade statistics above. Moreover, taking the first three quarters trade data for 2008 as an example, five of the 10 main trade partners of China were advanced countries. Europe, the US, and Japan were China's three biggest trade partners. This has been the situation since 2004 (MOFCOM 2008). Unlike the foreign policies in the 1950s and 1960s when Chinese government put less developing countries and developing countries as the focus of Chinese diplomatic relationships, Chinese government realized the significance of keeping good trade relationships with the big powers including Japan, West European countries and the US and so announced 'the Big Powers are Crucial' as one of its key foreign policy guidelines.[32] This did not change even when developments took place in international production networks. As examined in Chapter One, because of the changes in international production networks, developing countries do not need to depend too much on the support of advanced technologies from advanced countries.

Meanwhile, China realizes the importance of big powers, and the significant meaning of placing good relationships with neighbouring countries as a top priority. Apart from the statistics shown above, the first three quarters trade data for 2008 reveal that exports with South Korea and the ASEAN increased 41.8% and 28.4%, respectively (MOFCOM 2008). Among China's 10 major trade partners in the region, Japan was

[32] China has been working towards establishing all types of cooperation with these countries at all levels. For example, the ICT cooperation between China and the US is guided by 'the Sino-US Joint Commission on Commerce and Trade' and the 'US China Strategic Economic Dialogue'. Meanwhile, international cooperation in the field of intellectual property is regarded as one of the key projects. China held 'the Year of China in Russia', in which China sent well-known ICT enterprises to Russia for better and deeper bilateral cooperation. Russia and China also rotate in holding the Annual Sub-Committee Meeting on ICT cooperation. Moreover, cooperation between China and the EU continues to be strengthened. China and the EU held the 'China-EU Workshop on Value-Added Telecommunication Services' and 'China-EU Workshop on Licence and Approval of Wireless and R&TTE'. China and the UK have annual policy dialogues, while China and France have signed documents on cooperation in the fields of OSS and IPV6.

third, followed by the ASEAN countries, Hong Kong, South Korea, Russia, Taiwan, India and Australia, thus highlighting the significance of China's neighbouring countries. Developed and East Asian countries almost made up all ten major trade partners of China (MOFCOM 2008). Thus, it follows that one of the key guidelines is related to neighbouring countries. The following section will show how a number of relevant projects originated and agreements came to be signed. However, it should be pointed out that not all these projects finally bore fruit. Based on the results from interviews with officials of the MII, apart from the telecommunications workshops and training programmes, other projects mainly turned out to be mere formalities.[33] The important factor for the following section is to show that cooperation between China and neighbouring countries was key.

3 Understanding the Role of State by Cooperation and Collaboration at Regional and Global Levels

Cooperation and collaboration are becoming central themes in China, especially in the ICT industry, in the era of globalization (Li and Gao 2003). As the role of the ICT industry in national economic development became more important, for a better position in this information revolution, China has never stopped emphasizing the importance of cooperation with the outside world, especially cooperation with East Asian countries.

China is still lagging far behind the US, Japan, and many Western European countries in several areas related to ICT. With regard to software and service industrial development, for example, the revenue from software sales only occupied two per cent of the world

[33] Personal Interview with Z, a senior officer of MII, 25th July, 2006, Beijing

software market. China is indeed in the transitional stage in which further adjustments to its ICT structure are needed (Qiang 2007). At this stage, China should more accurately be called a ‘normal emerging industrial power’ rather than another Asian technological and economic giant (Gilboy 2004).

In addition to its massive production scale and capabilities, China has been ready for multinational and bilateral cooperation with surrounding countries not only in the domestic political and economic environment but also in manpower. The Chinese central government realized the importance of human capital in the new economy. Human capital is as the single most important asset (Kwan 2002; Yang 2008). China has committed to improving its higher education system, thus continuously providing a sufficient pool of intellectual resources (see above section on education). However, it is not realistic to expect that China can make great improvements in the educational level of the entire nation in a short period (Kwan 2002). That is regarded as one of the key reasons that drove the Chinese central government to pay more attention to the cooperation and collaboration on ICT innovation and creation both at regional level and at global level (Li and Gao 2003).

The foregoing discussion offered explanations for why the Chinese central government plays a crucial position in terms of trade and investment relationships with other countries in the ICT sector. What is more, it also sought to explain the foreign policy guidelines followed by the Chinese central government in dealing with the ICT trade and investment relationships with other countries. The Chinese central government declared that ICT cooperation at regional and global levels should be guided by government and under government supervision, but enterprises should also actively participate (Chen 2007). Chinese central government believes this to be an ideal way for the ICT industry to take full advantage of the general plan and overall guide issued by departments of the government (Chen 2007), though it doesn't mean full cooperation. Moreover, it is also believed to be an effective way for relevant agencies including the MII to strengthen monitoring and supervision, by which the MII believed that a better environment will be provided for ICT technological development and applications (Chen 2007). That also helps to maximize the capability of principle roles for ICT enterprises in technological innovation and creation when they are trying to go overseas (SCIO 2008). The following sections will focus more on official cooperation between China and other countries at regional and global levels.

As emphasized in Chapter One, RPNs are significant parts of international production networks. Regional ICT cooperation at governmental level also follows the rules and regulations made under the framework of international ICT cooperation, such as the WTO Agreement on Basic Telecommunications and APEC Telecommunity (APEC Tel). The following section will start with the cooperation at international level, with the purpose of providing a general background for understanding East Asian ICT cooperation.

On 15 February 15 1997, the conclusion of the WTO Agreement on Basic Telecommunications, which was named as the Fourth Protocol to the General Agreement on Trade in Services, was reached between 69 members of the WTO (WTO 1998). In this agreement, participants committed to providing specified levels of access to trade in basic telecommunications services in each member's market and made commitments on market access, national treatment and pro-competitive regulatory principles (WTO 1998). Eleven East Asian countries and regions signed this agreement to bring important new opportunities to 'improve telecommunications sector performance, accelerate the development of telecommunications infrastructure, and facilitate access to a broader range and better quality of telecommunications services at more competitive prices' (APEC 2000).

With the purpose of assisting APEC members to implement the WTO Agreement on Basic Telecommunications, the APEC Tel (Telecommunication Working Group) was initiated in 1990 to promote Asia-Pacific trade liberalization and facilitation in the telecommunications field. As it was said in the APEC Tel report, 'APEC members are at various stages of liberalizing their telecommunications markets, and there are diversities in the form and manner of these liberalization activities' (APEC 1998). That again shows the importance of 'various stages' in stimulating trade and facilitating improvements in relevant areas of the ICT industry.

With the establishment of WTO Agreement on Basic Telecommunications and APEC Tel, the ICT industry started to be a key area for cooperation. The ASEAN leaders signed the e-ASEAN Framework Agreement at the Fourth ASEAN Informal Summit in Singapore in November 2000 to enhance the competitiveness of the ICT sector in ASEAN countries and to bridge the digital divide within and among member countries (ASEANSEC 2000). After that, with the purpose of sharing prosperity among East Asian countries, considering the importance of ICT as a leading force in economic development and narrowing the development gap by increasing productivity, these countries realized the need to liberalize trade and investment in the ICT industry; and understood the importance for East Asian countries to cooperate through technology transfers and joint technological development (APTSEC 2002). In 2001, the East Asia ICT Cooperation Conference was held to promote East Asian cooperation.

The cooperation mentioned above still mainly stayed at the level of declarations, the ‘forum of communication’ and diplomatic conferences (Kaufmann 1996: 7). However, China and other East Asian countries established various programmes to accelerate the ICT industry’s development under the framework established by the WTO, APEC and East Asia ICT Cooperation (Durongkaveroj 2002; MOFA 2003). In the meantime, they tried to implement these programmes (Durongkaveroj 2002). As the cooperation projects state, cooperation on ICT in East Asia works under the framework of APT at all levels, such as the cooperation inside ASEAN and between China, Japan and South Korea. Programmes extended from the ASEAN+1 basis, including a special project to bridge the digital divide in East Asia.

The ICT industry was agreed as one of five key fields of cooperation for the 21st Century at the Fifth China-ASEAN Summit in 2001. In 2003, the Ministry of Information of China and ASEAN signed the Memorandum of Understanding on ICT Cooperation between ASEAN and China. The table (Table 3_10) below shows the clauses in the memorandum and how they have been implemented by China. (See next page)

Table 3_10 China-ASEAN Programme	
Clauses signed in 2003 memorandum	**Implementation of the clauses by China.**
1) Resources Development: China promised to provide training programmes for ASEAN countries by using its domestic training bases and both sides should set ICT MRAs	Under the framework of China-ASEAN and the framework of the Greater Mekong Subregion, China has provided ICT training programmes for more than 500 people.
2) Information infrastructure construction: China would take an active role in accelerating the construction of the information infrastructure in ASEAN countries;	The implementation of specific cooperation projects were carried out as cooperation projects among companies.
3) Technology R&D: both sides agreed that they would develop mutually beneficial ICT projects including the establishment of human resources training centres, technology transfer and exchange programmes of academics;	The implementation of specific cooperation projects were carried out as cooperation projects among companies or academic institutions.
4) Application of ICT: both sides would encourage their ICT private enterprises to take active roles in developing application system for governments and enterprises;	China-ASEAN ICT Week was launched to expand cooperation in information technology and communications;
5) Both sides agreed that they should deepen cooperation on the compatibility, integrity and security of ICT;	See below for explanation
6) e-ASEAN programme;	Numerous important cooperation projects have been launched, including the Greater Mekong Sub-region Information Superhighway and the China-ASEAN information Superhighway
7) Information communication;	The communications mechanism of the China-ASEAN ICT Ministry Meeting was established
8) China-ASEAN workshop.	The Forum was established for the China-ASEAN Telecom General Service and the China-ASEAN Information and Network Security Emergency Response Cooperation

Sources:

ASEANSEC (2002). Memorandum of Understanding Between the Association of Southeast Asian Nations and The People's Republic of China On Cooperation in Information and Communications Technology. http://www.aseansec.org/15147.htm.

ASEANSEC (2005). Beijing Declaration on ASEAN-China ICT Cooperation Partnership for Common Development ASEANSEC. http://www.aseansec.org/17452.htm .

The above table shows that, compared with the overall cooperation in the East Asian region, there was substantial progress in the cooperation between China and the ASEAN. So far the implementation of 'deepening cooperation on the compatibility, integrity and security of ICT' was integrated into other cooperation projects, such as the Greater

Mekong Sub-region Information Superhighway Network and the China-ASEAN information Superhighway. In addition, China and ASEAN agreed on a China-ASEAN partnership focused on the comprehensive economic development in the ICT industry in 2005. Apart from what is shown in the above table, the communication mechanism of China-ASEAN ICT Ministry Meeting was established (MII 2008). The relevance of the cooperation lies in the fact that it provides a platform at government level for the sharing of ideas and experiences and the peaceful settlement of possible trade conflicts between countries.

Apart from the cooperation with the ASEAN, ICT was also regarded as one of the key fields in ASEAN+3 cooperation and China-Japan-South Korea cooperation, as shown in the table below (Table 3_11).[34] (See next page)

[34] China also contributed to ICT cooperation among the members of Shanghai Cooperation Organization. The telecommunication working group was created under the framework of Shanghai Cooperation Organization in Beijing in 2006. Kirghizia Republic agreed to lead the working group, and China had the most active role in promoting all Preferred Participation Programs covering the construction of ‘Information Superhighway’, ‘E-Commerce’, and ‘Training Program on Human Resources’.

Table 3_11 ICT Cooperation ASEAN+3 vs. ICT Cooperation China-Japan-Korea

ASEAN-China–Japan-South Korea Programme	China-Japan-South Korea Programme
In September 2003, the first ASEAN-China–Japan-South Korea (10+3) Telecommunication Senior Official's Meeting was held in Singapore. It set the foundation for the 10+3 Telecommunication Ministers Meeting.	Under the framework of the ASEAN+3 Economic Ministers Meeting, China, Japan and South Korea intended to set up comprehensive ICT cooperation in the sixth East Asian Summit 2002. That centred on: (1) Raising awareness and contributing intellectually to policy and institution-building; (2) Developing and training of human resources; (3) Building IT infrastructure and providing assistance for network establishment; and (4) Promoting the application of IT in development.
In August 2004, the 1st. 10+3 Telecommunication Ministerial Meeting was held in Bangkok. 'The Range of 10+3 Telecommunication Ministerial Meeting or Senior Official Consultations' was set up. China proposed in the second. 10+3 Telecommunication Ministerial Meeting to support exchange programmes of academics, bridging the digital divide and strengthening human resources training as the basis for expanding and deepening cooperation.	In September 2002, relevant Ministers of China (Ministry of Information), Japan (Ministry of Internal Affairs and Communications) and South Korea (Ministry of Information and Communication) met in Morocco for the first time and issued a joint statement declaring the establishment of an official ICT Ministerial Meeting among the three countries. There are eight working groups under the Ministerial Meeting agreement: International Cooperation; the Third Generation Telecommunications; the Next Generation Internet and RFID; Digital TV and Broadcasting; Internet and Information Security; Open Sources Software; Telecommunications Service Policies; 2008 Beijing Olympics.

Sources:

1. Japan's Comprehensive Co-operation Package to Address the International Digital Divide, The Ministry of Foreign Affairs of Japan, http://www.mofa.go.jp/policy/economy/summit/2000/it1.html, and
2. Memorandum of Understanding Between the Association of Southeast Asian Nations and The People's Republic of China On Cooperation in Information and Communications Technology, http://www.aseansec.org/15147.htm,
3. Press Statement by Chairman, Fourth ASEAN Informal Summit, Singapore, 25 November 2000, The Fourth ASEAN Informal Summit 22-25 November 2000, Singapore http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN005492.pdf,
4. ASEAN-China–Japan-South Korean Cooperation, http://www.miit.gov.cn/n11293472/n11293832/n11294417/n11302676/11657705.html
5. China-Japan-Korea ICT Ministerial Meeting, http://www.miit.gov.cn/n11293472/n11293832/n11294417/n11302676/11657745.html

The above table shows parts of important agreements in the ICT industry between these three countries. The cooperation between China and the ASEAN is similar to the cooperation between these three countries (China, Japan and Korea) that also started after the 2001 East Asia ICT Cooperation Conference, which provided a framework for the subsequent cooperation projects between countries. However, compared with the cooperation with ASEAN countries, cooperation between these three countries concentrated more on cooperative R&D projects, ICT technology standards and the enhancement of informationalization in national economies. In practice this implied a higher level of cooperation in terms of technology levels. The cooperation between China and the ASEAN and the cooperation between the three countries showed the position of China in the EARPNs overall.

The policy of opening to the outside world, especially cooperation with surrounding countries, favours the growth of the Chinese ICT industry. To establish favourable cooperation networks, particularly with surrounding countries, has been the mainstream of Chinese foreign policies with regard to the ICT industry for the purpose of accelerating the development of China's ICT trade. As the trade statistics show, China has not yet changed the original pattern of the flying geese model, by becoming a lead goose to replace Japan. However, the rapid development of China's ICT manufacturing trade has threatened those East Asian countries on the same tier of the flying geese model. This tension appears to be one of the key reasons why the Chinese government has worked hard to establish regional cooperation with its East Asian neighbours. Most current ICT regional cooperation projects have not made substantial progress, in areas such as tax reduction and favourable trade conditions. However, such cooperation has helped China to establish its regional position as ICT market provider, ICT staff training basis and giant ICT importer.

4 Understanding the Role of State by Complicated International Relations

The EARPNs should have been a natural economic process in which FDI, trade, markets and technology transfer play the major roles. However, because of the involvements of governments, the development of EARPNs has also been a process underpinned by conflicts of political interests (Cumings 1984). For example, as quoted in Chapter One, the Japanese yen was forced to appreciate after the 1985 Plaza Accord because of the enormous pressure from the US government. China's key foreign policies call for cooperation with its surrounding countries, especially the cooperation with East Asian countries to sustain and stably develop the Chinese economy (Fu 2003). Because of the economic interdependence and mutual support of relative advantages, countries have become increasingly closer in their relations.

However, based on complicated trilateral relationships, no country can be absolutely influential in the geographic region. Due to the historical background and current political and economic interests, Japan still seeks to strengthen its regional influence in ASEAN and other East Asian countries, while further intensifying its alliance with the US (Sun 2006). East Asia has strategic significance for the US, both economically and politically (Tanaka 2007). Therefore, the complicated international relations between countries, especially China, Japan and the US, play a critical role in influencing whether the emerging powerful China with regard to the ICT industry has essentially made changes in the EARPNs.

China's rapid growth of economic power presented a serious threat to Japan's vision for East Asia. After hundreds of years of economic recession and the last 30 years of economic resurgence, China has become the third largest economic entity in the world. The emergence of China placed an obstacle for Japan to strengthen its role as a regional leader that was supported by the traditional flying geese paradigm (Wang 2004; Satoh 2006). However, Japan is still the second largest economic entity in the world with an average annual GDP that is higher than the US's. As the leader in many high-end technological fields including optical communications and micro-electronics, Japan is still an industrial and technological powerhouse both in East Asia and in the world in general in spite of its economic troubles in the 1990s. In practice, this sets an insurmountable barrier for China's ICT industry to overcome in the very short term. In other words, as stressed in the above section, this makes it harder for China to be a regional ICT leader in EARPNs.

'Frosty diplomatic relationship but closer economic relationship' has long been used to describe Sino-Japanese relations (Liu 2007). It shows the contradictory relationship between China and Japan. On the one hand, Japan would like to accelerate regional cooperation in East Asia and realize regional stabilization with the help of a rising China (Liu 2007). On the other hand, Japan persists in enhancing its position of political power with assistance from the US (Furuoka 2005). As a result, Japan is on the front line for the US to prevent China from rising. Meanwhile, for the purpose of gaining more support from conservative citizens in the continuous economic recession, the Japanese government takes a strong position towards China in politics (Zhu 2006: 35). Historical problems and the Taiwan issue are also used as provocations to strengthen Japan's political power, at the same time, undermining the peaceful environment that China is keen to create and maintain for its economic development (Zhu 2006; Satoh 2006). Moreover, Japan has already realized its decreasing influence in the East Asian flying geese paradigm, and Japan has taken various measures to compensate for this. According to recent reports, the Japanese government has announced that two trillion yen will be provided as financial support to stabilize the Asian financial market, after China has continuously sent purchase missions to various developing and developed countries (Xinhua 2009).

As discussed at the beginning of this thesis, the US factor has an absolutely crucial role in the formation and development of the EARPNs. It still continues as the FDI, advanced technology and market provider for the entire East Asian region, although the US is unable to act on its own because of the current financial crisis. The massive market potential cannot easily be ignored by any large American enterprise. It is common knowledge in the US that China is undoubtedly one of significant overseas market for the US (MOFCOM 2007). Unless the US can successfully explore and capture the Chinese market, US's global competitiveness would definitely be weaker than both the EU's and Japan's (Lee 2007). In short, enormous economic interests drive the US into actively developing cooperation with China.

While the US is keen to develop further and deeper cooperation with the purpose of pulling China into its world order, the US has never stopped using a containment policy to prevent China from being a dangerous competitor in East Asia (Lee 2007). The US tries to prevent China from rising to assume the US's position in East Asia and in the world (Christoffersen 2002). For example, although political changes occur with each US presidential election, containment and cooperation have always played leading roles in the US strategic framework towards China, though the proportion of containment to cooperation seems to be adjusted according to different presidencies (Zhu 2008. The complicated Sino-Japan relations and the Taiwan issue were used by the US to contain China's influence in the region. Foreign exchange and various anti-dumping of key Chinese exports are two main measures that have been taken by the US as significant containment measures. For example, with the purpose of negatively affecting China's exports, the US recently took severe sanction measures against China's tires exports. US trade unions have suggested that the US might launch more trade sanctions against other Chinese products, which are not very important to the US, yet critical to China (Jin 2009). All these 'normal' economic and political measures taken by the US showed that the US will not sit back and do nothing about the emergence of an even more powerful China in East Asia that is regarded by the US as a region with crucial strategic importance both economically and politically.

