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Lund University
Centre for East and South-East Asian Studies
Masters Programme in Asian Studies
East and South-East Asian Track
Fall semester, 2006

GOVERNMENT INTERVENTION

– A CASE STUDY OF THE TELECOMMUNICATIONS INDUSTRY IN
CHINA

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Acknowledgements

First and foremost, I want to extend my great gratitude to my supervisors, Anne Jerneck and Turaj S. Faran of the Department of Economic History in Lund University for their kind and generous support. During the process of thesis writing, they gave me a lot enlightening guidance and encouragement for the choice of thesis topic and research case and helped me by recommending many books and reading materials. And their suggestions and comments throughout the writing process gave me quite many inspirations.

Secondly, I would like to thank all the staff at the Centre for East and South-East Asian Studies of Lund University and all my classmates for the wonderful life experience and memories in Lund.

I also wish to thank all the interviewees from China Mobile, China Unicom, Datang Telecom and Japanese NTTDoCoMo for providing me a lot of fundamental information for the thesis. Their hospitality and insightful conversations helped me find out what is the right situation of China's telecommunications industry now.

Finally, I would like to take the opportunity to give a special thank to my wife for supporting me and everything else.

Abstract

The roles of government have long been discussed in economic development. Rather than discussing the existence of government intervention in China's telecommunications industry, the thesis was to identify how the government actually intervened to help bolster the industry. The research question is in what ways did the Chinese government intervene to promote its telecommunications industry?

To address the question, a case study was employed focusing on the development of China's telecommunications industry. The thesis mainly examined how the government stepped in the industry in three perspectives – foreign investment, structural reform and technological development since China's opening up in 1978. The data was collected through rigorous archival information studies and complemented with interviews.

An observation was found in the case that strong government intervention in the three aspects contributed a lot to the development of China's telecommunications industry. Therefore, a conclusion can be drawn that the success of the country's telecommunications industry could be attained by effective government intervention in the three major aspects 1) foreign investment; 2) structural reforms and 3) technological development.

Key words: Government intervention, Telecommunications industry, Foreign investment, Structural reform, Technological development

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Glossary and Abbreviations

- **2G** – Second generation (2G) of mobile telephone technology, a digital mobile phone system that covers multiple systems which mainly includes GSM (Global System for Mobile Communications), CDMA (Code Division Multiple Access) IS-95 which is more commonly called CDMAOne, PDC (Personal Digital Cellular) and TDMA (Time Division Multiple Access).
- **3G** – Third generation (3G) of mobile telephone technology, which include three ITU recognized 3G standards, namely, the European-based WCDMA (wideband code division multiple access), the US-based CDMA 2000 and the China-based TD-SCDMA. Compared to 2G, 3G has dramatic advantage in data transmission. The data rate is 144 Kbps for high-speed terminal motion, 384 Kbps for low-speed terminal motion and 2 Mbps when the terminal is stationary.
- **ATM** – Asynchronous Transfer Mode, a high-performance, cell-oriented switching and multiplexing technology that uses fixed-length packets to carry different types of traffic.
- **CDMA2000** – Code Division Multiple Access 2000, a 3G communication standard often used in North America and Asia.
- **CDMAOne** – Code Division Multiple Access IS-95, a second-generation digital wireless communication system being used in North America and Asia.
- **FDI** – Foreign direct investment
- **GDP** – Gross Domestic Product.
- **GDT** – Great Dragon Information Technology
- **GSM** – Global System for Mobile Communications, a 2G mobile communication system that is used worldwide, including Europe, Asia and North America.
- **ITU** – International Telecommunication Union, a specialized organization established by the United Nations in 1932. Its main role includes the standardization of telecommunication-related standards, the allocation of radio frequencies to individual nations and the provision of assistance for technical developments.
- **IPO** – Initial public offering.
- **KDDI** – the only Japanese telecommunications operator who provides both fixed-line and mobile communications.
- **MII** – Ministry of Information Industry, China’s telecommunications regulator.
- **MPT** – Ministry of Posts and Telecommunications, the former regulator of China’s telecommunications industry.