C. Summary of this chapter

Many governments are taking more active roles in intervening in the development of the ICT industry with the purpose of better taking advantage of opportunities in globalized production (PeopleDaily 2009). Governments provide support and subsidies; give protection through diplomacy; and create laws and regulations with regard to the implementation of ICT strategic development plans. Because of the impact of external pressures and opportunities and from internal changes, since the Open Door policy was launched in 1978 Chinese political and bureaucratic elites have realized that China's national industrial and technological capacity can only be strengthened and expanded by wider and deeper engagement with the global market (PeopleDaily 2006). Both institutional reform and government supporting policies have helped to establish the crucial role of the ICT industry and to formulate an 'energetically developing ICT industry' as one of the core state policies.

What happened in China's ICT industry has been fully supported by 'the favourable regulations and government policies in the country that enable it to attract a large share of FDI flowing into Asia' (Kumar 2002). China's central government takes the lead position in supporting and developing the ICT industry both in the very initial period and at the subsequent expansion stage. Being supported by the policies and regulations formulated by central or local governments, the ICT industry has made great progress both in terms of large scale manufacturing of low-end and labour-intensive products and in terms of R&D of high-end products and core technology. During the 1990s, China dramatically increased its market share in ICT products and now ranks among the world's top three exporters (Wang, Zhu et al. 2009). Moreover, China has upgraded from the assembly of imported parts to the manufacturing of hi-tech intermediate goods (Wang, Zhu et al. 2009). As a result, import dependence has declined and the domestic value-added of exports has increased (Wang, Zhu et al. 2009).

While working to fully support the ICT industry domestically, the Chinese central government continued to explore possible cooperation at regional and international levels, either voluntarily or passively. There are no clear signs that China would like to make changes to current EARPNs. However, the giant domestic ICT market, gradually increasing ICT innovation power and continuously expanding import capability are helping China change the position in regional cooperation.

From all data shown in this chapter, we can see the increasingly rapid growth of comprehensive strength of the ICT industry in China. Such a significant increase also helps promote the rise of the Chinese ICT industry in the global economy. At present, the scale of Chinese ICT products has been ranked second globally. China's 2.4 billion fixed-line and mobile phone market makes it the largest telecom market in the world (MII 2009). At the moment, the ICT industry in China is now at a turning point. After almost 20 years of development, China has completed the accumulation of manpower, technology and production scale. Meanwhile, the ICT industry in China was bound to prosper beyond expectation, which has been proved by trade statistics shown in the previous section of this chapter. Supported by governmental innovation-stimulating policies, enterprises have been capable of transforming from pure manufacturers to innovators and creators in varying degrees. In the next chapter, focus will be put on the impact of Chinese enterprises in EARPNs with regard to ICT industry.

CHAPTER FOUR: CHINESE BUSINESSES

After 30 years of economic reform, sales profits from the Chinese ICT industry increased from RMB1.45 billion in 1978 to RMB 5.6 trillion in 2007 (Chinanews 11 November, 2008). The ICT industry has become the leading industry of China's economy and the export of ICT products accounts for over one-third of overall national exports (Reuters 2009). Apart from strong support from the Chinese central government, two factors are crucial for the development of the Chinese ICT industry. The first is equity restructuring of Chinese enterprises that included the formal conversion of thousands of state-owned enterprises to joint stock companies and the shareholding experiments extensively employed in China's collective-owned enterprises. It is believed that such conversion not only helped in attracting more new investments and cutting down the proportion of state-owned assets, but also made a great contribution to overall increases in both current productivity and innovation (Jefferson, Jian et al. 2003). The second is that more non-SOEs gained large amounts of FDI and accumulated abundant funds by backdoor stock listing in Hong Kong financial market (Roberts, Balfour et al. 2004). As a result, the expansion and upgrading of the ICT industry in China are mainly the results of the dynamic and complex interaction between the Chinese government, MNCs and indigenous Chinese businesses. This chapter will focus on the role of business.

Considering the fact that the development of the Chinese ICT industry always relies on overseas MNCs, this chapter will first discuss the impact of overseas MNCs and evaluate the pros and cons of MNCs on the rise of the Chinese ICT industry. This chapter will then further discuss the indigenous Chinese ICT enterprises, including both

SOEs and private enterprises. The major question that will be answered in this part is on the general development pattern of Chinese ICT businesses. This will help to understand how the Chinese ICT business started from zero to 'going abroad' in general. To make this picture clearer, five Chinese ICT enterprises will be thoroughly analysed. These five enterprises were selected on the basis of three key sectors of the ICT industry, including the manufacturing sector, the software and IT services sector and the telecommunications sector. The five enterprises can be regarded as the most representative businesses in the three individual sectors. That will show that Chinese ICT enterprises have different characteristics in each sector along their way to 'going abroad'.

A. Understanding the Roles of MNCs in the Chinese ICT Industry

Supported by the latest wave of liberalization and privatization around the 1990s, MNCs emerged as key players in the world economy. The impact of FDI on economic development has always been one of the focuses of attention (Lall 2000). The significance of MNCs lies in their ability to bring the necessary FDI and advanced technology to target countries (Dobson 1997). MNCs relocate factories to destinations with cheap costs and resources, and then equip them with their own research centres. Although MNCs are more concerned with profits than technology sharing (ASEANSEC 2002), both investment and relevant technology brought by MNCs can contribute to enhancing the comparative advantages of host countries by offering more relevant and up-to-date skills (Blomström and Kokko 1998; De Backer and Sleuwaegen 2001; Ramstetter 1997) and help capital accumulation for the host countries (Young 1992; ASEANSEC 2002). The economic growth of host countries can largely benefit from inward FDI (De Mello 1997). Japan once had very successful experiences in early 1990s by depending on taking use of carefully selected and monitored FDI as a complement to indigenous capabilities (Bailey 2003b).

As elaborated in Chapter Three, a few of key Chinese national plans for stimulating the ICT industry are intended to attract more FDI to China, such as the hi-tech zones established in the Torch Plan and the 973 Plan. Since 1992, China has absorbed rapid growth in FDI inflows and become the largest FDI recipient among all developing countries (Xinhua 2006). Two key factors can explain the reasons for amazing changes in China. Domestically, building up the 'Socialist Market Economy' was formulated and announced by Xiaoping Deng (November 14th, 1993, the Third Plenary Session of the Fourteenth Central Committee of the Communist Party of China). In the meantime, the Chinese government's policy of 'using the market to change technology' and the policy of 'accelerating the transformation of inefficient big SOEs by joint venture' were both launched. These required huge amounts of investment and created a favourable environment to stimulate FDI inflows. Internationally, big changes occurred in the international capital movement in developing countries. As a result of the classic flying geese model, MNCs based in developed countries started relocating their factories and investments to developing countries that were located on lower rungs of the development ladder to save costs on labour and production. In general, FDI first flows to develop manufacturing capacity for exports, then goes to service domestic demand (Soderberg, Dean et al. 2005).

MNCs set their sights on developing countries after the slowdown of FDI that occurred in the late 1980s and early 1990s (Ostry and Gestrin 1993). Total FDI flows to developing countries increased to 25 per cent of the world's total in 1991, despite the downturn of the world's FDI flows (Ostry and Gestrin 1993). As for East Asian countries, MNCs and their manufacturing affiliates that were established in FDI host countries played significant roles and it is hard to ignore the contribution made by FDI to their rapid economic development (Felipe 1999). China started to rise in the early 1990s as a highly attractive destination for the FDI from developed countries (Wu and Puah 2002). In short, in the wave of FDI flowing more to developing countries, China took the opportunity to accelerate economic development by attracting more FDI inflows.

Under the comparatively relaxed economic environment created by the Reform and Open Door policy (see Chapter Three), it is easier for MNCs to establish their roles in the development of China's ICT industry. The Chinese ICT industry was the first industry which implemented the policy of 'limited open market and introduction of foreign capital and guide indigenous enterprises into the market' (Chen 2005). For example, in the early 1980s, Panasonic (Japan) introduced black and white TV assembly to Changhong (in Sichuan); Hitachi (Japan) introduced colour TV assembly to Jinxing (Shanghai); and Sanyo Japan established offices in Beijing (Lou 2008). Since 1987, 113 TV assembly factories and over 800 parts and components factories have been introduced (Lou 2008).[35] These significant changes serve as a great impetus to the progress of the localization of TV production. Along with the influx of this FDI, significant changes have occurred to components production technology, technological devices, inspection and production scale. In brief, it is hard to ignore the significance of MNCs when we discuss the development path of Chinese ICT enterprises. Next, the

[35] Qinjian Lou, Vice Minister of MII, China Achieves A Leap In The Development Of ICT Industry In 30 Years Reform And Opening. http://www.jxdii.gov.cn/zwga/2008/50520.html

focus will be first put on the changing roles of MNCs and then on the gradual emergence of domestic Chinese ICT enterprises.

1 The Dominant Role of MNCs in the Chinese ICT Industry

In the early 1990s, the Chinese government took a positive stand in introducing foreign investment and establishing relevant business cooperation between MNCs and domestic enterprises (Jefferson, Jian et al. 2003). Since then, massive FDI has continued to flow into China, which has significantly contributed to the Chinese economy in general. The Chinese ICT industry responded positively to both the transfer of global industries and the continuously expanding influx of FDI, which have been regarded as key elements for its rapid growth (Amighini 2005; Hou 2006). Until 2006, the Chinese ICT industry had cumulatively absorbed over USD 1.2 trillion (Hou 2006). The ICT industry was the largest industry to benefit from FDI (Chen 2005).

The pattern of the Chinese ICT industry development was dominated by FDI (Hou 2006; Hong 2008). Along with the continuously rapid growth of FDI, joint ventures have become an important new force in supporting the Chinese ICT industry. During the first three quarters of 2005, the sales profits from joint ventures reached RMB 16.3 trillion which accounted for 76.7% of sales profits of industry overall; industrial-added value from joint ventures was RMB 3.4 trillion which accounted for 78.4% of overall industry (Hou 2006). By 2005, 40.4% of all ICT enterprises in China were foreign-invested and 6,480 foreign-invested ICT enterprises in total. The foreign-invested ICT enterprises comprised 77.4%, 76.5% and 77.1% of the whole sector, in sales income, profits and industrial-added value respectively (MII 2005).

Because of China's changing domestic policies on FDI and intensifying competition, the modes of FDI in China also experienced a change from contractual joint ventures and joint exploration investments[36] before 1986 to more equity joint ventures and wholly foreign-owned enterprise investments[37] after 1986. Since the 1990s, the share of wholly foreign-invested enterprises has gradually increased and exceeded the share of equity joint ventures that once occupied a dominant position after 1986. Foreign control in joint ventures gradually increased after 1986 because the Chinese government launched a series of policies to encourage FDI inflows as a solution for fund-raising difficulties (Xinhua 1986). But the Chinese government still had a very conservative position on several sectors including telecommunications services (the share of FDI should not be over 25 per cent (Soderberg, Dean et al. 2005).

After China became a member of the WTO in 2001, MNCs further expanded their investments and accelerated the rate of mergers and acquisitions (Hou 2006). Mergers and acquisitions became one of the key measures for MNCs to expand their influence. For example, Amazon bought Joyo China and Asianinfo acquired Lenovo's IT service. Additionally, more foreign investors are inclined to move their headquarters, R&D centres and laboratories in hopes of fully taking advantage of sound and favourable policies and cheap labour costs while strengthening their local competitiveness. The establishment of R&D centres was also accelerated because of the readjustment of MNCs' investment strategy in China. For example, Alcatel established a new R&D

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[36] The relationship between the parties within the company is made through contracts. The involvement of foreign-invested parties within the enterprise does not change the legal status and ownership structure. Foreign investment parties have the right of business management and sharing profits through the contract. Such investment may actually be considered debt-capital investment (MOC 2004). http://hr.mofcom.gov.cn/aarticle/ddfg/tzzhch/200411/20041100309058.html

[37] Equity joint ventures and wholly foreign-owned enterprise investments refer to individual proprietorship or joint venture that is co-financed, co-operated by the Chinese investors and foreign investors. Both parties have to share profits and loss and deal with enterprises risk. The difference with contractual joint ventures and joint exploration investments is the degree of ownership by FDI. See http://www.fdi.gov.cn/pub/FDI/zcfg/law_ch_info.jsp?docid=47652

centre in Chengdu, and Micron invested USD 2.5 billion in Xi'an's new R&D centre (CNII 2009). Intel set up a new semiconductor packaging factory in Chengdu in 2005 and Corning Incorporated invested an additional USD five billion to expand its development of optic cable and LCD production in China (CNII 2009)**.** The establishment of these R&D centres promoted technology localization; in the meantime, this also helped the number of scientists and technicians to expand steadily. As Felker argued, the headquarters or operational headquarters status are helpful in increasing the local embedding of FDI, and having MNCs invest more affiliates and establish more production bases in the host country, which MNCs regarded as the centre of a regional cluster (Felker 2003). Along with the establishment of research centres and headquarters, the skills and knowledge of local workers, the capabilities of local manufacturing firms and the quality of industry-specific infrastructure will be further continuously improved, which will contribute to attracting more FDI influx (Belderbos and Carree 2002; Head and Ries 1996).

As for the investment structures of FDI, the available statistics demonstrate that FDI primarily flowed to the traditionally labour-intensive manufacturing industries such as textiles and garments before 1992. However, after 1992, FDI gradually shifted to capital- and technology-intensive sectors such as chemicals, machinery, transport equipment, electronics and telecommunications (Zhang 2008). That was mainly because Deng Xiaoping made remarks during his inspection tour of southern China in 1992, which are of historic significance for China's Reform and Open Door (Lai 2002). As a matter of fact, this tour laid the foundations for further reform and opening up and further introduction of more foreign investment (CPC 1992). Between 1997 and 2000, the amount of contractual and actual investment in electronics and telecommunications increased from USD 3.943 billion to USD 11.36 billion, and from USD 3.146 billion to USD 4.594 billion, respectively. In contrast, the amount of contractual investment in textiles only saw a minor increase from USD 1.143 billion to USD 1.988 billion, while the actual investment in textiles industry underwent a decline from USD 1.859 billion to USD 1.368 billion (MOFTEC 2001).

The major proportion of FDI flows to foreign-invested enterprises that are characterized by export-oriented labour-intensive manufacturing, especially FDI from Hong Kong which takes advantages of its close proximity to Guangdong province where the first and the most important special economic zone, Shenzhen, is located (Lardy 1996; Wen 2002). Before 1991, the production of foreign-invested enterprises in the manufacturing industry was mainly export-oriented (Naughton and Lardy 1996). Although the proportion started declining after the mid-1990s, the export ratio of foreign-invested enterprises remained between 40 to 45 per cent (MOFTEC 2001). Among these, most enterprises were involved in a special category of trade in which materials, components and parts were imported duty-free for processing and assembly and subsequently re-exported. As a result of such a special trade, both exports and imports of Chinese trade had significant increases. By 2000, the exports and imports of trade (from foreign-invested enterprises) accounted for 55.3% and 41.1% of the total exports and imports, respectively (MOFTEC 2001). Foreign-invested enterprises continued to be the driver for the rapid rise of this particular category of trade. Processing exports accounted for 90 per cent of total foreign-invested exports; while by 2000, they remained at 81.4% (MOFTEC 2001). As a significant part of trade, ICT manufacturing was also in a similar situation. For example, the large number of foreign-invested ICT manufacturing enterprises located on the east coast cities of China that subsequently became bankrupt and closed down under the current financial crisis that is reverberating around the world.[38]

As for FDI resources, among all FDI brought by MNCs from different countries and regions, FDI from East Asian economies had the dominant share. The table (Table 4_1) below gives detail statistics of China's FDI utilization and foreign-funded projects by country in 2001.

Table 4_1 Statistics Of China's Utilization of Foreign-Funded Projects by Country Jan.-Jun.2001						
Amount Unit: 10,000 U.S. dollars						
Region/Country	**Total**			**Direct Foreign Capital**		
	No. Of Projects	**Contractual Foreign Investment**	**Actual Investment**	**No. Of Projects**	**Contractual Foreign Investment**	**Actual Investment**
Total	11,991	3,440,069	2,155,827	11,991	3,345,908	2,070,866
Hong Kong	3,644	1,036,074	803,185	3,644	966,718	746,917
Macao	192	27,922	14,840	192	26,952	13,198
Taiwan	1,957	350,279	150,079	1,957	333,926	129,957
Vietnam	4	30	29	4	30	29
Philippine	60	13,956	7,863	60	13,956	7,863
Thailand	66	7,674	7,178	66	7,674	7,178
Malaysia	88	14,214	7,473	88	14,214	7,473
Singapore	312	80,234	94,519	312	80,230	94,519
Indonesia	33	9,632	11,206	33	9,632	11,206
Korea	5	119	18	5	119	18
Lao	1	10		1	10	
Cambodia	6	1,442	220	6	1,442	220
Japan	930	300,333	194,748	930	293,719	187,969
Burma	5	2,724	92	5	2,724	92
Subtotal	7,303	1,844,643	1,291,450	7,303	1,751,346	1,206,639

Source: MOFCOM, Statistics on January to June, 2001, China's FDI utilization and foreign-funded projects, by country

Based on above table, in 2001, East Asian economies altogether contributed over 56 per cent of total cumulative contractual and actual investments. FDI from Hong Kong has

[38] Personal interview with S, a previous technician of BH Electronics Co., Ltd. Shenzhen, 2nd. April 2009, Beijing

always been significant with contributions making up 30.12% of the total cumulative contractual investments and 37.26% of the total cumulative actual investments (MOFCOM 2001). Japan, Taiwan and Singapore account for 8.73%, 10.18% and 2.33% of the total cumulative contractual investment and 9.03%, 6.96%, and 4.38% of the total cumulative actual investment respectively (MOFCOM 2001). In comparison, the US contributed 10.8% of total cumulative contractual investment and 9.51% of total cumulative actual investment (MOFCOM 2001). The statistics shown above demonstrate the significance of FDI from East Asian countries in China's economy. To understand the situation more clearly, the table (Table 4_2) below shows the latest statistics on FDI utilization in China, and helps to explain the major function of FDI in China. The table below is on 'The top ten countries and regions investing in China from 2006 to 2009'. (See next page)

Table 4_2 Investment In China, The Top Ten Countries/Regions, Based On The Actually Paid-In Foreign Capital								
Unit: billion dollar								
	2006(1-11)		2007 (1-11)		2008 (1-12)		2009 (1-8)	
1	Hong Kong	17.5	Hong Kong	22.43	Hong Kong	41.04	Hong Kong	32.48
2	British Virgin Islands	9.66	British Virgin Islands	14.17	British Virgin Islands	15.95	Taiwan	4.55
3	Japan	4.07	Korea	3.29	Singapore	4.44	Japan	2.77
4	Korea	3.16	Japan	2.99	Japan	3.65	Singapore	2.4
5	USA	2.42	Singapore	2.46	Cayman Island	3.14	USA	2.33
6	Taiwai	1.934	USA	2.22	Korea	3.14	Korea	1.76
7	Singapore	1.932	Cayman Island	2.15	USA	2.94	UK	8.56
8	Cayman Island	1.663	Samoa WS	1.6	Samoa WS	2.55	Germany	0.68
9	Germany	1.656	Taiwan	1.43	Taiwan	1.9	Netherland	0.54
10	Samoa WS	1.37	Mauritius	1.05	Mauritius	1.49	Macau	0.51
	Actually paid-in FDI of the top ten / The total actually utilized FDI	83.62%	Actually paid-in FDI of the top ten / The total actually utilized FDI	87.13%	Actually paid-in FDI of the top ten / The total actually utilized FDI	86.85%	Actually paid-in FDI of the top ten / The total actually utilized FDI	87.50%

Sources: MOFCOM, statistics on FDI utilization, 2006, 2007, 2008, 2009

Compared with 2001, FDI from East Asian countries increased substantially. The table above clearly shows that countries and regions in East Asia still played a crucial role in terms of providing FDI to China. In a word, FDI was mainly from East Asian countries. As the largest industry in terms of FDI utilization, the situation for ICT industry is same.