- **NIEs** – Newly industrialized economies.
- **NTTDoCoMo** – Japan's largest mobile communications operator and also one of world's leading mobile communications companies. It launched the world's first 3G mobile service based on W-CDMA in 2001.
- **RMB** – Renminbi or Ren Min Bi, the official currency in the mainland of the People's Republic of China. Currently, RMB 100 equals to USD 12.5.
- **SPC** – Stored program controlled switching technology
- **TD-SCDMA** – Time Division-Synchronous Code Division Multiple Access, a 3G standard developed by China but yet to have any commercial usage right now.
- **WCDMA** – Wideband Code Division Multiple Access, a 3G communication standard often used in Europe and Asia.
- **WTO** – World Trade Organization
- **ZTE** – Zhongxing Telecommunications Equipment Co Ltd

Chapter 1 Introduction

1.1 Problem formation, purpose and research questions

Since China started its economic reform late 1970s, it has maintained unprecedented growth. As the world's largest developing country, China was removed in 1998 “from the World Bank's low-income classification and placed into the lower-middle-level-income category” (ITU 2001: 5). In 2003, China's GDP per capita surpassed USD 1,000 – a symbolic benchmark for developing countries (ibid.). Its GDP growth reached RMB 20.9 trillion in 2006, increased by 10.7% from the previous year, according to National Bureau of Statistics of China.

The extraordinary economic success in China made since its economic reform goes against major Western economic theory and policy which upholds that bureaucratic invention will lead to poor results. Western economic institutions and policies have a consensus view over the fundamental agreement about economic development which emphasizes the free market as well as other factors such as macroeconomic stability, private property rights, and full integration to the world economy.

Unlike Eastern Europe and Russia who tried to move rapidly towards a market economy, China adopted “an incremental reform path (‘touching stones to cross the river’)” throughout its economic transition from a planned economy to a more market economy (Nolan 1994: 25). By developing “market socialism,” China combined “the virtue of markets and planning – in striking contrast to the economic ideology of post-communist countries in Eastern Europe and Russia” (ibid.: 26). In the 1980s and early 1990s, for example, China outperformed almost all developing countries in terms of economic growth, which “presents economists with a puzzle: Why did China perform so well ... despite the fact that its economic institutions and policies were gravely inadequate in relation to mainstream Western economic theory and policy?” (ibid.: 30).

The interesting thing is therefore not whether there is government intervention in China or not but how the intervention is performed since China's is still a one-party system and

on its way towards “market socialism”. The aim of the thesis is thus to identify how the Chinese government actually intervened into its economic life by looking into the development of its telecommunications industry since “long-term economic performance of a country depends, to a crucial extent, on the endogenous technological advances” (Kabiraj & Yang 2001: 247). Hence, the research question can be stated as: In what ways did the Chinese government intervene to promote its telecommunications industry?

The reason to choose the study of China’s telecommunications industry is mainly because the booming industry is now being recognized as an emerging technological power to the national economic development. Before China’s economic reform in 1978, China’s telecommunications industry lagged far behind the world, almost the lowest among 140 leading countries with its teledensity reaching only 0.43 percent in 1980 (ITU 2000: 6). However, in just over two decades later, it has developed into one of the world’s largest telecommunications markets. By the end of 2006, China has recruited more than 360 million fixed-line subscribers and over 460 million mobile subscribers, enhancing the teledensity for fixed-line and mobile telecommunications to 28.1 percent and 35.3 percent, respectively.¹

To examine how the government intervened during the process of China’s telecommunications industry, this thesis will focus on three major aspects where government had strong interference – foreign investment, structural reform and technological development. And a number of sub-questions will be addressed in three major aspects, respectively:

Firstly, on foreign investment:

- How did the Chinese government take advantage of foreign investment to drive up its telecommunications industry?
- What was the major trend for the country’s policies on foreign investment?

¹ Figures from Ministry of Information Industry <http://www.mii.gov.cn>

On structural reform:

- How did the Chinese government adjust the structure of telecommunications industry to meet the changing environment both domestically and internationally?
- How did China reform its telecommunications industry to cope with its entry into the World Trade Organization?

On technological development:

- What is the role that the government played in promoting the country's technology adoption and diffusion?
- How did China intervene to develop its self-owned leading telecommunications technologies to enhance its competitiveness?

1.2 Methodological considerations

With respect to research methods, there are many considerations to be taken among the ways of doing social science research such as case study, experiments, surveys, histories and the analysis of archival information. Since my research question is: In what ways did the Chinese government intervene to promote its telecommunications industry? I choose case study based on Chinese telecommunications industry. According to Yin, types of research questions will lead to the different choice of strategies for doing a research. "In general, case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" (Yin 2003: 1).