In essence, the rise of the ICT industry is an example of the flying geese paradigm of the international division of labour. As examined in Chapter One, this model drives advanced countries, which are at a higher level and have enough investments and advanced technology, to seek places which are at lower levels of the paradigm and provide even cheaper labour costs and a sounder investment environment (Lai 2002; Gaulier, Lemoine et al. 2005). For example, because of gradually intensifying competition in lower technology markets from NICs, Japanese electronics firms started focusing on research and innovative and manufacturing technology-intensive products. They also paid more attention to their outsourcing strategies (Ernst 1999). Meanwhile, succeeded by Japan, NICs started making big investments in other ASEAN countries and China in the sectors with lower technology such as televisions.

MNCs still made great sales profits and exports volume which accounted for a large proportion of the overall ICT industry. However, a number of domestically-funded enterprises including both SOEs and private enterprises have already become the pillars of the Chinese ICT industry.

2 The Decrease of MNC Influence versus the Rise of Indigenous Chinese Enterprises

As shown above, MNCs made a great contribution to the development of China's ICT industry, in terms of both the import and export of ICT products and overall level and capacity of China's ICT industry (Wen 2002). However, low tax contributions made by MNCs in China gave rise to an onslaught of complaints over the special treatment enjoyed by MNCs (Jin 2007). The question of whether favourable taxation policies enjoyed by MNCs should be cancelled has been on the agenda since 2005. With the purpose of creating a fair competitive environment for enterprises with different types of ownership, various favourable policies in taxation were eventually cancelled in March 2007 (Jin 2007). In the meantime, the fast growth of FDI in the ICT industry has slowed since 2007 (CCN 2008).

The global financial crisis has slowed the inflow of foreign capital. According to financial resources, during the first two months of 2008 foreign capital that was utilized was worth RMB 103.6 billion, which had decreased by 20.2% compared with the same period in 2007 (ACS 2008). FDI was worth RMB 85.9 billion, a decrease of 23.9% compared with the same period in 2007 (CCN 2008). However, compared with the decrease of the entire foreign capital influx, the growth rate of foreign capital from enterprises of Hong Kong, Taiwan and Macau stabilized (Xing 2009). During the first two months of 2008, accumulated finished investment was worth RMB 57.1 billion, an increase of 44.7% compared with the same period of the previous year (MOFCOM 2008).

By comparison, investments from domestically-funded enterprises have flourished since the beginning of 2008. During January and February of 2008, domestically-funded enterprises accumulated RMB 106.3 billion, an increase of 65.3% compared with the same period of the previous year (MII 2008). Among all investment from domestically-funded enterprises, investment from private enterprises increasingly thrived (CEOCIO 2008). The domestically-funded enterprises accumulated finished investment of RMB 31.3 billion, which was an increase of 94.4% compared with the same period in 2007, and the growth rate increased 13.3% compared with the same period in 2007 (MII 2008). The proportion of private enterprise investments was 29.4%

of all domestically-funded investments which was an increase of 4.1% compared with the same period in 2007. State-owned enterprises accumulated RMB 16.6 billion, an increase of 61 per cent compared with the same period in 2007 (MII 2008).

The data provides evidence that domestically-funded enterprises, especially private enterprises, increased investment in the ICT industry, while foreign capital investment slowed down. The slowdown of foreign capital investment resulted from various reasons. As research has shown, some investment was transferred to other East Asian countries, such as Vietnam, which have the advantage of lower costs (Devezone 2008). The global financial crisis also directly led to a decrease of foreign capital influx and decrease of exports. The foreign capital decrease and foreign capital transfers have resulted in critical disadvantages for the Chinese economy. However, it also provides a good opportunity for the domestically-funded enterprises that have accumulated immense strength and have prepared for further investment by transferring from 'Made in China' to 'Created by China' (Hao 2007). In the meantime, domestically-funded enterprises have made great progress in expanding exports. That will be further discussed later in case studies, in which more focus will be on the rise and influence of indigenous Chinese ICT enterprises.

Apart from the decreasing influx of foreign capital, the decreasing influence of MNCs in China could also be indicated from exports. According to statistics from the Ministry of Industry and Information Technology, exports from solely foreign-funded enterprises reached USD 3.476 trillion, which accounted for 66.6% of overall ICT exports, an increase of 12.41% compared with the same period in 2007; while the growth rate decreased by 14.88% compared with the same period in 2007. Exports from joint ventures reached a value of USD 822.8 billion, an increase of 10.12% compared with the same period in 2007; while the growth rate decreased by eight per cent compared with the same period in 2007 (MOFCOM 2008).

Compared with exports from MNCs, exports from private enterprises reached a value of USD 337.11 billion, an increase of 39.61% compared with the same period in 2007. Also, the growth rate decreased by 7.16% compared with the same period in 2007. Exports from SOEs reached a value of USD 386.53 billion, an increase of 10.94% compared with the same period in 2007. The growth rate decreased by 17.13% compared with the same period in 2007 (MOFCOM 2008). These statistics indicate that ICT exports continued to rise even though the growth rate had started declining. The grim international economic situation was the immediate cause of the decrease in volume of ICT products exported (ACS 2008). Meanwhile, along with the decrease of exports from MNCs, there was a rise in the proportion of exports from domestically-funded enterprises, especially from private enterprises.

In a word, China is no longer just a destination for foreign investments, but is regarded as a rising, formidable power in terms of overseas purchases and mergers (Ille 2009). As the modified flying geese paradigm stresses, once a country finishes the relevant accumulation in the initial period of its development, it is inevitable for the country to start an overseas transition both in investments and trade. What is particularly special in China's economy is the speed of such a transition. Historically, few countries have completely changed from being FDI receivers to FDI providers in a very short period. Hence, the rise of emerging Chinese multinationals has impressed the Western world and East Asian countries by several compelling overseas purchases and bids such as

Unocal by CNOOC, IBM by Lenovo and RIO by ACH. These purchases and bids were entirely supported and encouraged by the Chinese Central Government. Consequently, there were observations that 'China will buy the world' (Anderson 2006).

3 Evaluating the Roles of MNCs in the Chinese ICT Industry

Throughout the 30 years of Reform and Open Door in China, MNCs came to China with huge amounts of FDI that have been deeply integrated into all main industries of the Chinese economy (Hao 2007). The inflow of FDI indeed brought the necessary technology, helped China in solving the problem of fund-raising and drove the increase of GDP and the domestic Chinese market more in line with international practice, and consequently pushed the development of the Chinese domestic market (Hou 2006). The growth of China's ICT industry accelerated largely because of the establishment and development of a large number of ICT manufacturing enterprises and R&D centres. In the meantime, these enterprises and centres created millions of foreign exchange deals as a result of a large proportion of exports, which was conducive to importing more advanced ICT technologies.

Since the 1990s, previously nationalistic protectionism against MNCs was relaxed to accelerate national industrialization and climb the global value–added chain (Zhan 1993). Since then, foreign capital brought by MNCs helped China become a major part of the international production network by receiving downstream ICT production relocated from Taiwan, Hong Kong and other advanced East Asian countries (Zhan 1993; Kiminami 1999). In addition, China also fostered the formation of the pattern of FDI-driven and export-oriented mode of industrialization in almost all industries in

China (Li and Zhang 2009). The Chinese ICT industry soon took off and expanded rapidly to be known globally as the world's factory and 'top export processing base (PeopleDaily 2004; Talwar 2006). China has become the second largest electronics products manufacturing and exports country (CEOCIO 2008).

With greater openness, the utilization of foreign capital grew by a large margin and the ability to use foreign investment was markedly improved (Lou 2008). Until the end of 2007, China's ICT industry had utilized over USD 1.3 trillion worth of foreign capitals (Lou 2008). Because of the massive scale of utilization of foreign capital, China experienced continuous growth in its industrial scale and improvements in its technology. China's indigenous enterprises participated in increasingly more international economic cooperation, and became integrated into the division of labour on a larger scale and in greater depth, and produced increasingly varied and higher quality electronics products (Gaulier, Lemoine et al. 2005). In short, the introduction and the utilization of foreign capital contributed to establishing the current state of China's ICT industry.

FDI was continuously attracted to China due to the gradually maturing market there. The massive infusion of FDI contributed to the development of the Chinese ICT industry. However, such a massive infusion established the pattern of the absolute domination of foreign capital in ICT production and exports (Hou 2006). MNCs were beginning to focus more on the Chinese market and readjusted their investment strategy in China because of increasingly intensified competition. As a result of a series of mergers and acquisitions, the indigenous Chinese ICT enterprises that might have possibly become leading ICT enterprises in China have now become a part of global networks including integrated supply chains and integrated product management of those overseas MNCs (Lang 2008). As a result, the development of Chinese ICT enterprises has been limited to the large volume and low value-added stage of final production (Lang 2008).

Domestic ICT enterprises are easily influenced by the changes of FDI due to over-dependence on FDI (Hao 2007). Many ICT manufacturers, such as small and middle ICT manufacturers (mostly joint ventures) in the cities on the east coast of China are still struggling to compete for overseas products' orders which determine their businesses' ability to survive (Cheng 2008). Many workers in electronics factories in the cities like Shenzhen remain unemployed.[39] The situation tells how deeply these small and middle ICT manufacturers depend on exports. Once they lose overseas orders, they collapse. Along with the slowdown of capital influx, the growth rate of the ICT industry declined. For example, in the city of Dongguan, known for ICT products manufacturing, industrial value-added reached RMB 388.58 billion, a decrease of 11 per cent compared to the same period of the previous year (Zhao 2008). Although a number of factors, including readjustment of the industry caused this decrease, the slowdown of capital influx was one of the key reasons. The main reason for such decrease is that the ICT industry in China is characterized by exports orientation.

Apart from the over-dependence of indigenous Chinese ICT businesses on MNCs, although MNCs directly or indirectly helped driving the growth of domestic ICT enterprises, ICT industry exports have essentially strengthened and enriched MNCs instead of indigenous ICT enterprises in spite of massive exports volume. The amount of tax revenue paid by foreign-invested ICT enterprises only made up 42.3% of the total,

[39] Personal interview with S, a previous technician of BH Electronics Co., Ltd. Shenzhen, 2nd. April 2009, Beijing

due to favourable policies enjoyed by foreign-invested enterprises (MII 2006).

As advanced technology providers, MNCs still became one of key factors restricting the development of indigenous Chinese ICT businesses, because of the central control of MNCs on core technology (Lang 2008). Due to intensified competition, MNCs focused on protecting and strengthening their core technology, thus enhancing their control on upstream R&D and high value-added products. Because of the policy of 'trading market for capital', Chinese ICT enterprises lacked the motivation in climbing up the upstream R&D. As a result, MNCs that brought FDI essentially controlled the development of Chinese ICT enterprises. Moreover, tight control on core technology and advanced technology also confined China's ICT industry to a relatively low level by comparison to the world in general in the long term (Lang 2008). From this point of view, inflows of FDI limited the development of local ICT enterprises to varying degrees.

Because of cheaper labour costs, and favourable domestic policies and regulations, more MNCs started relocating their manufacturing bases to China and partly withdrawing from other East Asian countries (Chen 2008). As more FDI flowed to China, more anxieties rose up in East Asian countries, such as Malaysia, Indonesia, Singapore, the Philippines and Thailand (Wu and Puah 2002). For example, China has been the largest beneficiary of relocation efforts of Japanese electronics firms in EARPNs since the early 1990s, as the majority of relocations have been to China (Belderbos and Zou 2006). It is true that other East Asian countries lost their FDI inflows because of the emerging China. For example, from 1989 to 2004, Japan's FDI to China increased 736 per cent from yen 587 billion to yen 4.91 trillion, while in the same period, Japan's FDI to Singapore decreased from yen 2.57 trillion to yen 768 billion. A decrease also happened in Thailand from yen 1.7 trillion to yen 1.27 trillion; in Indonesia from yen 840 billion to yen 334 billion; in Malaysia from yen 902 billion to yen 135 billion. Although Japan's FDI to the Philippines increased 27 per cent from yen 269 billion to yen 341 billion, it is far less than it is to China.[40] Such a phenomenon explains why most ASEAN countries are concerned with the rise of China. It was possible that developing ASEAN countries would be forced out of the market because of the rising China. Moreover, many small and middle ICT manufacturing enterprises are joint ventures established by MNCs, which moved their factories to China because of cheap labour costs and an environment with sound regulations and policies. As a result, these factories which might have possibly moved to other developing countries are now located in China. The rise of the largest ICT manufacturing country is at the cost of lost opportunities for other countries, especially those newly industrialized East Asian countries. From this perspective, the relationships between China and the ASEAN countries were more competitive than cooperative.

However, the FDI inflow from other East Asian countries (except Japan) also increased greatly. For example, from 1999 to 2001, the actual utilized FDI from Singapore increased from USD 1.48 million to USD 945.19 million; the actual utilized FDI from Malaysia increased from USD 200,000 to USD 74.73 million; the actual utilized FDI from Indonesia increased from USD 69,000 to USD 112.1 million; the actual utilized FDI from Thailand increased from USD 179,000 to USD 71.8 million (MOFCOM 2000, 2001).[41]

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[40] All above results are calculated based on the statistics database of MOFA Japan, Outward / Inward Direct Investment (historical data), see: http://www.mof.go.jp/bpfdi.htm

[41] Based on the FDI statistics database of MOFCOM, see: http://3w.mofcom.gov.cn/table/wztj/2001_1_6_a.html; and http://3w.mofcom.gov.cn/table/wztj/2000_9_22_19.html

In terms of FDI transfer, the direction of FDI and the fact that China received huge amounts of FDI not only from Japan but also from other ASEAN countries showed that China was still located on a lower tier of the EARPNs as an FDI outflow destination. The difference was that FDI from the top tier of EARPNs (Japan) directly flowed to China without passing through those countries located on the second tier. The key point here is that this was a process of continuous transfer and continuous catching-up in terms of attracting more FDI. In short, the emergence of China made China take the place of those countries located on the second tier of EARPNs and become a key FDI destination, but this did not fundamentally change the FDI transfer model in EARPNs.

B. Understanding the Role of Indigenous Chinese ICT Enterprises

Since 1978, China's indigenous enterprises have been actively participating in the international division of labour and have become an important part of international production networks. Not so long ago, the 'Made in China' label was mainly on low-end products, such as textiles and plastic articles, but China has rapidly moved upstream along production networks. This section will focus on the indigenous Chinese ICT enterprises, with the purpose of making clear the general rising-up pattern of the indigenous Chinese ICT enterprises, such as what strategies they have carried out and what are the results of these strategies.

1 General Pattern of Rising Indigenous Chinese ICT Enterprises

Most indigenous Chinese ICT enterprises have experienced seven stages including processing and compensation, original equipment manufacturer (OEM); original design manufacturer (ODM), original brand manufacturer (OBM), foreign joint ventures and cooperatives, establishment of R&D centres and transnational mergers and acquisitions (Lou 2008). These seven stages helped indigenous ICT enterprises to be actively integrated into multidirectional and multi-level international cooperation and competition. To be specific, these seven stages stimulated the growth of the ICT industry overall, relieved insufficient domestic demand and strengthened the comprehensive competitiveness of these indigenous enterprises (Lou 2008).

Moreover, in recent years, 'three stages of market competition' have occurred in all sectors of China's ICT industry. MNCs first entered China's market by fully making use of their high-end advantages, and then faced challenges from China's indigenous ICT enterprises which competed with low costs but relatively good quality (Zeng 2007). MNCs have to keep a low profile and take challenges, but only those that can create and produce high-quality goods are successful in the long run (Ji, Liu et al. 2007). At this point, China's indigenous ICT enterprises actually face the strength of the internationally prominent MNCs, which have the advantages of powerful global marketing and R&D networks. So far, few Chinese ICT enterprises could eventually survive the three stages of market competition, after they finally went through the seven tough stages. Immature marketing and R&D capabilities made Chinese ICT enterprises lack core competence in the protracted battle with MNCs.[42]

The mobile phone industry is a prime example of the competition between Chinese and foreign enterprises. In 2001, Chinese manufacturers gained a 10 per cent share of the domestic mobile market. Once they finished establishing their production bases and technology platforms, the Chinese manufacturers started constructing their marketing

[42] Personal interview with W, a senior staff member of IDC, 19th November, 2007, Beijing

networks in China. With low costs and localized design, these Chinese manufacturers fought against international giants such as, Motorola, Siemens and Nokia. In 2003, half the country was taken hold of by these newly developed indigenous ICT enterprises. Although the profits of indigenous Chinese mobile manufacturers were increasing, the trend slowed because MNCs countered with their stronger and more mature marketing networks, and more advanced technology with price reduction (Zhou, Li et al. 2005). The market share of China's indigenous ICT enterprises decreased to 37 per cent in 2004 and 31 per cent in 2007 (CITIC 2008). This example showed that indigenous Chinese ICT enterprises have the capabilities to compete with powerful MNCs in the Chinese market and it was possible for them to win a place in such fierce competition. However, the tendency to skimp on innovation still seriously limits the sustainable development of Chinese ICT enterprises (Roberts, Balfour et al. 2004; Ji 2008).

2 Are They Ready For 'Going Out'?

The 'Top 100 ICT Enterprises' concept was launched in 1986. According to the business scales, profitability, R & D capability and market shares, these top 100 ICT enterprises are believed by the MII to be the most competitive ICT enterprises in China. Therefore, research on the growth route of these top 100 Chinese ICT enterprises helps us understand the general rising-up pattern of Chinese ICT enterprises overall.

The Growth Route of the Top 100 Indigenous Chinese ICT Enterprises

> 'The development of the ICT industry will ultimately depend on whether ICT enterprises would be stronger and more powerful … only when those ICT

> enterprises could rank among world top level MNCs, would the competitiveness of the overall ICT industry be finally strengthened … we should establish large, internationally competitive companies or enterprise groups that rank among top-level international MNCs and have distinctive main lines of business and possess their own intellectual property rights and name brands.' (Wang 2005).

With the purpose of growing more pillar companies from the seven stages, the MII has been contributing to the growth and support of a number of large ICT enterprises, namely the 'Top 100 ICT Enterprises', but these enterprises account for no more than two per cent of the thousands of ICT enterprises, while creating almost a quarter of overall sales income, a quarter of sales profits and over a half of the tax income (Du 2008). According to the latest rankings of the 'Top 100 ICT Enterprises', Lenovo, Haier, BOE, Midea, Hisense, Founder, TCL, Panda Electronics Co. and ZTE took the top ten positions. In total 55 ICT enterprises are privately owned, while state-owned enterprises and joint-ownership enterprises accounted for 45 (Du 2008). That again showed the increasing power of private ICT enterprises in China.

Since 1986, the adjustment of product structure has continued to make progress. For example, because of the significance of the production of colour televisions in China in 1986, 90 per cent of the Top 100 ICT Enterprises in 1986 mainly dealt with colour televisions and components for colour televisions (Hu 2003). The 'diversified products structure' which included telecommunications, computers, new electronics components and home electronics was formed in 1996 (Hu 2003). In 2008, almost three-quarters of the Top 100 ICT Enterprises finished the transition to the businesses of integrated circuits, software, computers, telecommunications equipment, integrated systems and new type display devices (Du 2008). The Top 100 ICT Enterprises contribute to developing high-tech products, such as next generation networks, new generation mobile telecommunications, digital TVs and information home electronics, which will further help them make the connection between optimizing products structure and fostering new points for economic growth (Du 2008). From this point of view we can see that the development of these 100 ICT enterprises is closely related to the support and guide from the relevant Chinese governmental institutions.

R&D was increasingly emphasized to strengthen the power of the Top 100 ICT Enterprises which has adjusted its structure since early 1985. Since the 1990s, the top 100 ICT enterprises have been devoted to establishing and improving independent innovation guided by the market, supported by industry policies and invested by enterprises, and the creation of the organic integration of production, education and research (Wang 2005). So far, reasonable arrangements and rational adjustments have been completed for the purposes of strengthening R&D capabilities. R&D investment of the overall industry was over RMB 1 trillion in 2007, representing 1.74% of sales incomes and 27 per cent of national overall R&D investments (Lou 2008). Thus far, the number of R&D staff accounted for 9.6% of all ICT industry staff, and R&D expenditures accounted for 3.8% of overall sales income (Liu and Fan 2008). Huawei's R&D expenditure reached RMB 71.4 billion and ranked number one in China, while R&D expenditure by ZTE accounted for 9.8 % of its overall sales income (Liu and Fan 2008). More than 10 of the top 100 ICT enterprises, such as Shanghai Huahong Group, Neusoft and Sichuan Jiuzhou Opto-Electronics Co., reached six per cent in terms of the proportion of R&D expenditures in sales income, which nearly equals the international standard level (Du 2008). The above shows that the top 100 ICT enterprises have paid more attention to R&D since 1985, which contribute to strengthening their competitiveness in the domestic and international markets.

Apart from the upgrade of the production structure, a standards strategy has taken shape. With high R&D expenditure, the top 100 ICT enterprises have continued to achieve breakthroughs in core technology and attain independent intellectual property rights. By the end of 2007, 2,158 national standards and 4,718 industrial standards have been enacted (Du 2008). Twenty-one independent intellectual property rights have been attained such as Super Video Cassette player (Super VCP), Global open Trunking architecture (GoTa), Audio and Video Coding Standard (AVS), Wireless LAN Authentication and Privacy Infrastructure (WAPI) and Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) which have been recognized by the International Telecommunication Union (ITU) as 3G standards[43]. According to statistics of China's State Intellectual Property Office, Huawei has made 1,544 Patent Cooperation Treaty (PCT) applications, which ranks fourth in the world (Du 2008).

So far, the top 100 ICT enterprises have participated in 23 of 27 standard working groups including TD-SCDMA, R&D for digital TV standard, satellite navigation application systems, wireless broadband Internet Protocol (IP) networks standard and the core standard of integrated circuits IP (Du 2008). The top 100 ICT enterprises have not only made efforts in standards making domestically, they also contributed to standards making in various international organizations. For example, Huawei has been members of 83 international standards organizations and taken important roles in those

[43] 3G or 3rd Generation is a family of standards for mobile telecommunications defined by the International Telecommunication Union. It is also known as International Mobile Telecommunications-2000 (IMT-2000)

organizations (Huawei 2009). The above demonstrates that, supported by ICT policies and led by the top 100 ICT enterprises, ICT business alliances persist in making independent ICT standards to strengthen intellectual property rights and to enhance the integration between standards making and industrialization (Wang 2005).

Compared with their western countries' competitors, Chinese ICT enterprises did not make so many advantages in the international ICT market. However, these were regarded as the first step for Chinese ICT enterprises to try to participate in standards setting and making. With strong support from the enormous Chinese domestic market, the participation of Chinese ICT enterprises in standard setting and making is gradually changing the pattern of international competition, at least in the Chinese ICT market. That in fact changed the situation in which Chinese ICT enterprises have always been participants in competition.

As elaborated on in Chapter Three, the big corporation strategy was advocated and gave rise to the model in which big enterprises acted as a mainstay while leading small and medium enterprises in common development. As the key part of the big corporation strategy, under the principles of 'insisting on a high standard, self-renovation and market improvement', a number of superior domestic brands arose and improved the international competitiveness of Chinese products. As the top 100 ICT enterprises gradually made the transition from 1980's OEM and ODM to 1990's OBM, more and more Chinese ICT brands have become known in the world. In 2008, 15 indigenous Chinese ICT enterprises were included in the Global 500 companies, such as Lenovo, Changhong and Tongfang (Lou 2008). Haier was selected for the '100 World Class Brands' (in *CEOCIO* magazine) after Haier successively established its global networks of ‘design, procurement, manufacturing, marketing and services’ (CEOCIO 2007). Lenovo’s purchase of IBM personal computers signalled an important breakthrough for the ‘Super Corporation Strategy’ of China’s ICT industry.

New progress has been made in the internationalization strategy. With strengthened economic power and an increasing level of opening up, many Chinese enterprises are encouraged to go global to better utilize international and domestic resources and markets, and for achieving the goals of the integration and combination of ‘attracting foreign investment’ and ‘going global’ (See Chapter Three). I will make some general statements followed by specific examples in the case studies. Huawei, a private ICT enterprise located in Shenzhen, had sales income that reached over USD 900 billion, while its overseas income was over USD 90 billion in 2007. Moreover, Huawei’s CDMA products have been popularized in over 50 countries (Huawei 2009). ZTE, another well-known ICT private enterprise in China, realized rapid overseas expansion by ODM cooperation with South Korean and Japanese enterprises (ZTE 2009). By focusing primarily on colour televisions, TCL expanded its global marketing networks to India, Russia and Australia after successfully penetrating the Southeast Asian market. Currently, the market share of TCL is ranked second in Vietnam and ranked first both in Singapore and the Philippines (Roberts, Balfour et al. 2004). In brief, MNCs helped Chinese ICT enterprises establish strong foundations for their further development. In addition to the government’s protection, a large number of Chinese companies now compete with foreign corporations not only in the Chinese market but also in the markets of both developing and late-developing countries (Zhao 2008).

In recent years, the top 100 ICT enterprises launched international mergers and acquisitions to restructure and integrate resources (Zhang 2007). For example, TCL finished restructuring and acquired the colour TV business of Thomson, and the mobile phone business of Alcatel (Ji 2007). BOE became one of the world's largest PC display manufacturers after purchasing the production lines of TFT-LCD from Hyundai in 2002, Groudjay in 2003 and then the LCD sector from Philips via Groudjay. Lenovo is another example of successful mergers and acquisitions. The purchase of the PC business from IBM in 2004 further accelerated Lenovo's internationalization (Du 2008). The initial results of these international acquisitions were achieved within three years. Lenovo has become one of the three largest PC manufacturers and Fortune 500 companies.

The role of MNCs in the ICT industry's development lend some support to the fact that the path of China's rise is directed by export-oriented industrialization which has been practiced by Japan and Asia's NICs such as Singapore and South Korea. Therefore, similar to most ICT enterprises in other East Asian countries, China's indigenous ICT enterprises also began by providing OEM for international brands, relying on the assembly of low-end and high-volume final products. Once these indigenous enterprises accumulated sufficient experience and gained adequate competencies in OEM exports, it was time for them to establish a base for themselves. For example, BYD, the world's second largest secondary battery provider, made its fortune through OEM. Because of the huge influence of BYD that is now the largest battery provider for Motorola and Nokia, the model of battery manufacturing has been changed from the capital-intensive to the labour-intensive model (Xu 2007; Chai 2008).

In sum, China's rise in the ICT industry showed that China has undergone a similar journey that Japan and other advanced East Asian countries have experienced despite the differences in the global economy and domestic policy making and implementation. Indigenous Chinese ICT enterprises followed the road from low-end, labour-intensive products such as colour TVs and the components and parts of colour TVs, and then progressed upstream by strengthening R&D and independent standards, then going abroad to expand markets and take advantage of more resources (Yin 2009). To be clear, that is a journey from processing and compensation to independent R&D, from FDI intervention, to joint venture, to self-funding (Gaulier, Lemoine et al. 2005).

China's huge domestic economy and great support from central government provided these emerging indigenous ICT enterprises with a protective umbrella in the most competitive market. Meanwhile, by relying on various favourable policies and international negotiations supported by the Chinese central government and local governments at all levels, these Chinese ICT enterprises gained opportunities in building up their revenues for future exploration overseas. However, the picture is not entirely rosy.

So far, indigenous Chinese ICT enterprises are still at the 'learning process' stage, which includes both making better products and selling them more effectively. Both of these need strong support from innovative and creative capabilities. But both of these cannot be reached in a short period, even in the era of rapid information flow. Chinese central government has already made various strategies and plans for driving these indigenous Chinese ICT enterprises to enhance their R&D capability. Despite policy requirements from governments at all levels, not too many Chinese companies indeed met the international norm of spending five per cent or more of revenues on R&D (Roberts, Balfour et al. 2004). That fully explained why indigenous Chinese mobile companies were finally defeated by MNCs in the war for the Chinese mobile market referred to previously. In short, the parsimony of indigenous Chinese ICT enterprises on R&D investments directly helped give MNCs an edge in the fierce competition.

This learning process also implies that Chinese ICT enterprises are still not mature enough in terms of corporation management. Family-style management has always been a key tradition in Chinese business circles (Ji 2008). Although these gradually changed as more western-style management systems were introduced and integrated into Chinese ICT enterprises, the influence of family-style management is still quite strong (Ji 2009). Key examples here of heroic entrepreneurs include Liu Chuanzhi for Lenovo, Zhang Ruimin for Haier and Ren Zhengfei for Huawei. Because of the great influence of these individuals, significant decisions of these corporations were usually finally controlled by these individuals (Ji 2008). In short, modern corporate management mechanisms have not been wholly established in most Chinese ICT enterprises, which usually led to unwise decisions (Ji 2008). For example, Lenovo decided to explore overseas markets when Lenovo had still not establish a clear exploration plan. In the meantime, Lenovo also decided to expand its business scope which was beyond its expertise in laptops, PCs and servers. All these directly resulted in decreasing annual revenues and shrinking domestic market shares for several years.[44]

Once indigenous ICT enterprises grow up and have well-known brands, on the one hand, they have to spend large amounts of money and human resources in fighting forged and fake commodities within domestic markets. On the other hand, they have to confront

[44] Personal interview with WA, a staff member of Lenovo, 2nd December 2008, Beijing

intense competition on price from their domestic competitors. These surely weakened their revenues, since it is much harder to further cut down production costs. Moreover, these factors also diverted their energies in considering their possible 'going abroad' strategies. For example, Haier was seriously hit by Hisense Electric Co. (China) in the recent price war, which left Haier with only six per cent profit growth for the first half of 2004. In the meantime, once these ICT enterprises become well-known enterprises in China, they are required to provide various financial supports for the activities of local and central governments, which surely become big financial burdens for these enterprises, despite the tax reductions from government. For example, it is well-known in China that Haier is a famous corporation in the red, because of the price war and huge amounts of financial support for various activities required by governments.[45]

Moreover, because of the Reform and Open Door policy, most top 100 ICT enterprises gathered on the east coast of China. About 77 top ICT enterprises are located in main regional clusters, such as the Yangtze River Delta, the Pearl River Delta and the Baohai Bay Rim. Industrial concentration and comprehensive competitiveness in those areas have been increasingly enhanced. However, it also aggravated the imbalance between East China and West China (Chen 2006; MII 2007). A series of adjustments on changing the irregular regional structure has been implemented to drive these top 100 ICT enterprises to transfer to Central and Western China to take advantage of rich resources there. Regretfully, there are no significant effects so far.

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[45] Personal interview with D, a senior officer of SASAC, 22nd July, 2006, Beijing

4 Summary of This Section

The rapid growth of indigenous Chinese ICT enterprises is closely related to the enormous domestic market and government support. As this section shows, more and more Chinese ICT enterprises finished accumulation in the initial stage and proceeded to the advanced stage. As the reform deepens, the deep-seated problems long compressed in the economy, such as the imbalanced investment structure, excessive duplication of capacities, overdependence on the large scale of extensive production and low-quality growth, are becoming more acute. The Chinese government realized the seriousness of the situation and was trying to make the Chinese ICT enterprises finish the transition from 'Made in China' to 'Created in China'. However such a transition could not be accomplished in a short period because R&D capability and management experience would take time to become strengthened. Despite the great progress that indigenous Chinese ICT enterprises have made, most of them are still in the learning process.

It cannot be denied that Chinese businesses have made great efforts to enhance overseas expansion, especially for natural resources and strategic resources including petroleum and in overseas manufacturing and R&D centres. All cases of Chinese multinationals' overseas action showed their ambitions. The impact of overseas Chinese FDI is even greater when overseas Chinese ethnic networks characterized by bamboo networks are included. The problem is whether China's multinationals are competent to provide adequate FDI to East Asian countries as Japan and the US does. Moreover, a problem also lies in whether China's overseas FDI has produced effects by which East Asian countries can be closely connected in EARPNs.

The answers to these questions are ‘not yet’ if we review the current situation of China’s overseas FDI. In the latest ranking of Fortune 500 companies, only 35 Chinese multinationals, including several companies from Taiwan and Hong Kong, are listed and all of these ranked Chinese indigenous multinationals are SOEs that focus mainly on finance, resources, engineering and telecom and electronics. Of course, Fortune 500 ranking cannot be the only standard to evaluate the overall situation of China’s multinationals, but it still shows the comprehensive strength of China’s multinationals in terms of world ranking. According to MOFCOM statistics, FDI inflows to China are still far more than FDI outflows. For example, in 2008, China’s actual utilized overseas fund is USD 53.505 billion, while accumulative external investment only reached USD 35 billion up to 2002 (UNCTAD 2003). In brief, China is still characterized by an exports-oriented economy, rather than an ‘exports powerhouse’ (Steinbock 2005: 8). Strictly speaking, China still belongs to the group of FDI receivers, although China is gradually becoming a capital exporting country. In other words, China does not qualify to be an FDI provider as Japan and the US did for the development of EARPNs.

Meanwhile, China has indeed made incredible strides in its overseas direct investment, overseas purchases and mergers, R&D alliances and strategic alliances since it launched its strategy of ‘going abroad’ in 2003. According to the statistics from the MOFCOM, Asia is the largest destination for China’s overseas investments, followed by North America, Africa, South America and Europe, particularly in Middle and Eastern Europe. In reality, purchases and bids also occurred in countries rich in natural resources, such as Australia, Russia, and Brazil and in many oil-exporting countries. As for ICT overseas markets, the case studies (see below) show that the purchases and bids made by Chinese ICT enterprises mainly occurred in less-developed countries, such as Bangladesh and places in West Africa where most engineering and telecommunications projects occurred, and in regions that already have very mature ICT markets including the UK and Western Europe. Apart from political and diplomatic reasons, the root causes for China's multinationals to go abroad and invest are to seek natural resources to make up for domestic shortages, accumulate experiences for possible future investments and explore overseas markets.[46] Most regional cooperation programmes between China and other East Asian countries discussed in Chapter Three focused on R&D for the purpose of strengthening Chinese ICT power, except that the ICT cooperation project in the Greater Mekong practically accelerated ICT trade and FDI between China and several major ASEAN countries. So far, no evidence can be found to show that FDI from China has in practice created reasonable trade for the members of EARPNs through overseas FDI outflows, unless considering the role of overseas Chinese ethnic business networks.

In brief, it is too optimistic to say that China has become a big capital exporting country. The development of EARPNs has indeed been affected by the arrival of Chinese FDI because China is already becoming one of the key FDI providers to other East Asian countries within the region. In other words, the promotion of the position of China in the EARPNs is proved once again by its FDI outflows. The truth is that no clear evidence shows that China is the leading FDI provider for EARPNs.

[46] Personal interview with W, a senior staff member of IDC, 19th November, 2007, Beijing

C. Indigenous Chinese ICT Enterprises by Sectors

The above analysis on the 100 indigenous Chinese ICT enterprises provided us with a general picture. However, the picture would be quite different if we were to analyze the Chinese ICT industry in three independent sectors: ICT manufacturing, ICT R&D and ICT application. To further explain the general growth pattern and general overseas expansion strategies of indigenous Chinese ICT enterprises, I will focus on three main sectors in the ICT industry and five large Chinese ICT enterprises: Huawei and ZTE (Zhongxing)—the two most well known equipment manufacturers; Neusoft and UFIDA (the biggest management software supplier both in China and Asia), the two most significant software R&D developers in China; and China Mobile—the strongest telecommunications operator in China. In a word, five case studies constitute this section. The following five case studies on ICT equipment manufacturing, software development and telecommunications sector represent different aspects of China's ICT industry. As each sector has very distinctive characteristics, I will start from a general picture of the sector, and then approach the details and analysis for each case study.

1 The ICT Manufacturing Sector

Overview--The Manufacturing and Processing Centre

The centre of global manufacturing had been based in Europe, and then transferred to the US. After the Pacific War, it transferred to East Asia where Japan, Korea and other NICs successively made astonishing economic achievements. With the tide of economic shift to Asia, manufacturing has gradually transferred to China (Wu and Mu 2005).

China's massive productive power remained the driving force for the dynamic development of the ICT industry. According to and OECD report (2005), Made in China products accounted for only 10 per cent of imports for US ICT products in 2000, while the proportion rose to 27 per cent in 2004. From 1996 to 2004, the growth rate of the US ICT industry was 50 per cent and reached USD 37.5 trillion while the gross value of the Chinese ICT industry rose from USD 3.5 trillion to USD 32.9 trillion and the growth rate reached 1,000 per cent. In 2005, the exports of China's ICT products accounted for 30 per cent of national exports overall, and China replaced the US as the world's largest exporter of ICT products. China has not only become the manufacturing and processing centre of Asia but for the entire world, but also the world's sixth largest ICT market.

In terms of manufacturing scale, China's ICT industry is ranked the second in the world; many important products have ranked first in the world. For example, in 2007, the manufacturing of mobile phones represented 48 per cent of the world's total; the manufacture of PCs represented 46 per cent of the world's total, colour TVs represented 42 per cent of the world's total, display screens represented 65 per cent of the world's total; SPC exchanges represented 58 per cent of the world's total; and digital cameras represented 57 per cent of the world's total (MII 2008; CEOCIO 2008).

In the Chinese ICT manufacturing market, there is a long list of ICT manufacturers including international network equipment suppliers: Alcatel, Cisco, Lucent, Nortel and Siemens; and international portable phone sets suppliers: Ericsson, Motorola, Nokia, Samsung and Siemens. These are well known brands both in China and in the world. But now they all confront challenges from China's rapidly emerging indigenous ICT manufacturers. Within the ICT manufacturing sector, Amoi, Konka, Ningbo Bird and

Keijan are representative of Chinese mobile phone manufactures; Datang is the main TD-SCDMA manufacturer; UTStarcom is the main PAS/PHS manufacturer; Huawei leads the SMS market and ZTE stands out in telecommunications equipment market.

As a crucial part of ICT industry, telecommunications equipment manufacturing is key to the realization of the Chinese national informationalization strategy (Wu and Mu 2005. Thus, the Chinese central government announced that TD-SCDMA, broadband digital mobile communications and the next generation network would be brought under National Development Strategies. So far, China has become the world's largest R&D and manufacturing base and consumer market for mobile communications terminals (Wu 2007). Huawei and ZTE, two Chinese indigenous telecommunications equipment suppliers, have had tremendous impacts worldwide (Everbright 7th January, 2009). Because of their involvement in the global telecommunications equipment market, the original high costs of telecommunications equipment have been massively reduced. Because of the increasing competitiveness of Chinese domestic manufacturers represented by Huawei and ZTE, the structure of global telecommunications equipment manufacturers is gradually changing (Li 2008). Huawei and ZTE are regarded as the pillars of the Chinese national telecommunications sector and the epitome of the global telecommunication sector (Sinolink 14th January, 2009). The sustainability and stability of the development of Huawei and ZTE are of vital significance to the Chinese national telecommunications sector, and to some degree are more of political than economic significance (CICC 9th January 2009; Sinolink 2nd December 2008). Therefore, in this sector, I will stress these two telecommunications equipment suppliers to demonstrate the state of Chinese ICT manufacturing. Unless being specifically pointed out, the data involved in this section mainly came from the official websites or annual reports of

Huawei and ZTE.