By looking at the concrete case of China's telecommunications industry, I am aiming to investigate how government interference has actually been implemented to find a prescription or trend for the developing countries like China to catch up with its international counterparts. To do this, I will first come up with some pre-understandings based on literatures about government intervention and the development of China's telecommunications industry and then through empirical study to have a better understanding of the real story.

The reason I also choose the analysis of archival information is because “the analysis of archival records are advantageous when the research goal is to describe the incidence or prevalence of a phenomenon or when it is to be predictive about certain outcomes” (ibid.: 6). By applying the strategies, I studied government policies on the development of China’s telecommunications industry mainly in the areas of foreign investment, structural reform and technological change. Meanwhile, I studied the previous literatures on China’s telecommunications industry. Data obtained from archive studies are mainly from government websites, reports from research institutes, newspapers, company’s annual reports, company websites and previous related literatures.

For the critical methodology, I choose interviews to gather archival data. “Interviews allow the subjects to convey to others their situation from their own perspective and in their own words” (Kvale 1996: 70). And among actors in China’s telecommunications industry such as government regulators, telecom operators, equipment providers, cellular phone providers and content services providers, semi-structured interviews were mainly conducted with telecom operators and equipment providers. Four interviews have been done with officials with China Mobile, China Unicom, Datang Telecom and Japan NTTDoCoMo. Some basic questions concerning foreign investment, structural reform and technological development were posed to all interviewees and then followed up by subsequent questions on specific regions depending on individual answers.

1.3 Limitations

First, this single-case study based on China’s telecommunications industry under an in-depth study is interpretive, but lacking of in-depth comparisons to other countries and regions make it less standout. It would be more interesting and convincing to study telecommunications industries in other developing countries and regions to check if the phenomenon is the same. However, in consideration of the limited time and fund for the research, this single-case study does serve as a stimulator for future research and investigation, but to what extent the case in telecommunications industry can be representative in other industries is yet to known.

Second, there are also limitations in data collecting. This research puts government intervention towards foreign investors, China telecom operators and equipment providers into the focuses of the study, however, interviews have been mainly carried out with major Chinese mobile operators and equipment providers. Data about foreign investment in China's telecommunications industry are mainly second-hand from archival studies.

1.4 Disposition

The four major chapters to follow are sketched below: an analytical framework will be built primarily based on existing studies and researches on government intervention in Japan and NIEs and China's telecommunications industry in chapter 2. Next, chapter 3 is the empirical part for this thesis which will concentrate on the major findings in a chronological order. Chapter 4 will be a discussion part for the thesis. Finally, in chapter 5, the thesis will be summarized and a conclusion will be made based on empirical findings.

Chapter 2 Analytical framework

The purpose of the thesis is to identify the ways that the Chinese government did to promote its telecommunications industry. In this chapter, an analytical framework will be built by applying existing theories and findings on government intervention, mainly from the studies on Japan and newly industrialized economies (NIEs) in East Asian countries and also the existing studies on China's telecommunications industry.

Firstly, theories and ideas about government intervention will be reviewed in section 2.1. And in section 2.2, related studies on China's telecommunications industry will be examined. Then an analytical framework will be constructed in section 2.3 to analyze government interference in promoting China's telecommunications industry.

2.1 Studies on government intervention

The great successes of Japan and NIEs such as South Korea, Taiwan, Singapore, and Hong Kong have greatly influenced our understanding of the process of economic development. Among the research that has been done to explore the reasons for the success of Japan and NIEs, most discussions have focused on the role of government versus the market. This section mainly focuses on studies on government intervention.

2.1.1 The developmental state

Government intervention in Asia has a strong distinctiveness. Perhaps Japan's since post-Meiji transformation and subsequent reconstruction after the World War II was the most salient one and could not be neglected when looking into state interference and economic growth. Among different explanations, Johnson (1982) outlined a new concept explaining the miracle that Japan achieved – “developmental state”. Johnson emphasized the role of the developmental state in Japan's economic miracle which attributed Japan's rapid industrialization to effective industrial policy.

What is the developmental state?

Johnson argued states everywhere performed almost the same roles before industrial revolution, however, after the industrial revolution, the functions of the state in economic affairs changed (Johnson 1982: 18-19). The role of those states who were the first to industrialize shifted mainly from economic activities to “regulatory functions” such as maintaining competition, consumer protection, etc. For those who were late to industrialize, the states led the industrialization drive and took on “developmental functions” (ibid.).