Huawei and ZTE (Zhongxing)

Huawei was established in 1988, as a private business which started up by focusing on the rural market. Since 1999, Huawei successively set up overseas research centres in India, Sweden, and the US, and its overseas sales incomes totalled USD 5.2 billion in 2002. In terms of cooperation with other overseas MNCs, Huawei established joint ventures with 3com and Siemens, and secured a substantial contract from the Netherlands' Telfor, which helped Huawei make its first breakthrough in European markets. Its overseas sales income exceeded its domestic sales income in 2005. In the same year, Huawei became the premium telecommunications equipment supplier to UK-based Vodafone and preferred network suppliers to British Telecom (Ji 2008). In 2007, Huawei became the supplier of all top European telecommunications operators (Ji 2007). According to Informa's consultation report, Huawei is ranked number three in the global mobile equipment market, while the market share of Huawei's mobile broadband products is ranked number one in the world. Thus far, overseas sales income has accounted for 75 per cent of its total sales income (Hao 2009). Moreover, Huawei founded 14 research centres throughout the world (Ji 2007). Huawei clearly announced that its final goal is to expand globally.

ZTE is a state-owned and private-run company, which started out by focusing on semiconductor businesses. Since 1995, ZTE launched its internationalization strategy. Guided by this strategy, ZTE obtained cooperation projects from Bangladesh in 1996, and then set up its research centre in the US in 1998. ZTE is also the first Chinese telecommunications equipment manufacturer to win the world's largest turnkey telecommunications project from Pakistan. In 2001, internationalization became one of key strategies of ZTE (Wu 2007). ZTE proposed the 'multinational operators' (MTO) strategy, which signalled that ZTE would develop the mature market in Europe and the US and strengthened cooperation with operators in those NICs (Wu 2007). ZTE had good opportunities in the revival of the global telecommunications sector, which further accelerated the internationalization strategy (Sinolink 2nd December 2008). Wireless-LAN products, transmission equipment and mobile phone handsets have successively entered the markets in India, Brazil and Russia. Moreover, mobile and fiber optic communications equipment helped ZTE make its historical breakthrough in Western Europe. In 2003, overseas sales income for the first half year accounted for eight per cent of overall sales income; while that of the second half year accounted for 59 per cent of overall sales income. The internationalization strategy of ZTE made its breakthrough in 2007, when overseas sales income accounted for 60 per cent of ZTE's overall sales income (Wu 2007). Meanwhile, ZTE became the terminals supplier for top-level operators, such as Vodafone, Telefonica and Telstra, and its cooperation with Sprint Nextel began with Wimax. ZTE made clarifications on its internationalization strategy: overseas newly emerging countries are still the main markets for ZTE; and ZTE will make further investments in marketing and technology in developed countries (Wu 2007). So far, ZTE has been ranked by Forbes as one of the 'best 50 big companies in Asia Pacific'.

After briefly reviewing the development history of Huawei and ZTE, a clear picture emerges: both telecommunications equipment companies are developing their internationalization strategies. It is usually astonished to see their impressive achievements in such a short period as private (or state-owned and privately run) companies in China. The reason is not difficult to answer once we understand how much support they had from the Chinese government.

Firstly, supported by the financial policies of the Chinese government, both ZTE and Huawei confronted more chances than risks. For example, during this global financial crisis, all operators face multiple pressures from increasing costs of financing, decreasing returns on investments, and slowdown of the growth rate. On the one hand, operators have to be inclined to pursue telecommunications equipment with excellent quality and reasonable price, due to rigid demand from performed network expansion and upgrading (Li 2009). On the other hand, operators are more inclined to seek out telecommunications equipment suppliers which can offer financing (Li 2009). In a word, low costs and favourable financing conditions are two key factors to determine whether millions of emerging telecommunications equipment suppliers can obtain contracts. ZTE and Huawei, on the one hand, have advantages on equipment costs and prices; on the other hand, in terms of the financing environment, most European and US suppliers chose multinational banks as their cooperation partners for exploring emerging markets. Both ZTE and Huawei chose either domestic policy banks or commercial banks which are not impacted by the current global financial crisis (Li 2009). These two elements have helped both ZTE and Huawei to win more chances in newly emerging markets for their overseas expansion strategies. In other words, the current global financial crisis leads to poor performance of overseas telecommunications equipment manufacturers, while indigenous Chinese telecommunications equipment manufacturers achieved better performance (Hao 2009). Under conditions of the current global financial crisis, indigenous Chinese telecommunications equipment manufacturers such as Huawei and

ZTE are actually able to obtain a valuable chance to have a better outcome of competition, especially in newly emerging markets.

Secondly, the Chinese central government offers special funds to promote the national informationalization strategy, and urges operators to accelerate the construction of a 3G network. According to Chinese national guiding policies, the Chinese central government encourages and guides operators to make procurements from domestic indigenous telecommunications equipment suppliers for products and services (CEEM September, 2008). The Chinese central government also formulated a series of policies to avoid unhealthy competition. Moreover, along with investments in 3G construction, investment in the fixed assets of telecommunications will be further expedited. In the two years after 2008, investments in 3G will reach RMB 2.8 trillion and investments on telecommunications will reach RMB three trillion in 2009. According to one of the authorities' predications, Chinese indigenous manufacturers will take over 50 per cent of overall market share under any 3G system (Hao 2009). These increasing domestic demands contribute to making up for the decrease in overseas sales income of both Huawei and ZTE. In addition, such increasing domestic demand also provide cash and profits for Huawei and ZTE to further strengthen their overseas expansion strategies (Li 2009). In brief, 3G network construction that the Chinese central government promoted offers a safe harbour for indigenous Chinese telecommunications equipment suppliers (CICC 9th January, 2009).

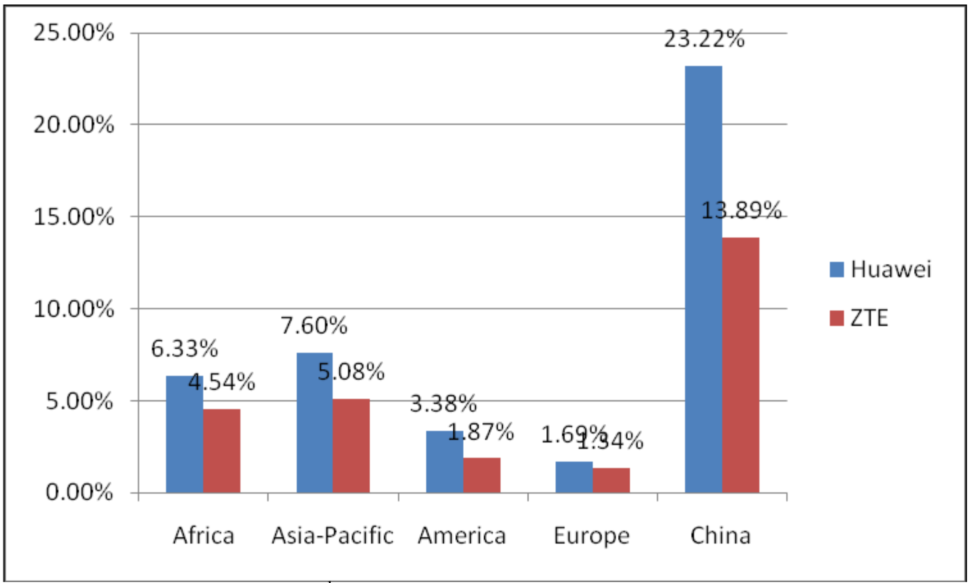
As equipment manufacturers, they benefit from global industries transfer in which advanced countries transfer low-end labour-intensive sectors to places which provide cheap labour and rich resources. They also belong to the earliest group of enterprises that developed with a rate of exponential growth while FDI flowed to China. Although they now attach importance to internationalization strategy, they still win contracts and projects by offering better prices which are based on cheap labour including cheap manual labour and cheap intellectual labour in China (Du 2008).

Moreover, manufacturing centres have been rapidly transferred to China, which greatly drives indigenous Chinese manufacturers to develop suitable products for competition and expansion. It results in intensified competition among Chinese domestic manufacturers. In comparison with MNCs, both Huawei and ZTE are still weak at technological power and business scale. Whether they can seize the opportunity of telecommunications sector transition and update and whether they can realize products update and growth in scale are crucial to their future positions in the global telecommunications equipment market (Sinolink 2nd December, 2008). The current global financial crisis also necessitates ZTE and Huawei to make the transition from quantity to quality. Moreover, the performances that Huawei and ZTE made in advanced countries have impacted on the planning of development strategies and strategic arrangement in their indigenous market of overseas MNCs. Both Huawei and ZTE are now confronting the situation of being forced out. For example, politics is significant in the US, apart from intellectual property disputes. In Europe, though Huawei and ZTE made some achievements in most European Fixed Telecommunications Network Services (FTNS) and mobile handsets markets they are still being forced out in the mobile telecommunications field.

Apart from those challenges mentioned above, both ZTE and Huawei have to consider adjusting their internationalization strategies which are characterized by 'encircling the cities from the countryside', in other words, encircling advanced countries from developing countries and emerging countries (Wu 2007). Because of increasingly severe global financial conditions and consequently shrinking market demand, overseas MNCs, which usually focused on markets of developed countries, now focus on emerging markets. As a result, Huawei and ZTE have to increase their investments in developed countries to optimize their marketing structures and avoid financial risks in emerging markets (Wu 2007).

Although Huawei and ZTE implement very general internationalization strategies, they still have distinctive performances in different regions, which can be seen by the following chart (Chart 4_1):

Chart 4_1 2007 Huawei and ZTE Receivable Accounts/Overall Income



Source: Sinolink Securities 2nd December, 2008

The chart above shows that Asia-Pacific accounted for the highest proportion, compared with all the other overseas markets. On the one hand, it is because of the strategy of 'encircling the cities from the countryside' that Huawei and ZTE put more emphasis on emerging markets. On the other hand, it is related with the rise of Chinese ICT equipment manufacturing that has been motivated by Japan and East Asian NICs, such as Singapore, Taiwan, Malaysia and Hong Kong. These East Asian countries moved their factories to China in pursuit of cheap labour cost.[47] However, we can also conclude from the chart above that both Huawei and ZTE also emphasized Africa and America, while focusing on Asia-Pacific and East Asia. The reason for that is, based on detailed research and according to clear points presented by employees, both Huawei and ZTE indeed created special departments for specific regions which are based on different characteristics of each region.[48] That is to say, both Huawei and ZTE attached importance to the entire world, rather than limit their sights to a specific region. Meanwhile, they designed specific overseas exploration strategies for each individual region; and the 'East Asia' mentioned by both Huawei and ZTE is not totally in line with the definition of the East Asia in EARPNs. [49]

As for ICT equipment manufacturing, China is the largest ICT manufacturing country in the world. Huawei and ZTE are only two representatives of a large number of Chinese ICT manufacturers, both of which can be called successful indigenous private (or state-owned, privately run) enterprises (Hao 2009). They rapidly got rid of the OEM model and independently created their national brands, which, as stressed above, was a similar experience that other East Asian countries had at the beginning of export-oriented economic development. Despite this, both Huawei and ZTE are still positioned at the mid-level of ICT manufacturing and are seeking globally for any possible expansion which could help them enlarge their scales (Wu 2007). In the

[47] During this process, overseas Chinese businesses played significant roles. For example, in Dongguan , Hitachi, Fujitsu, Sanyo, Fuji, NEC, Flextronics (Singapore) and Samsung have settled there.
[48] Personal interview with HA, a senior technician of Huawei, 10th December, 2008, Beijing; Personal interview with ZHE, a senior staff member of CITIC Securities, 5th June, 2008, Beijing and 20th June, 2008, Beijing
[49] Personal interview with HA, a senior technician of Huawei, 10th December, 2008, Beijing

meantime, both Huawei and ZTE have admitted that they are confronting big challenges of increasing costs and decreasing profits while they are trying to further explore overseas markets (Wu 2007). Despite all achievements that Hauwei and ZTE made in exploring overseas markets, they remain at the stage of ‘learning process’ until they are truly capable of exploring overseas markets by the ‘road map’. In a word, profits and national orientation are the major drivers for both Huawei and ZTE to explore overseas markets. In light of the fact that they are still not mature in overseas market exploration, the plans made by both companies are more based on the overall economic level of the region, such as developing and less-developing countries, rather than on the geographic region as a whole.

Moreover, ICT manufacturing sector is the sector that has been deeply integrated into regional/international production networks. Because of continuous industries transfer at regional level and global level, Chinese ICT manufacturing enterprises gained numerous product orders from MNCs by relying on the cheap labour and rich resources. Support from central and local governments indeed play significant roles in accelerating the development of these enterprises in terms of favourable policies in financing and taxation. As emphasized above, they are the members of the earliest group of enterprises that developed with a rate of exponential growth while FDI flowed to China, and they benefit from preferential policies stimulating Informationalization. Compared with other ICT enterprises in China (mentioned in the following section), ICT manufacturing enterprises have much more flexibility in terms of corporation development strategies and making regional / international expansion plans.(Reasons will be explained at some length in the following relevant sections on other case studies)

With support from central and local governments, Chinese ICT manufacturing enterprises gradually develop from low-end labour intensive enterprises to middle and high valued added knowledge-based enterprises. That is essentially related to ICT development in East Asian region and the world. As mentioned above, most Chinese ICT manufacturing enterprises are located at Shenzhen and other reform and opening-up areas, where most enterprises have been deeply impacted by East Asian regional production networks because of changes and transfer in regional / international production networks. For this reason, Chinese ICT manufacturing sector can be regarded as a typical case to prove the applicability of flying geese model.

2 The Software Sector

Overview-- Increasingly Strengthened R&D Power

Chinese government has realized that China is only situated at the end of global production networks while having the lowest value in the total product value chain (Lang 2008). Compared with forerunners in the software sector, in 2005, China only shares 5.5 % of the total global software sector, in spite of having the highest growth rate in the world (IDC 2006).[50] Although the Chinese government has attached great importance to the development of the software sector, China still lags far behind that of the world in general. So far, the Chinese software sector and IT services only accounts for 25.8 % of the total IT industry of the country, while the rate reached 69.9 % in the US (IDC 2009).

During fierce competition with MNCs, indigenous Chinese ICT enterprises, which

[50] 40.3% in 2005, while the average growth rate of world software sector was 12.5%

usually survived by depending on importing key components and devices from the US, Japan and Taiwan, learned that innovation and high quality are the key elements of the outcomes. The Chinese government is also aware of the seriousness of this reality after 30 years of 'Reform and Open Door'. The guideline of the Chinese government has also changed from 'relying on low cost advantages' to 'core technology advantages and low cost advantages'(Zeng 2007). Thus, the development of China's software sector is of great significance when China transfers from 'Made in China' to 'Created by China' (see Chapter Three).

As a matter of fact, the Chinese software and IT service sector is confronting unprecedented opportunities for further expansion. According to IDC (2009), the expenses on IT in most Asia-Pacific countries are still higher than those of other regions in the world. That is because government expenditures were one of the key motivators for IT expenses. Most Asia-Pacific countries' governments are trying to realize informationalization in their administration procedures, considering that IT technology helps to reduce costs and save resources. For example, CCID (2009) predicted that the Chinese domestic telecommunications sector and financial industry will keep increasing their investments in the IT sector. Meanwhile, the Chinese government has just formulated 'Invigoration Plans for Ten Major Industries', which further emphasize the integration of industrialization with informationalization. It implies that traditional industries should be informationalized for better and sustained development (see Chapter Three). In other words, large scale informationalization will be launched in China. Moreover, enormous domestic demand motivated the development of the Chinese software sector. The development of manufacturing industries and services further drove the increase in demand for management software (IDC 2009). On the one hand, the rapid growth of small and middle businesses brought about energetic demands for informationalization; on the other hand, Chinese enterprises were focusing on the expenditures on IT services. Global division of the software sector continued providing a favourable environment for the development of the Chinese software sector (Everbright 7th January, 2009).

The software sector consists of system software, middleware and application software. In terms of technology barriers and profit margins, system software and middleware are higher than application software (Lang 2008). So far, system software and middleware are mainly controlled by international ICT giants such as IBM and Microsoft, while countries like China and India take very positive attitudes in developing their software outsourcing to compete in application software which is easily imitated because of its low technology barriers and low costs (Zeng 2007; Han 2008; Lang 2008). However, low costs and low technology barriers bring about fierce competition in the application software sector, in spite of low profit margins. Only those who are able to bear high R&D costs, high requirements on technology and marketing can be successful in the competitive environment (Han 2008; Ji 2008).

Another significant part of the Chinese software sector is software outsourcing, which has been regarded as a great opportunity for most developing countries including China to further strengthen their ICT power (Zeng 2007). Software outsourcing is very attractive to developing countries, due to its low technology barriers and high investment returns. India gained great shares in the global software outsourcing market for a long period because of her advantages in talent, low labour costs and language. However, China has now forged ahead. Software outsourcing has sprung onto a new economic growth point of the software sector in China (Han 2008). So far, several companies have become involved in this business, especially those located in Beijing, Dalian, Shanghai and Shenzhen. According to CCID (2008) data, in 2005, the scale of the Chinese software market was USD 9.2 billion which accounted for 2.3 % of the global software outsourcing market, an increase of 45.34 % compared with the same period of 2004. The main target markets for most Chinese companies dealing with software outsourcing are Japan and the US.

In the next section, I will take UFIDA and Neusoft as case studies to show how China's indigenous software businesses grew from 'imitating and following' to 'creating and exceeding'. Considering the significance of software outsourcing, more emphasis will be put on Neusoft to show how Chinese software enterprises try to survive and win a place in the global software outsourcing competition. Unless being specifically pointed out, the data involved in this section came from the official website and special report of Neusoft and UFIDA.

UFIDA and Neusoft

No management software companies have gained a big share in China's domestic software market. Microsoft accounts for 8.9%; IBM accounts for 8.6%; while indigenous Chinese UFIDA and Kingdee account for 2.4% and 1.6%, respectively (Cheng 2009). UFIDA is the leading enterprise in China's domestic software sector. UFIDA is a private business established in 1988, and has become the market leader in China after three years. So far, UFIDA has been ranked number one in market shares of both Chinese management software and the enterprise resource planning (ERP) software market for five consecutive years. UFIDA concentrates on application software and gave up R&D on middleware for the reasons of high costs in this area. UFIDA made its breakthrough by focusing on financial management software, and then successfully transferred to become a management software company including ERP. In 2008, the focus of UFIDA's business strategy shifted from product management to customer management. In the meantime, UFIDA paid more attention to mergers and acquisitions, both of which further strengthened UFIDA's position as the market leader in the Chinese software market (Wang 2008). Apart from that, UFIDA deepened cooperation with Microsoft on ISV.

So far, UFIDA is the only company in the world to partner Microsoft on ISV. UFIDA has become the top-level strategic cooperation partner for Microsoft in the world. The cooperation between UFIDA and Microsoft covers combined R&D on product development, technological innovation and marketing channels. From UFIDA's point of view, the fact that UFIDA has become Microsoft's partner on independent software vendors (ISV) shows that UFIDA is even closer to becoming a world-class software business.

Because of strong government support and increasing demand for informationalization, the Chinese software sector has not been seriously impacted by the downturn in the global financial crisis.[51] In 2008, from January to November, the software sector accumulatively produced RMB 6.4 trillion, an increase of 30.8% compared with the same period in 2007. The structure of the software sector has been further improved: software products cumulatively produced RMB 3.08 trillion, an increase of 32 per cent compared with the same period in 2007, while software services cumulatively produced

[51] Personal interviewee with W, a senior staff of IDC, 5th. March, 2009, Beijing

RMB 1.23 trillion, an increase of 38.6 % compared with the same period in 2007 (IDC 2008). Moreover, the exports of software reached a value of USD 125 billion, an increase of 50.3% compared with the same period in 2007, while the export of software outsourcing was valued at USD 11.3 billion, an increase of 48.1% compared with the same period in 2007 (IDC 2008). All the above mentioned illustrates that the Chinese software sector was barely impacted by the current global financial crisis because of intentional protection by the Chinese central government. As a matter of fact, because of 'industrialization and informationalization' which are guided and supported by the policy of 'expand domestic demand, increase economic growth and adjust structure', the Chinese software sector actually gained opportunities to further strengthen its power (Liu 2008).

In the Chinese market, the software sector has the inherent advantage that it can satisfy local enterprises in easily and quickly (Liu 2008). However, as most software service companies put small and middle businesses as their main target customers, these software services companies confronted huge challenges when those small and middle businesses were bankrupted because of shrinking overseas orders (Shang 2008). Meanwhile, the development of the Chinese software sector still faces three major challenges: uncontrolled R&D costs, the loss of R&D talent and uneven resources distribution.[52] As mentioned above, no one enterprise, including international software giants and indigenous Chinese software 'New Star', has actually won the Chinese market.[53] Therefore, Chinese software development enterprises have to consider how to survive and how to win the war with the international giants, before they focus on the overseas markets.

[52] Personal interview with ZU, a senior staff member of CITIC Securities, 19th May, 2008, Beijing
[53] Personal interview with ZU, a senior staff member of CITIC Securities, 19th May, 2008, Beijing

Neusoft was established in 1991 at Northeastern University in Shenyang. So far, Neusoft is the largest supplier of software outsourcing in China and became one of the 'ten newly emerging largest software outsourcers in Asia' and one of the 'ten best performers for IT services in the world'. I detail the development of Neusoft to illustrate the general pattern of Neusoft outsourcing. The original base for Neusoft was a small research office founded by several young professors at Northeastern University. Business cooperation with Alpine (Japan) was explored for technology exports and software outsourcing. In a sense, Alpine was the first international client for Neusoft. In 1991, Opensoft a system development company (belonging to Northeastern University) and Alpine founded a joint venture, which evolved into the 'software centre of Northeastern University' (the first national computer software research centre) after a series of transformations. Supported by the national 'Torch Plan', in 1995, Northeastern University Software Park was founded and approved as the first software base. After that, Neusoft and Toshiba established a joint venture, and in the same year, Neusoft became the first listed company as a software business. Neusoft became involved in more software products fields with domestic SOEs, such as Shanghai Baogang Steel Group. Since 2000, Neusoft has sett up branches in Hong Kong, the US and Japan. Also in 2004, Philips, Intel and SAP became involved in strategic investment with Neusoft.

By reviewing the history of Neusoft, two key factors are found. The first is the support from overseas MNCs, especially cooperation and support from Japanese corporations. Alpine (Japan) took a crucial position in the establishment of Neusoft. Alpine provided a USD 30 billion investment to set up cooperation projects in the early stages of Neusoft. Neusoft's cooperation partners include at least 20 Japanese companies, such as Toshiba, NEC, Hitachi, Sony, and Fuji. Most of these Japanese companies have kept long relationships with Neusoft. For example, the cooperation between Toshiba and Neusoft continued for over 10 years, and almost 10 per cent of Toshiba's software outsourcing business is given to Neusoft each year. Although Neusoft has contributed to exploring more overseas markets in the US and Europe, Japan maintained its significant position in Neusoft. The above demonstrates that, based on this particular case of Neusoft, Japanese MNCs indeed played crucial parts in the development of Chinese RPNs.

The second key factor for the development of Neusoft is support from central and local governments. As mentioned above, reform of joint stock companies was launched in Neusoft in 1992 and Neusoft became a listed company in 1996. This motivated domestic business operations of Neusoft and helped Neusoft rapidly grow to become the largest software supplier in China. Both the first national software research centre and the first university software park are located at Neusoft. With the increasingly mature software park and software base which were both supported by the government's 'Torch Plan', the company have realized its 30 per cent increase in sales income of software outsourcing business.

China has recently advanced from its infancy stage in the software development industry by taking advantage of technology transfer and technology assistance from other advanced countries. Both UFIDA and Neusoft have not actually obtained core technology from their corporate partners thus they are now focusing their sights on the domestic market. Their development strategies are still focused on mid- and low-end software development and the emphases of their marketing strategies are still on the businesses within the Chinese market. In a sense, even the most well-established

Chinese software development companies have not yet become leading regional or global software companies. In brief, Chinese software development businesses target the domestic market, while simultaneously they explore any possible cooperation with well-known MNCs to further strengthen their power.

As for Chinese software enterprises, they have similarities with Chinese ICT manufacturing enterprises. On the one hand, both of them gain benefits from regional / international division of labour and have the possibilities of leap-forward by absorbing advanced technologies. That helps them integrate into regional / international production networks more easily, by which they become inseparable parts of regional production networks. On the other hand, different from normal catching-up and the following continuous transfer process that are argued by the flying geese model, Chinese software enterprises mainly focus on domestic markets rather than overseas expansion after they finish 'catching-up' process. That is because software markets have strong regional features in terms of demands on software design. It is also because of the limitation in the level of R&D, which leads to much higher threshold for later-comer to access overseas markets.

As far as Chinese software sector is concerned, the development at early stage conform to what is described in the flying geese model, as this sector was deeply impacted by MNCs, especially MNCs from East Asian region, in the primary stage of development. However, as these software enterprises grow and develop stronger, they have not started the process of 'transferring to overseas markets where low labour and resources costs exist'. In the meantime, they still keep getting continuous support from MNCs and gradually establish cooperation with MNCs. By this means, these Chinese software enterprises are still the inseparable parts of regional production networks by outsourcing and relevant cooperation and they successfully gain dominant positions in Chinese domestic market. Unfortunately, they are only dominant in the domestic market. Under these circumstances, flying geese model does not apply to Chinese software sector perfectly.

3 The Telecommunications Sector—China Mobile

General Review—Typical State Monopoly

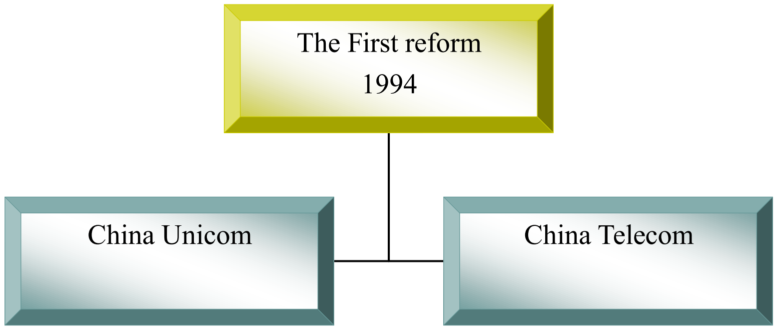
Compared with the above two sectors, the telecommunications sector has special characteristics, especially in China, not only because of its sector's nature, but also because of the enterprises' nature of SOEs. The Chinese telecommunications sector's growth rate was approximately 20 per cent between 1997 and 2002. This is double China's GDP rate (Wang and Werker 2004),[54] and is the strongest and fastest growth rate in the world for this industry (Sautedé 2002).[55] In 2003, total investment on network infrastructure by fixed-line operators and mobile operators was an average of USD 25 billion, which was more than western European carriers have invested together (Kang 2009). In terms of both network capacity and the number of subscribers, with 1.3 billion citizens, China owns the world's largest fixed-line and mobile networks.[56]

All the achievements that the Chinese telecommunications sector has made are closely related with three big reforms within the Chinese telecommunications sector. The initial

[54] J. Wang and C. Werker, 'Telecommunications Equipment Market in China.' STAT-USA Market Research Reports. 2004
[55] E. Sautedé, 'Telecoms in China: Towards a Post-WTO Shock Therapy?' in China Perspectives. 2002
[56] 'China: Telecommunications.' US Commercial Service. 2003

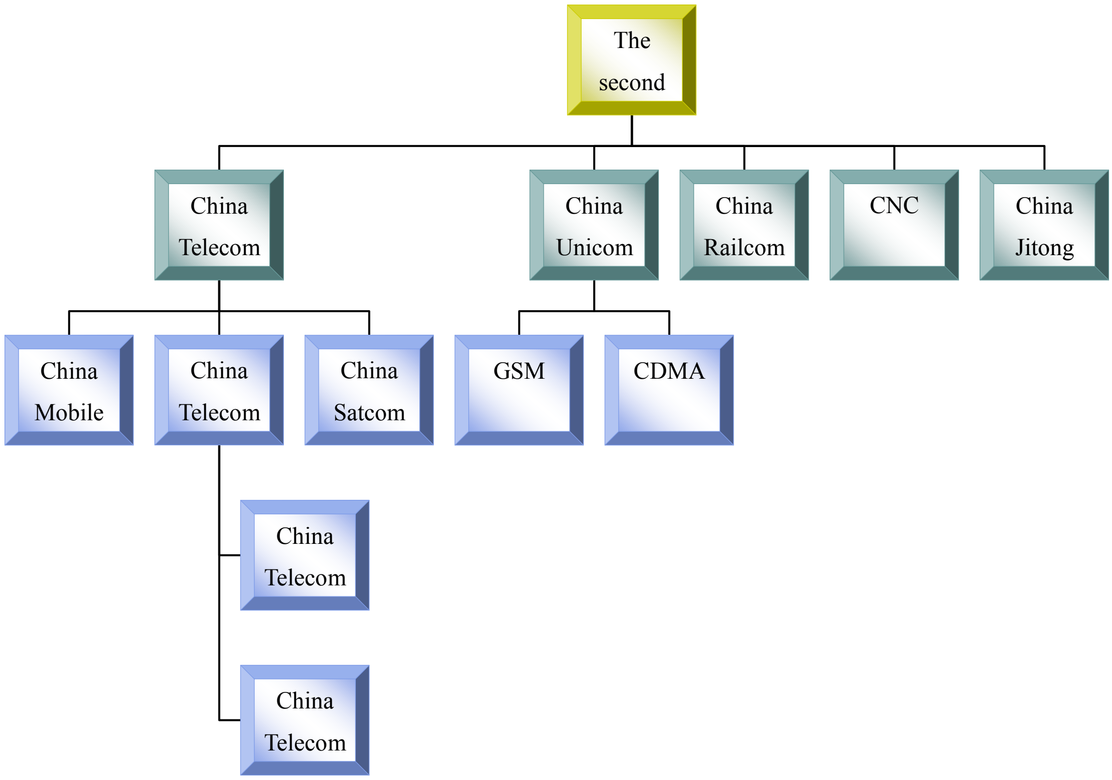
target for these reforms was to break the monopoly of any one telecommunications enterprise. I would like to show these three big reforms by the following chart, which is based on various years official documents.

Chart 4_2 The First Reform On Chinese Telecommunication Sector



As shown in above chart (Chart 4_2), after the first reform (1994), China Unicom was established, which altered the original Chinese telecommunications environment in which China Telecom monopolized the entire market.

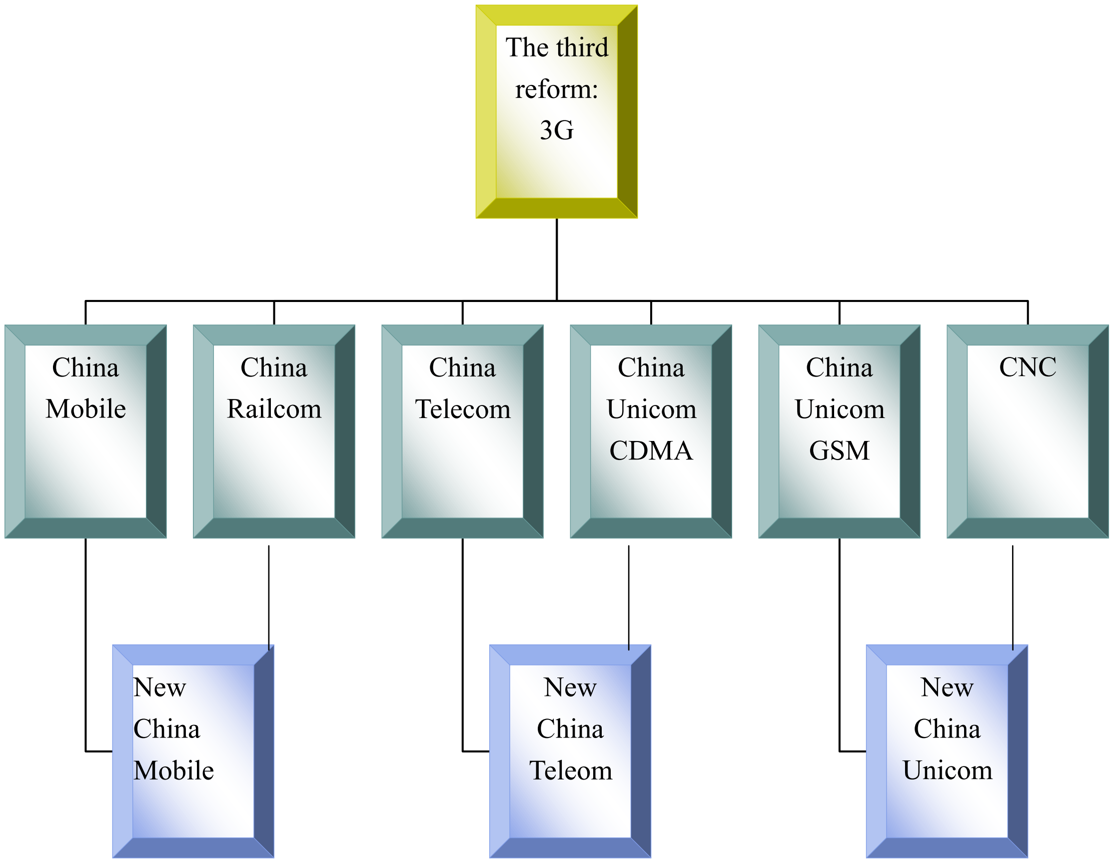
Chart 4_3 The Second Reform On Chinese Telecommunication Sector



As shown in above chart (Chart 4_3), the second reform restructured the telecommunications sector. In this reform, China Telecom's business was split into three parts including fixed-line, mobile and satellite. As a result, China Telecom continued to be a monopoly of fixed-line services. China Mobile and China Satcom were created to run the mobile and satellite sectors, respectively. With the purpose of changing the monopoly position of China Telecom, the company was geographically split into two parts: North China Telecom which kept 30 per cent of the network resources and formed China Netcom (CNC), and South China Telecom (or New China Telecom) which kept 70 per cent of the resources. The second reform focused on China Telecom's fixed-line (landline) separation with the purpose of changing the monopoly position of China Telecom. As a result, six telecommunications carriers in total began operations in the

Chinese telecommunications sector.

Chart 4_4 The Third Reform On Chinese Telecommunication Sector



The latest reform (as shown in Chart 4_4) is targeted at preserving and increasing the value of state-owned assets, developing domestically designed 3G, balancing telecommunications businesses in all carriers and promoting competition. The latest reform was still mainly executive-led but carried out by market-oriented operations (Wu 2007). Except for China Satcom that concentrates its business on satellite communications, the strength of the other three telecommunications carriers all increased, although New China Mobile and New China Telecom appear to be a little bit stronger than New China Unicom, in terms of comprehensive competitiveness (Sinolink

2007).[57] By reviewing their historical performances, China Mobile and China Telecom were still ranked above China Unicom in terms of operating revenue: RMB 1.67 trillion, RMB 886.2 billion and RMB 496.3 billion in 2007, respectively (Sinolink 2007).[58] On the 2007 Global 50 Telecommunications Carrier's rankings, China Mobile was ranked eleventh, followed by China Telecom which was ranked fifteenth. In a word, China's current telecommunications sector is monopolized by China Mobile, China Telecom and China Unicom. Next, I will use China Mobile to present the current picture of the Chinese telecommunications sector. Unless being specifically pointed out, the data involved in this section came from the Year Reports and the official website of China Mobile.

China Mobile

China Mobile belongs to large-sized SOEs. It is well-known throughout China and is one of the most important taxpayers for both central government and local governments at all levels. China Mobile was first established in 1997 in Hong Kong, and was listed in both the Stock Exchange of Hong Kong Limited and New York Stock Exchange. China Mobile is the largest telecommunications supplier in China, and has the largest group of mobile users and largest scale of mobile telecommunications network in the world. Its market share in China accounts for 69.3%. The net profits of China Mobile exceeded the sum of all the other telecommunications operators. It has been ranked in the *Financial Times'* Global 500 for several consecutive years. In 2007, the market value of China Mobile first successfully exceeded Vodafone which was the leader of international telecommunications, and was ranked number one of global

[57] Based on Sinolink Securities Statistics 2007: 'Comparative Analysis on Comprehensive Competitiveness on Telecommunication Carriers after Reform.'
[58] Based on Sinolink Securities Statistics 2007: 'Performances of Four Big Telecommunication Carriers in 2007.'

telecommunication operators.

Although China Mobile has over half of the Chinese telecommunications market, China Mobile had to make provisions for rainy days. Within the domestic telecommunications market, China's major telecommunications operators have been continuously making huge amounts of investments in relevant telecommunication businesses and infrastructures. For example, the proportion of telecommunications investment and telecommunications income was 78.6% in 2001. As a result, the telecommunications market in major cities is going to be saturated. China Mobile then decided to explore markets in rural areas. At the same time, China Mobile also set its sights on the overseas market. As a matter of fact, the global telecommunications sector has been confronting fierce competition and razor-thin profits. Only by the effect of large-scale operations, can telecommunications operators survive. According to Wang Jianzhou (2005), CEO of China Mobile, China Mobile had adopted the strategy of 'going out', by which China Mobile would find new opportunities in other developing countries.

China Mobile believed that its global competitiveness would be increased by various overseas acquisitions. All the attempts at overseas acquisition are supported by the abundant cash flow of China Mobile, which China Mobile is strong enough to provide. According to the 2008 performance report of China Mobile, the profits of China Mobile were RMB 1.13 trillion, an increase of 30 per cent compared with 2007. Moreover, China Mobile believes that it is the right time for overseas acquisitions considering that most companies are confronting decreasing market values due to the current global financial crisis. However, China Mobile is still confronted by fierce situations in which competitors prevent China Mobile from accessing their markets for the purpose of avoiding even more intensified competition.[59] Meanwhile, these acquisitions have also been held back by national governments which are worried about the rise of China (Kong 2008).

Apart from all these challenges from overseas markets, China Mobile has to deal with the very special domestic situation because of its status as a SOE. Before going into further detail, I would like to go over and emphasize specific background relevant to China Mobile (see Chapter 3). Considering the complicated and opaque relationships between the MII, the SASAC, the Ministry of Finance (MOF) and other stakeholders, China Mobile is far from being a truly independent business. For example, the senior executives of Chinese Mobile would not be assigned without approval from the MII, the SASAC, and the CCCPC.[60] In short, government intervention is deeply integrated into the business operations of China Mobile, either in the form of protection or in the form of restriction.