Johnson explained the developmental state (or plan rationality) by comparing it with the regulatory state (or market rationality) in four major different aspects. First, the regulatory state concerns itself with the forms and procedures of economic competition instead of substantive matters, while the developmental state tends to have substantive social and economic goals (ibid.). Secondly, in the developmental state, the government has great priority to industrial policy for the structure of domestic industry and international competition, while the regulatory state usually don't have an industry policy but stress rules and reciprocal concessions (ibid.). The third way to tell the differences between developmental state and regulatory state is to “look at the trade-offs involved in each approach” (ibid.: 21). The fourth difference lies in that economists dominate economic policy-making in a regulatory state while nationalistic political officials dominate in a developmental state. “These various distinctions are useful because they draw our attention to Japan's emergence, following Meiji Restoration of 1868, as a developmental, plan-rational state whose economic orientation was keyed to industrial policy” (ibid.: 20).

What is industrial policy?

Johnson argued that all states intervened in their economies for various reasons. In the “developmental state” theory, state intervention is made possible via the industrial policy which consists of two basic components – “industrial rationalization policy and industrial

structure policy”² (ibid.: 27). Johnson argued that implementation of industrial policies could be divided into protective and developmental sides.³

Johnson also argued the truly controversial aspect of these mixes of tools was the nature of the relationship between the government and the private sector. “MITI took a long time to find a government-business relationship that both enabled the government to achieve genuine industrial policy and also preserved competition and private enterprises in business world” (ibid.: 29). Johnson favored the argument that there were three basic ways to implement industrial policy: bureaucratic control, civilian self-coordination and administration through inducement (ibid.: 30). Johnson listed four major elements for Japanese model including the existence of an elite bureaucracy, favorable political system, the perfection of market-conforming methods of state intervention in the economy and a pilot organization like Japan’s MITI. However, he also suggested that other nation’s imitating Japan’s achievements have to take their local situations into consideration to figure out institutions for their developmental state (ibid: 323).

2.1.2 Other theories and ideas on NIEs

The literature on the developmental state was complemented by the research on the development of NIEs like South Korean, Taiwan, Hong Kong and Singapore that began in the 1960s, which had particular significance for debate about government intervention in Asia.

² The micro aspect, “industrial rationalization policy”, refers to state intervention into individual enterprises to improve its operation. While the macro aspect, “industrial structure policy”, refers to state intervention with the proportions of agriculture, industry and tertiary among national economy. Although there were debates about the presence of industrial policy in an open capitalist system, Johnson believes the real controversy about industrial policy lies in “how it is applied” (Johnson 1982: 27-28).

³ Tools applied in protective side included discriminatory tariffs, preferential commodity taxes on national products, import restrictions based on foreign currency allocations and foreign currency controls. On the developmental side, they include the supply of low interest funds to targeted industries through governmental financial organs, subsidies, special amortization benefits, exclusion from import duties of designated critical equipment, licensing of imported foreign technology, providing industrial parks and transportation facilities for private businesses through public investment. “On the all these tools could be mixed in different era and changed based on economic needs” (Johnson 1982: 29).

In contrast with the neoclassical view which upholds the efficiency in resources allocation as the major factor for economic growth⁴, Robert Wade (1990) proposed a political-economy approach which he called “government market” which treats capital accumulations as the major general force for economic growth (Fan 2003: 33). He upheld that government has played a crucial role in East Asian countries and the higher rate and different composition of investment in East Asia account for the greater success in the region (ibid.). Wade argued that as to foreign trade and investment in Taiwan, the government placed “significant, general constraints on foreign investment” to help favor the domestic companies (Bruton 1994: 219).

Alice Amsden (1989) argued that it was a strong government intervention that spurred the South Korean's economic development in the 1960s and 1970s instead of the policies of economic liberations. Amsden discussed that the South Korean government extended trade protection and subsidies to the nation's large diversified business groups “chaebol” (Marks 2005: 301). Under the “late industrialization”, a country or firm purchases foreign technology and then learns to use it and take advantage of the technology (ibid.). Stiglitz (2001) insisted that the rapid development in East Asia was “mainly a result of government-led strategies” (Stiglitz 2001: 513).

By comparing NIEs of Asia and Latin America, Stephan Haggard (1990) highlighted the critical role domestic political forces played in shaping policy choice and change (Pang 1992: 389). Haggard identified four sources of policy change: “the international system, domestic coalitions, political institutions, and ideas” (ibid.). He argued that a country's choice of development strategy could be shaped by the changing domestic and external conditions, especially the pressure from the international environment (ibid.).