As an enterprise in the national priority sector and the national pillar sector, China Mobile has been wholly protected from the involvement of FDI, except for the foreign equipment vendors.[61] Moreover, central authorities only allow and approve investments related to technology transfer.[62] Prior to China's WTO accession, all international telecom carriers were wholly banned from market accession in China. After China became a member of the WTO, according to WTO regulations, Chinese telecommunications carriers market was gradually opened to foreign investors. But one of the prerequisites for the foreign investors who would like to enter the Chinese market

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[59] Personal interview with XU, a senior staff member of China Mobile, 22nd December, 2008, Beijing

[60] Personal interview with D, a senior officer of SASAC, 22nd July, 2006, Beijing; and personal interview with Z, a senior officer of MII, 25th July, 2006, Beijing

[61] Personal interview with XU, a senior staff member of China Mobile, 22nd December, 2008, Beijing; and personal interview with ZH, a previous senior staff member of China branch, Nokia, 21st November 2007, Beijing

[62] Personal interview with XU, a senior staff member of China Mobile, 22nd December, 2008, Beijing

is to find a Chinese partner to form a joint venture; and the Chinese partner should be preferably one of the major carriers.[63] As mentioned in previous chapters, foreign investors have been allowed to set up joint ventures, with investment up to 50 per cent in the internet services sector in the entire country, up to 49 per cent in the mobile sector in 17 major Chinese cities and up to 25 per cent in fixed-line basic services in Beijing, Shanghai and Guangzhou (Sharkey and Wang 2003). However, based on personal interview with a senior member of staff who once helped Nokia explore the Chinese market, Nokia finally got no more than 25 per cent share in their joint venture after going through the complicated negotiating procedures, government bureaucracy and overlapping 'guanxi'.[64] In a word, as a sector that is regarded as a state monopoly, policies will still ultimately go in the direction conducive to SOEs in the course of implementation. Bearing in mind such a background, it will be easier to understand the case study on China Mobile.

As a result, China Mobile is one of the large-sized SOEs unlike ICT equipment manufacturers and software development companies which work independently of overseas acquisitions and purchases. Telecommunications operators are guided and supported by the government and they are a significant part of the strategies for the national economy and trade. Therefore, China Mobile's overseas acquisition strategy is also included in the national 'going out' strategy. In early 2005, the MII identified 'going out' as a very important part of the national strategy. The MII worked together with the Chinese Academy of Telecommunications Research (CATR) on the road map for the whole ICT industry. As for the telecommunications sector, 'telecommunications enterprises should go to those countries which are closely related to China in economy

[63] Personal interview with XU, a senior staff member of China Mobile, 22nd December, 2008, Beijing; and personal interview with ZH, a previous senior staff member of China branch, Nokia, 21st November 2007, Beijing

[64] Personal interview with ZH, a previous senior staff member of China branch, Nokia, 21st November 2007, Beijing

and trade'. That was the essential reason that China Mobile first launched its overseas acquisition of Pakistan Telecommunication in 2005 (See below). As a matter of fact, China Telecom's strategy on the Greater Mekong Sub-Region was also guided and supported by central government.[65]

As a matter of fact, in response to that call from the MII and the 'going out' strategy, China Mobile started overseas investments and acquisitions in 2005, but those attempts ultimately failed. In June 2005, China Mobile launched its first large-scale overseas acquisition—26 per cent share of Pakistan Telecommunication. Although China Mobile finally failed in this acquisition, it was the first attempt in going abroad for China Mobile. Later in August 2005, China Mobile independently competed for the bid of a 49 per cent share of Uzbekistan Telecommunications. China Mobile was also included in the invitation to tender by Yemen GSM Licenses. Moreover, in 2006, China Mobile intended to purchase Millicom (Latin America and African telecommunications operator). It was also said that China Mobile had a detailed acquisition list which focused on newly emerging markets, especially in India. However, all these attempts at overseas acquisitions finally ended up without anything until the 2007 Paktel acquisition, by which China Mobile obtained an 88.86% share of Paktel for USD 2.84 billion. This was China Mobile's first successful overseas acquisition. Recently, China Mobile has been seeking new partners to purchase part of MTN which is the largest telecommunications company in Africa, and whose overall value is going to be USD 20 billion. So far, China Mobile is the only telecommunications operator in China which has made successful overseas acquisitions.

[65] Personal interview with X, an officer of MOFCOM, 10th December, 2008, Beijing

As a latecomer in overseas acquisitions, China Mobile has been clear about its interests in overseas acquisition, particularly on Asia, Africa and Latin America (Wang 2008). However, China Mobile has not had a very clear strategy or plan over its acquisition strategy either globally or regionally. According to Chen Jinqiao (2005), a telecommunications expert in China, the direction of China Mobile's overseas acquisitions is from Middle Asia to West Asia (from India to Pakistan to Uzbekistan to Yemen). This 'direction' is only a 'guess', since it is only based on analysis of telecommunications experts, but not approved by the decision making of China Mobile. The reason for China Mobile to focus its overseas strategy on Asian countries is the great market potential in these countries and their geographic proximity.[66] It is also because of the even closer relationships between countries in this region, which the Chinese central government goes to great lengths to maintain. China Mobile, as the key player in the national pillar industry, has a clear responsibility to support the Chinese central government by various kinds of economic activities. [67]

In short, as the largest Chinese telecommunications operator, China Mobile has just started its 'going out' strategy, which did not actually have a detailed plan. Almost all the targeted overseas markets that China Mobile is interested in, such as India, Pakistan and Brazil, are also the targets of advanced countries. Competition for these newly emerging markets will become fiercer. However, as a SOE in China, China Mobile fully enjoys policy protection and preferential policies at the central governmental level. That is because the 'going out' strategy of China Mobile is included in the national 'going out' strategy. As a result, China Mobile is powerful enough to make any possible expansion globally, as long as this is supported by the government. The key problem for

[66] Personal interview with XU, a senior staff member of China Mobile, 22nd December, 2008, Beijing; and personal interview with L, an official of MOFCOM, 19th March, 2008, Beijing

[67] Personal interview with L, an official of MOFCOM, 19th March, 2008, Beijing

China Mobile is that it lacks enough authority in choosing the acquisition targets since its targets might not have been included in the national 'going out' strategy. In summary, China Mobile's overseas acquisitions have to be authorized and limited by government. Both the development route of China Mobile and overseas market exploration essentially show the will of the State but not the will of the enterprises.

Moreover, as the key representative of the Telecommunication sector, China Mobile's case also shows a slight different story from what described by the flying geese model. As emphasized above, China Mobile was strongly supported by Chinese central government, either in terms of early stage of development or in terms of later stage of internationalization. The Telecommunication sector, represented by China Mobile and other large state-owned telecommunication enterprises, has been tightly protected and closed supervised. Although MNCs might possibly have impacts and can be integrated into the development of Chinese telecommunication sector by equipments purchasing process, foreign investments have not been that influential in the Telecommunication sector, compared with their influences on ICT manufacturing sector and the software sector. The power of state intervention is much greater than the self-reliance and strenuous efforts made by these Chinese state-owned telecommunication enterprises. It is Chinese central government that goes to great lengths to support and drive the large scale Chinese state-owned telecommunication enterprises to go aboard and to be integrated into regionalization and internationalization. The arguments of the flying geese paradigm do not apply to the development of Chinese telecommunication sector. It is for that reason that the flying geese model does not perfectly work here.

4 Summary of this Section

Indigenous Chinese enterprises are doing their utmost to develop both the domestic market and overseas markets. However, these indigenous Chinese ICT enterprises have to deal with great challenges from MNCs in the domestic market. Meanwhile, being limited by their capabilities and the reality of overseas markets, indigenous Chinese ICT enterprises usually focus their sights on the newly emerging markets or less-developed countries, which are also regarded as places of strategic importance for the advanced countries. The above five case studies on ICT manufacturing, software and IT service sector and telecommunications sector cannot cover all Chinese ICT enterprises. As the representatives of each sector, their growth trajectories are very typical of each sector. No sweeping generalization can be made on both the operation of Chinese ICT enterprises overall and their overseas strategies. One of the key impressions made from above case studies is that the overseas strategies of Chinese ICT enterprises were mainly controlled by the Chinese central government. That is true, but not entirely correct. The reason is that all the indigenous Chinese ICT enterprises mentioned above, apart from China Mobile, are mainly private enterprises. For these private enterprises, the MII and other relevant institutions in the Chinese central government are usually used as government negotiators for these private enterprises to have the most favourable conditions for market access in their target countries.[68]

D. Summary of This Chapter

Since the early 1990s, relevant policies and regulations on FDI have been released in

[68] Personal interview with X, an officer of MOFCOM, 10th December, 2008, Beijing; and personal interview with L, an officer of MOFCOM, 19th March, 2008, Beijing

China. As a result, a large number of MNCs have come to China to seek cheap labour costs, cheap resources and to explore the massive market. The ICT industry, as one of the very earliest industries which implemented 'limited opening up', has cumulatively utilized large amounts of foreign investments. Despite the adverse effects brought by MNCs, the fact that MNCs transfer their low-end and sunset industries' sectors to China successfully makes China the well-known factory of the world. Indigenous Chinese ICT enterprises have been exceptional in the large-volume and low value-added stages of final production including assembly and processing. In a word, the inflow of FDI, on the one hand, helps China's ICT industry gain a jump-start both in exports volumes and in production scales. On the other hand, because of the MNCs' tight control on core technologies and Chinese indigenous enterprises' laziness in climbing the value chains, the development mode of the Chinese ICT industry has long been dominated by MNCs. It also shows that indigenous Chinese ICT enterprises constitute an important part of the RPNs that are controlled by the MNCs.

With the major support from Chinese Central government in creating favourable conditions and establishing a sound environment for the relevant industry to flourish, the early stage of Chinese indigenous ICT enterprises' development mainly depend on supports from Chinese central government and local governments. As these indigenous Chinese ICT enterprises grow up and gain more strength, support from Chinese central government and local governments is still of significance, though strategies and internationalization efforts made by the enterprises are even more important with regard to RPNs development. That is more applicable to those private enterprises, such as Huawei and ZTE mentioned above. As for the large scale SOEs including China Mobile, they have not had full freedom and flexibility in strategies for companies' development, despite the separation of government from enterprises, transformation of government functions and changes in its working methods and work style.

Indigenous Chinese ICT enterprises benefited from the deep integration with global production networks, while they also learned how to confront the challenge brought by this deep integration. With China's increasing openness, overseas investors will gradually be treated on a par with their counterparts in the mainland. Tempered through years of failures, indigenous Chinese ICT enterprises have gained much experience. Many of these ICT enterprises are not satisfied with the achievements that they have made in China, therefore they continue exploring for more markets as MNCs do. Taken together, the various indicators suggest that the overall Chinese ICT enterprises have the qualifications to take the places of some worldwide well-known MNCs. Members in East Asian region felt the impact of the arrival of Chinese FDI, but it is still too early to conclude that China has replaced Japan and the US as the major capital exporting country. Moreover, it is not what it seems on the surface if we analyze Chinese ICT enterprises in three independent sectors

As the case studies above have shown, although China has already been the largest ICT manufacturing country, most enterprises in Chinese ICT manufacturing are generating revenue by seizing overseas orders and struggling with razor-thin profits in global production networks. The two most successful indigenous Chinese ICT manufacturers, Huawei and ZTE, indeed made outstanding performances in middle and downstream manufacturing sectors. However, so far, they remain at the learning process stage.

As for the software development sector, almost all enterprises dealing with software development in China put their sights on domestic Chinese enterprises. Although the Chinese government announced a series of policies to promote the integration between industrialization and informationalization, it is still difficult for indigenous Chinese software development enterprises to enter the high-end software development market. This is because these Chinese software enterprises choose to focus on low- or middle-end software R&D in the very initial period. As a matter of fact, it is not easy for any enterprises gain high-end R&D capabilities in a very short period. As for UFIDA and Neusoft, they already gave up this high-end part of business early in their development strategy. As a result, it is still hard to say if they can keep their territory while confronting great challenges from the well-known international software development giants.

As for the telecommunications sector, because of close relations with relevant ministries and the Party's intervention, Chinese telecommunications enterprises can hardly be considered as independent enterprises. As shown above, both appointments of managers and development strategies would not be implemented without ministries' and Party's approval. Based on the mass number of users and markets, supported by the government's preferential policies and exclusive policies, Chinese telecommunications enterprises still became telecommunications giants in the world in terms of scale, profits and users. However, except for China Mobile, no other telecommunications enterprises have been involved in overseas expansion, in spite of the 'going out' strategy proposed by the Chinese central government. Even China Mobile is still in its early stages of overseas expansion. Thus far, no clear overseas expansion strategies or plans have been officially announced in public.

To sum up, China, subjectively or subconsciously, follows the developmental path of Japan and the Four Dragons in which it starts from export-led industrialization in the global information economy. Under the combined effects of the Chinese central government, MNCs and the efforts of indigenous Chinese ICT enterprises, China’s ICT industry has leaped over several stages in the flying geese paradigm. That is why more and more merger and acquisition cases are led by indigenous Chinese ICT enterprises. However, due to the timing and distinctive development modes of China’s ICT industry, most successful Chinese ICT enterprises put their sights more onto the emerging markets, such as Brazil and India, and underdeveloped markets, such as Africa, in their investment strategies. In the meantime, they continue strengthening their power by relying on MNCs that continuously provide partly-finished products (mainly from East Asian countries, like Taiwan, Hong Kong, Malaysia and Singapore), and offer technological cooperation and support (mainly from Japan, Korea, Taiwan and Singapore) in high-end products. In short, indigenous Chinese ICT enterprises mainly stayed at the middle of both EARPNs and international production networks.

CONCLUSION

This thesis has attempted to examine the impact of China on EARPNs, with regard to its rapidly developing ICT industry. As mentioned at the very beginning of this thesis, discussions about the rising power of China are not new and cover issues as varied as the environment, human rights, military threats and economic issues (Robert J. Art 1991; Brown, Lynn-Jones et al. 1996; Buruma, Faison et al. 1996; Goldstein 1997/1998). It is clear the Chinese Government has pressed ahead with its industrial upgrading and industrial structural adjustment. Emerging Chinese enterprises have played their part and China's domestic market is increasingly essential for the economic well-being of the world economy (Ge and Li 2005). The government and businesses have gradually played a more significant role in the processes of relocating and re-clustering, which are influenced both by globalization and ongoing East Asian economic regionalism. The economic growth of China has gradually led to more commentaries assessing the shifting balance of power in the global political economy, especially in the East Asian region (Breslin 2005: 735). Accompanied by rapid economic development and major investment and trade opportunities as a result of its Open Door policy, China's economic growth potential and China's size have led scholars to conclude that China poses a threat at a range of levels (Cable and Ferdinand 1994). As stressed in previous chapters, within East Asia the growth of China's economy impacts profoundly on both the structure of the regional political economy and the developmental trajectory of each country in the region (Breslin 2005: 737). China's neighbours in particular are anxious about China’s future projects (Cable and Ferdinand 1994). At the same time, many of these states recognise the need to be part of China’s economic and political growth, for their own survival.

However, what exact impact does China bring to EARPNs as a result of its rapidly developing ICT industry? To be more specific, do changes in China’s ICT industry reshape the existing RPNs in East Asia, which for a long time saw Japan as the key actor (Ge and Li 2005)? In discussing these questions, this thesis has examined how China’s integration in the dynamic international production networks contributes to its increasing economic power. By examining the efforts made by the Chinese central government and Chinese enterprises, this thesis has addressed how the increasing economic power in turn impacted on the EARPNs in the ICT sector This thesis used a refined flying geese model to illustrate these changes. Flying geese model has been continuously criticized from various aspects and some scholars find application of the original paradigm to EARPNs to be relatively outdated, mainly because they do not consider RPNs to be a significant part of international production networks. Although the refined flying geese model indeed has some shortcomings in explaining some phenomenon in practice, this thesis has shown that a refined flying geese model does in fact offer a complex means for understanding the overlapping areas of trade, investment and division of labour. Originally considered to be a theory of economics, it has been modified to integrate various elements of political economy, such as regional integration and the influence of leading countries. The model centres on comparative advantage and production cycles, through three levels of development: upgrading domestic industries; inter-country transfer of industries; and rise and fall of powers in the world economy. The level of inter-country transfer of industries is usually regarded as the basis for Japan's particular brand of the flying geese model. Based on Japanese comparative advantage, Japan's large scale FDI and technology transfer to other East Asian countries were regarded as the key reasons for the rapid economic development in the region. Continuous industrial structural adjustment and the upgrading of Japan's production cycle, was followed by the Four Dragons and then the NICs. This process essentially drove the development of the EARPNs. The international political and economic environment also provided favourable conditions for such a development model. Triangular trade between the US, Japan and other East Asian countries helped to establish the initial bases for the flying geese development model.

As mentioned at the beginning of this thesis, the wave of IT revolution represented by the emergence of the ICT industry accelerated the development of economic globalization that is characterized by the rapid expansion of international production networks. Wintelism proved to be an important approach for emphasizing how countries can climb up to higher stages of international production networks by taking control of one key part of international value chains or international supply chains, even when they are not strong enough to compete with powerful countries in terms of their overall economic capabilities. In a word, as emphasized in Chapter One, every country in an RPN has the chance to take a leading role by jumping ahead of others, because it is easier to gain access to advanced technology in international production. Because of the rapid development of the ICT industry, the conditions for maintaining a flying geese paradigm have changed. With the emergence of the ICT industry, a new direct international division of labour appeared between the US, the NICs, the ASEAN countries and China. In other words, these countries directly became part of international production networks, without being limited by EARPNs. At the same time, economic recession and poor performance in industrial upgrading have weakened the role of Japan as the leading goose. The conservative technology transfer and decreasing FDI from Japan to East Asian countries also made EARPNs gradually approach the position of losing their leading goose. Because of this situation, the flying geese model needed to be modified.

The original flying geese paradigm was indeed seriously challenged by the emergence of the ICT industry. The rise of the ICT industry led to massive vertical intra-industry trade in parts and components within East Asia, which, in turn, promoted regional economic interaction and accelerated even closer connections between East Asian countries. As Hymer argued (1975), MNC that plays as one of key agents in RPNs can locate different activities in different locations. Countries within East Asian regional production networks have more chances to climb the development ladder more quickly, because they have more opportunities to get directly involved in vertical specification and horizontal cooperation simultaneously. As a result, in the refined flying geese model the cyclical process is not always sequentially transferred in the order of strata from higher levels to lower levels. The order of the catching-up process can change because of the dynamics of comparative advantage. At the same time, the processes of the transfer to catching-up countries are even faster and several transfer processes can happen simultaneously. As a result, although the rapid development of the ICT industry in the global economy sped up the cyclical process of EARPNs, the catching-up process continues to be driven by a hierarchical division of labour based on comparative advantage.

The original flying geese paradigm emphasizes that EARPNs emerged in a dense and highly elaborate form, based on varied production capabilities and thus a high degree of intra-regional complementarity (Borrus, Ernst et al. 1999). One of the outstanding aspects of the East Asian economy was that production was constituted by several sequential processes, and these separate production processes were located within a country or across several countries (Hiratsuka 2008). As emphasized in Chapter One, the precondition for the flying geese paradigm is the status of each country within a region. Apart from geographical proximity, one of the key factors that contributes to the development of EARPNs is the diversity of the East Asian economies (Zysman, Doherty et al. 1996: 27). Because comparative advantages are based on such diversity, more advanced countries can transfer sunset industries, sectors and technologies to the newly emerging countries. These countries will subsequently become stronger by adopting those comparatively new technologies. In this cyclical process, the economy of all countries in a region will gradually and successively be driven by advanced countries.

In short, the flying geese paradigm is essentially about transfers to catching-up countries. This, too, remains the case in the ICT sector. The catching-up process still plays a crucial role, since all countries cannot possibly rise up to the same tier simultaneously, both in terms of entire industries and in terms of parts of production networks. In the light of the essence of catching-up, which is based on dynamic comparative advantages, the model still has an explanatory power. In brief, because of the nature of catching-up, the flying geese paradigm still plays a significant role in EARPNs.