In summary, both studies on Japan and NIEs indicated that government intervention had a strong influence on the development of the regional economy. And the government intervened in almost every aspect to drive the national economy.

⁴ Neoclassical theorists attributed the NIEs success to the superior market in the region with few price distortions and a more efficient allocation of resources than market in other countries and regions.

2.2 Studies on China's telecommunications industry

With the fast development of China's telecommunications industry in the past two decades, there were many studies in this regard. They analyzed the success of China's telecommunications industry from very different perspectives.

In studies on foreign investment, Chismar, Jussawalla and Snow (1996) studied the foreign investment in China's telecommunications in 1990s. Mueller and Lovelock argued that the restriction on foreign direct investment in telecommunications services is "a result of a coalition between the government and China Telecom as the state is to protect China Telecom from foreign competitions since China Telecom served as a key role for national development" (Muller and Lovelock 2000: 756). Tan (2002) upheld that China's ultimate desire for foreign investment is to search for a strategic path for its industrialization, which is especially true in China's telecommunications industry. For foreign investor in China's telecommunications industry, Chang, Fang and Yen (2004) argued that the booming national economy would provide huge business chances for foreign investors.

As for structural reform, Yu, Berg and Guo (2004) argued that the importance of the introduction of new telecom operators and rounds of reforms were carried out to try to realize fully competitions and improve the economic performance of China's telecommunications industry (Yu et al. 2004: 723). Harwit (1998) pointed out that the development of China's telecommunications industry partly fit the patterns of other developing countries. The pattern featured that the industry would be controlled by a central government agency, protected from foreign competition and targeted on urban areas in early stages (Harwit 1998: 178-179). He also insisted that the structural reorganization of the industry was conducive to the development of China's telecommunications industry (ibid.: 187).

In the area of technological development, Fan (2003) argued the importance of technology catching up and innovation and the role of the government in the four

consequential stages. Fan developed a "staged catching-up theory" in analyzing the catching up process of telecommunications firms in late industrializing countries. The four stages include the preparation state, growth stage, filtration stage and globalization stage (Fan 2003: 23). In another article, Fan (2006) emphasized that the Chinese firms should initiate innovation capability from the very beginning to build up their competitiveness and to survive the competition with the multinational companies and other domestic companies. Mu and Lee (2005) depicted a "trade market for technology" model for the development of China's telecommunications industry by setting up joint ventures with foreign telecommunications companies to import foreign technologies and transfer to domestic firms.

For studies on government policies, Loo (2004) reviewed and analyzed the changing telecommunications policies in China since China adopted the "Opening up" policies in later 1970s. Loo built up an analytical framework of China's telecommunications industry by looking at three key factors – government concerns, foreign influences and market forces in four separate stages (Loo 2004: 711-712).

To sum up, we see that factors such as foreign investment, structural reform, technological development and government policies are very important in driving up the development of China's telecommunications industry. They helped generate the direction for my research on government intervention.

2.3 China Model

Sections 2.1 and 2.2 reviewed the literatures and studies on government intervention on the development of regional economy and China's telecommunications industry respectively. These studies and ideas laid a solid foundation for constructing an analytical framework for the thesis which deals with government intervention on China's telecommunications industry.

China after shifting its national priority to economic development since 1978 shares many similarities with post-war Japan and NIEs who targeted economic growth through

the implementation of industrial policy. Like Japan in the past, China is now facing the similar problems like late development, a large population, the need to trade and the constraints of the international balance of payment. While compared to the NIEs, China also shares a lot of similarities with them such as late development, thirst for capital accumulation and cultural background.

Considering characteristics of Johnson's "developmental state" which is mentioned on section 2.1, we could reason that China also belongs to the developmental state, which implies that the Chinese government will take on "developmental functions" for the industrialization of the national economy via the industry policy. Therefore, we assume that government intervention is also playing a considerable role in China's telecommunications industry. Meanwhile, based on the research on the literature reviewed in section 2.2, we can identify that three factors including 1) foreign investment; 2) Structural reform and 3) technological development are the key engines for the development of China's telecommunications industry. Therefore, we can construct an analytical framework by investigating how government intervened in China's telecommunications industry in the three-mentioned aspects.

2.3.1 Foreign investment

Foreign investment has been playing a role in driving up the economic development of developing countries. As presented in section 2.1.2, Wade (1990) proposed capital accumulations as the major general force for economic growth and also suggested the developing countries to channel more investment into industries strategic to future growth. "Early growth accounting suggested that virtually all of Asia's growth could be explained by sheer accumulation" (Haggard 2004: 56).