EARPNs can facilitate the economic development of a country or circumscribe a country at a particular stage of economic development. However, the performance of national government and indigenous businesses sheds lights on both how a country can fully take advantage of comparative advantages that include improving institutions, large markets, abundant resources, cheap labour and emerging technology powers. It also sheds light on whether such a performance can finally exert an influence on EARPNs. Throughout the whole process, market forces, including private trade and investment flows, as well as the policies and decisions of companies, are the key driving forces for EARPNs (Ernst 1994).

As argued in Chapters One and Two, RPNs imply state-to-state relationships, business-to-business relationships and relationships between states and businesses. In addressing these different levels, the Chinese central government has put great efforts into making improvements in institutions, policies and regulations and launching practical plans and strategies for the sustainable development of the Chinese ICT industry. As a result, the crucial role of the ICT industry has been established by both institutional reform and government policies to support it. For example, the core state policies are to ‘energetically develop the ICT industry’ and to ‘energetically promote IT application and use IT to propel and accelerate industrialization’. In practice, these policies ensure that the ICT industry plays a central role in promoting China’s national economic development. As mentioned in Chapter Three, with support from central and local governments, the Pearl River Delta, the Yangtze River Delta and Zhongguancun in Beijing have already been recognized as new global hubs for the ICT industry. These efforts also establish a more favourable domestic environment for the large quantities of FDI and the relatively advanced ICT technology from the US, Japan and other advanced countries (including other East Asian countries) to flow directly to China. In brief, by improving the domestic political and economic environment, China has been directly integrated into the international division of labour, which has helped China’s ICT industry absorb funds and technology and enabled China to catch up with the leading goose sooner with regard to the development of ICT industry.

Meanwhile, China has taken advantage of being a big country and played an active role in EARPNs. In addition to the policies demonstrated in this thesis, China also wields its enormous domestic market as leverage when promoting its own independent ICT standards. This strategy has created artificial barriers for both trade and investment with other countries, whilst contributing to China’s lead status within the region with regard to R&D. At the same time, as discussed in Chapter Three, the Chinese central government has sought to build favourable relationships with its neighbours, in order to eliminate trade conflicts and further drive possible cooperation. As examined in Chapter

Three, the enormous domestic market and expanding FDI outflows are the key reasons for other East Asian countries to seriously consider strengthening cooperation with China, which has engendered teh creation of closer connections within the East Asian region. Trade statistics shown in Chapter Three demonstrate that the current ICT trade pattern in East Asia has changed from heavy dependence to less dependence on outside markets. The series of cooperation programmes and agreements examined in Chapter Three also show that the Chinese central government has transformed from being passively integrated into regional cooperation to actively and voluntarily taking part in East Asian regional cooperation with regard to the ICT industry. Time is still needed to test the effectiveness of this cooperation, but the Chinese central government appears to be acting on its pledges to enhance regional cooperation.

As examined in Chapter Four, Chinese indigenous businesses have been supported by the Chinese government at all levels and enjoyed the active support of MNCs. They have succeeded in becoming significant parts of the international production networks of those MNCs, especially the MNCs from Japan and other East Asian countries. All of these help explain how changes in the Chinese ICT industry occurred in the context of RPNs. In short, China's industrial structure is a key part of EARPNs. After 30 years of development since the 1978 Open Door policy was launched, the overall multi-level ladder-like structure within the Chinese economy shares similarities with the industrial structures of other East Asian economies. Because of the overall industrial structure of China, China is equipped with production bases for the development of both a vertical division of labour and the a horizontal specification of labour. In other words, China is capable of being competitive, not only in labour-intensive and capital-intensive sectors, but also in technology-intensive sectors. In brief, China is able to engage in labour intensive sectors and capital-intensive and technology-intensive sectors at the same time. As addressed in the modified flying geese paradigm, the development of ICT businesses in China demonstrates that the cyclical transfer process does not happen in a sequential order.

The case studies discussed in Chapter Four show that Chinese indigenous ICT enterprises have started exploring overseas markets. Depending on which sectors the ICT businesses are in, Chinese enterprises have seen varied performances. These varied performances contribute to the reflections on the utility of the flying geese theory in practice and understanding the shortcomings of the flying geese theory in reality. Chinese ICT enterprises in the software and IT services sector still concentrate on the domestic market, and play a key part in overseas MNCs' off-shoring and outsourcing networks. Chinese software and IT services enterprises are good at establishing cooperative R&D programmes with MNCs, as the example of Neusoft's cooperation with Japan's Toshiba shows. These cases show that the development of the Chinese software and IT services sector has been deeply influenced by MNCs, particularly Japanese MNCs. In other words, Japan's companies played a very significant part during the process where the Chinese software and IT services sector integrated into EARPNs. Chinese enterprises in the ICT manufacturing sector and telecommunications sector have already taken the initiative to develop foreign markets, and a few of these enterprises, such as Huawei, ZTE, and Lenovo indeed posed a threat to overseas MNCs (see Chapter Four). However, the case studies selected here demonstrated that indigenous Chinese ICT enterprises, despite their excellent performances within the Chinese market, are still not capable of playing the role of leading goose for the entire EARPNs. This is because they still lack experience of exploring overseas, and also because they still need to solve inherent problems regarding industrial upgrading and improving R&D capabilities in the short term. As research has shown in Chapter Four, with regard to the strategy to explore overseas markets, few of these Chinese ICT businesses have drafted detailed plans for a specific region, though businesses like Huawei, ZTE and China Mobile did become involved in intra-regional programmes that were driven by cooperation agreements between China and ASEAN countries. The case study in the telecommunications sector shows that SOEs should be treated differently when analysing their overseas development strategies. SOEs, as the case of China Mobile shows, should not be regarded as real businesses with autonomy, compared with private businesses. Rather, and unsurprisingly, their overseas development strategies tend to reflect the will of the Chinese central government. In brief, research on Chinese enterprises shows that no sweeping generalisation can be made about the overall ICT industry when analysing the integration and the impact on EARPNs. The flying geese theory can generally describe the picture of EARPNs in an effective way, despite the criticisms on the flying geese paradigm. However, no sweeping generalisation can be made about the usefulness of the flying geese theory when it comes to very detail sectors even within a same industry. That imposes limitation on the application of the thesis to a certain extent.

Chinese ICT development challenged the original sequential development model in EARPNs, since the development of China's ICT industry rapidly overtook several development stages and came to play the key role in the world's ICT industry in a very short period of time. From this point of view, the rise of China' ICT industry caused the changes to the original East Asian flying geese model in which the transfer order was supposed to be from Japan to the Four Dragons, then to other ASEAN countries and then to China. However, the rise of the Chinese ICT industry does demonstrate the catching-up essence of the flying geese paradigm. As shown in Chapters Three and Four, both in terms of high-end ICT manufacturing and R&D, and in terms of overseas exploration by indigenous Chinese ICT enterprises, the Chinese ICT industry is still catching up with those countries (or regions) in higher strata, such as Taiwan, South Korea and Japan. The development of China's ICT industry still depends heavily on the support of capital and advanced technology from outside markets, such as that of the US. In short, this thesis has argued that EARPNs, as significant parts of international production networks, still retain the essence of catching-up and the characteristics of a dynamic hierarchical division of labour.

Instead of the original Japan-led EARPNs and guided by the Flying Geese Paradigm, a new model is emerging in which China is likely to take a leading role through horizontal cooperation and vertical specialization in the region. In this regard, international production networks offer a more satisfactory model for operating in East Asia. At the very least, the rise of China fundamentally poses new challenges to the previous model of the 'ladder' and 'catching-up step by step'.

As this thesis has demonstrated, China is influencing the region through its ICT policy, driven by the state and businesses. EARPNs have further improved through the larger and more energetic Chinese ICT market and their participants are capable of approaching enough markets for their exports products. In short, the massive Chinese market has improved EARPNs. The 1997 financial crisis showed a flaw in EARPNs, which were formed according to the flying geese paradigm, by revealing that most East Asian countries were over-dependent on Japan and external markets, such as the US' (Haddad 2007). But the rise of China's ICT-led growth brought benefits to other East Asian countries in terms of a massive domestic market, gradually increasing outward investment, and more powerful R&D capabilities (Kui 2007). China's domestic market helps to absorb huge amounts of ICT exports from other countries within the region. This has contributed to improving EARPNs by allowing the cycle to start and finish within the region. It has also precipitated changes to the original exports order among countries, by playing the role of key exports destination and by taking a great share of exports from other East Asian countries. From this point of view, the rise of China with regard to its ICT industry establishes China's position as a regional leader in EARPNs.

The continuously growing outward FDI from China that was fully supported by huge foreign exchange reserves helps China replace Japan as the new engine of economic growth in the East Asian region (Kui 2007). The growing FDI and stronger ICT power also contribute to helping more East Asian countries integrate further into EARPNs. The role of ethnic Chinese business enterprises is crucial here. Continuous industrial upgrade in China has increased the spread of advanced technology and capital to ensure the transfer of industry or sectors between countries. Therefore, the countries located on the lower tiers of the flying geese model can continuously gain support from China both in capital and technology when they need it. Because of the emergence of China with regard to the ICT industry, the process of cross-border production-sharing networks has been boosted since even more trade flowed between the advanced Asian economies, the developing Asian countries and the rest of the world (Zhuang 2006). China's integration into EARPNs has deepened production fragmentation and international specialization in East Asia (Haddad 2007). The current global financial crisis makes China's significant role both in the region and in the world even more prominent, and this has directly shaken the role of Japan as the lead goose of EARPNs.

Another crucial point is that China has not been fully ready to replace the original lead goose. Rather, it plays a role that makes the process of EARPNs more complete within the region. Based on the research in this thesis, China has not reached the situation of sharing a strategy of leadership with Japan in EARPNs. Initiatives and actions both from Chinese central government and businesses show how China may be moving towards a possible future role as lead goose in EARPNs, and China's comparative advantage has indeed helped it to obtain unprecedented regional influence in the last 200 years. However, these comparative advantages do indicate that China possesses the appropriate capacity for taking a leadership role in the region. China still depends heavily on exports to the US, EU states and other developed countries and relies on imports of components and parts from ASEAN countries. As a country that still has large FDI inflows, China has just launched the first salvo in her own FDI mainly focused on natural resources and low-priced manufacturing, including electronics. This FDI has not produced the expected returns to further connect RPNs in East Asia. Moreover, as for continuously strengthening ICT R&D power, China lags far behind Japan, the US and developed European countries by horizontal comparison. The Chinese central government and businesses find it difficult to accelerate the modernization processes in a short period, no matter what impressive growth and development China has made in its ICT industry. This is because there needs to be a reasonable time for a country to establish the necessary world-class scientific research and development infrastructure, which is crucial for a country to eventually replace a leading goose (Goldstein 1997/1998: 39). The independent ICT standards have made astonishing achievements and practically become artificial barriers for other countries to gain access to the Chinese ICT market. In addition, China lacks natural resources and an emerging ICT service sector (Kui 2007). China is not yet ready to provide a mature exports market for various products including high-end and hi-tech products from other countries. For this reason, China cannot be regarded as either an advanced ICT technology provider or a rich FDI provider for the region. Meanwhile, China's domestic social and economic problems hidden in the long-term economic Reform and Open Door policy have become key impediments for subsequent Chinese economic development. The continuous tensions coming from other East Asian countries because of China's competitiveness in low-end and middle-end ICT manufacturing and standards-setting require the Chinese central government to seek solutions. Last but not least, the very complicated trilateral relationships between the US, Japan and China have always caused complications for the Chinese central government.

In the light of the factors shown above, it is too early to conclude that the dynamic hierarchical division of labour has changed, with China replacing the previous leading goose, both in terms of large amounts of FDI and in terms of capabilities of continuously providing advanced technology. China has not yet become the leader of EARPNs. Looking back on the past two decades we can see that vital transformations of regional economic and political development that have taken place in EARPNs laid strong foundations for the emergence and development of East Asian economic regionalism. The arguments in East Asian regional production networks provide the context and foundations for understanding ongoing East Asian economic regionalism. East Asian economic regionalism is a process of regional economic integration and cooperation, which can be accelerated by improvement in resource allocation and the concentration of a series of economic activities, such as progress in trade, investment, and technology transfer. In short, in practice the combination of factors in RPNs, such as services and information technology, accelerated the process of economic regionalism. That is because economic regionalism processes can be further accelerated by a combination of other regional production factors, such as services and information, when economic forces impact on the region from the bottom (Liu and Regnier 2003: 11). Various regional cooperation programmes in a specific field had the potential to improve the existing framework of cooperation. As shown in Chapter Three and Chapter Four, the rise of China with regard to the ICT industry indeed helps increase intra-regional ICT trade and investment within the region, which practically contributed to the even closer connections between countries in East Asia. FDI and advanced technological support from Japan helped the formation of *de facto* East Asian economic regionalization, and the emerging China with its huge markets, growing FDI and stronger ICT power make for the further development of this process (Yu 1995). This also helps to explain the interference from Japan and the US, the latter of which intends to prevent China from making big changes in EARPNs, because EARPNs largely help the development of East Asian economic regionalism.

The development of economic regionalism created a more favourable environment for EARPNs. The continuously strengthened intra-regional transactions involved in EARPNs suggest that a more structured framework might be desirable among these countries, to further enhance intra-regional connections and provide a forum to address disputes between countries (Haddad 2007). The development of EARPNs directly affects the progress and characteristics of East Asian economic regionalism, because the adjustments in national policies and regulations among states, which accompanied the whole process of shaping EARPNs, helped further build economic regionalism by trade reciprocity and preferential investment policies. As discussed in this thesis, the Chinese central government tried to strengthen its R&D level by using the domestic market as leverage, especially when China already had independent ICT standards. This largely helped improve China's negotiating power in the region. The previous form of East Asian economic regionalism was characterized by a strong Japan supported by powerful economic strength, and a strong China supported by powerful political and military strength. However, because of the rise of China's ICT industry, the East Asian economic regionalism has been transformed. Japan is suffering under a weakening economy and China has increased its economic power, as well as its military and political power. It is too soon to conclude that China will become the next East Asian leading power, but it is clear that China has more negotiating chips to influence the direction of East Asian economic regionalism.

This thesis has focused on the ICT industry, but has relevance for other sectors because there are similarities between the ICT industry and other industries. The ICT industry covers sectors including low-end equipment manufacturing, mid-end software outsourcing and R&D for high-end products, all of which provide a wide representation of other sectors. However, as stressed in previous chapters, the ICT industry has special characteristics and plays a decisive role in the overall development of the industrial economy. For example, with regard to wealth creation and enhancement, there is a clear distinction between the ICT industry and traditional industrial sectors. As examined in this thesis, it is much easier for a country to be integrated rapidly into RPNs by concentrating on the manufacturing of parts or components in the ICT industry, and countries are much more likely to take control of parts of ICT manufacturing or outsourcing in the short term. ICT off-shoring and outsourcing further accelerate the catching-up process in RPNs. It is also because of the extensive coverage of ICT industry (from low-end to high-end with high value added) that different sectors of ICT industry can show various aspects of the whole story. That easily reflects the shortcoming of the flying geese theory to a certain extent. It further limits the application of the thesis. Whilst the unique characteristics of the ICT industry limit the application of these findings to a certain degree, it is important to encourage future research into the relationships between China and EARPNs in wider dimensions. It also encourages tests on other relevant theories that possibly make sense. It also illustrates the need to conduct further thorough research into whether and economic interdependence has affected the political order in the region. As for East Asian countries, the real challenge does not come from the so-called ‘China threat’, but from how to respond to the China threat by facilitating domestic structural adjustment and enhancing competitiveness at home.

APPENDIX

TABLE 1: Telecommunications and Sound Recording and Playback Device Equipment

Telecommunications and Sound Recording and Playback Device Equipment						
						Unit: USD
	2002			2003		
Country/ Region	Import	Export	Balance	Import	Export	Balance
USA	135,246,480	788,302,573	653,056,093	1,133,813,317	11,020,948,937	9,887,135,620
ASEAN	86,184,518	237,931,592	151747074	1,189,319,753	2,832,234,910	1,642,915,157
JAPAN	316,641,937	423,285,931	106643994	4,408,540,892	5,231,845,439	823,304,547
KOREA	456,375,465	110,045,245	-346330220	4,231,830,503	1,770,087,368	(2,461,743,135)
TAIWAN	109,312,439	36,513,815	-72798624	1,260,476,499	482,923,447	(777,553,052)
HONG KONG	73,253,783	555,935,225	482681442	819,858,790	8,445,110,312	7,625,251,522
Sum EA	1,177,014,622	1,363,711,808	321,943,666	11,910,026,437	18,762,201,476	6,852,175,039
	2004			2005		
Country/ Region	Import	Export	Balance	Import	Export	Balance
USA	1,004,438,497	16,975,639,182	15,971,200,685	940,235,390	23,857,068,533	22,916,833,143
ASEAN	2,134,261,143	5,151,490,903	3,017,229,760	2,804,997,283	6,310,974,127	3,505,976,844
JAPAN	4,967,272,374	6,383,629,000	1,416,356,626	4,666,290,096	6,306,107,974	1,639,817,878
KOREA	4,510,163,716	3,198,566,168	(1,311,597,548)	5,213,464,360	3,979,248,639	(1,234,215,721)
TAIWAN	1,623,271,174	691,052,640	(932,218,534)	1,642,019,439	966,929,686	(675,089,753)
HONG KONG	854,053,454	12,950,821,205	12,096,767,751	1,061,236,658	21,962,493,043	20,901,256,385
Sum EA	14,089,021,861	28,375,559,916	14,286,538,055	15,388,007,836	39,525,753,469	24,137,745,633
	2006					
Country/ Region	Import	Export	Balance			
USA	1,015,652,599	30,572,677,449	29,557,024,850			
ASEAN	3,078,095,985	8,664,409,073	5,586,313,088			
JAPAN	5,004,619,410	6,198,335,925	1,193,716,515			
KOREA	6,112,677,617	4,877,860,769	(1,234,816,848)			
TAIWAN	1,448,113,382	1,565,592,635	117,479,253			
HONG KONG	875,837,414	30,221,218,805	29,345,381,391			
Sum EA	16,519,343,808	51,527,417,207	35,008,073,399			

APPENDIX TABLE 2: Interviewees List

INTERVIEWEES LIST		
Interviewees	**Position**	**Time and Location**
Academics		
U	A senior researcher of the University of Hong Kong	20th. June, 2006 Hong Kong
F	A senior researcher of the University of Hong Kong	25th. June, 2006 Hong Kong
Government officers		
D	A senior officer of SASAC	22^{nd} July, 2006 Beijing
Z	A senior officer of MII	25^{th} July, 2006 Beijing
F	An officer of Beijing Local government	15th January, 2009 Beijing
X	An officer of MOC	10^{th} December, 2008 Beijing
L	An officer of MOC	19^{th} March, 2008 Beijing
Businessmen		
ZH	A previous senior staff member of China branch, Nokia	21^{st} November 2007 Beijing
H	A technician of Sony Erricson, China	15th April, 2008 Beijing
J	A senior staff member in the China branch, ELCOTEQ SE, Finland	9^{th} November, 2008 Beijing
S	A previous technician of BH Electronics Co., Ltd. Shenzhen	2^{nd}. April 2009 Beijing
W	A senior staff member of IDC	19^{th} November, 2007 Beijing 5th. March, 2009 Beijing
WA	A staff member of Lenovo	2^{nd} December 2008 Beijing
R	A staff member of China Mobile	20^{th} November 2008 Beijing
XU	A senior staff member of China Mobile	22^{nd} December, 2008 Beijing

Interviewees	Position	Time and Location
HA	A senior technician of Huawei	10th December, 2008 Beijing;
ZHE	A senior staff member of CITIC Securities	5th June, 2008 Beijing
		20th June, 2008 Beijing
ZU	A senior staff member of CITIC Securities	19th May, 2008 Beijing

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