However, foreign investment often presents developing countries with both opportunities as well as threat to domestic competitors (Tan 2002: 19). In one way it enables "the access to capital, technologies, management skills, and international markets, to create local employment, but on the other hand, it suppresses domestic competitors and new ventures" (ibid.). "Opening to foreign investment too wide, too fast shifts the balance in

a way that threatens viability of the domestic competitors” (Mueller and Lovelock 2000: 757). Since the purpose of wooing foreign investment is to help the development of domestic industries, we can see that government intervention will step in to balance the positive and negative impacts of foreign investment.

Tan (2002) pointed it out that the telecommunications industry could be categorized into two sectors, manufacturing and service provision (Tan 2002: 18). We can therefore assume that government intervention on foreign investment mainly in the two different sectors to protect its telecommunications industry. With regard to the different development stages of the industry, government policy on foreign investment in the early stage may tend to ease restrictions on the peripheral sectors such as telecommunications manufacturing while tight control on those sectors which stand for the benefit of national economy such as telecom services operation, but it will later on open fully for market liberalization and competitions.

Thus, we may construct the following proposition:

Proposition 1: Government role on absorbing foreign investment in telecommunications industry might change from the peripheral telecommunications manufacturing sector in early stage to gradually expand to key factors such as services operation later on.

2.3.2 Structural reform

Noticeably, though post-war Japan remained plan rational, “it had no ideological commitment to state ownership of the economy” (Johnson 1982: 23). In Japan, mainly three different solutions were developed to solve the relationship between government and enterprises – self-control, state control and cooperation (ibid.: 310). Compared to Japan, historically the leading telecommunications operators in China usually have a tight relationship with the government as the interest of the incumbent operators and the regulators were closely related (Yu et al. 2004: 717). We could argue that China is still in favor of those state-owned enterprises since it is still in the process of the development of

socialist market economy, which implies that the government is reluctant to loosen its rein over state-owned telecom operators.

However, “it is difficult to realize full competition and rapid improve the economic performance of China’s telecom industry meanly by means of deregulation or announcement about liberalization” (Yu et al. 2004: 723). While presenting the Taiwan development trajectory, Wade pointed out among his prescriptions for the economic development for both the developed and developing countries that it is important to “develop effective political and corporatist institutions before the system is democratized and to make piecemeal reforms in small steps” (Wade 1990: 220). Harwit also upheld that the decentralization of China’s telecommunications industry had added the industry’s efficiency (Harwit 1998: 187).

Based on the literature reviewed, we can assume that government has to conduct structural reforms to introduce more competitions and market liberalization to improve the performance of the telecommunications industry. The reforms might be carried out step by step in line with the changing environment, the complexity of the historical reasons and China’s unique institutional endowment.

Thus, we can construct a proposition as follows:

Proposition 2: In line with changing market environment, government intervention via structural reform step by step helps bring in market liberation and introduce competitions in the telecommunications industry.

2.3.3 Technological development

As presented in section 2.2, Mu and Lee (2005) emphasized the effective technological transfer via the establishment of Sino-foreign joint ventures. “Given the huge market in China, access to knowledge was made possible by a purposeful strategy adopted by the Chinese authorities – the so-called “trading market for technology” policy in the joint ventures (JVs) (Mu and Lee 2005: 767). Mu and Lee also believed that the import of

foreign technologies from multinational companies to domestic firms was a major source for technological development and productivity growth (Ibid.: 772).

The import of foreign technologies can be categorized into the developmental side of industrial policy based on Johnson's theory. In Japan, the importation of technology was "one of the central components of post-war Japanese industrial policy" (Johnson 1982: 17). Like the development of Taiwan and Japan, Amsden's growth model of "late industrialization" in South Korea highlighted that imitation of foreign technology is a learning process. Under this mode, "a country or firm purchases foreign technology and then actively learns to use it and then leads to process improvements and higher quality production of existing goods" (Marks 2005: 301).

On the other hand, as reviewed in section 2.2, Fan (2006) upheld that the decisive role of innovation capability and self-developed technologies for domestic firms to catch up with the leading multinational corporations. "The government can play a positive role in guiding and helping domestic firms to accumulate the innovation capabilities" (Fan 2006: 367).

Therefore, we could argue here that the Chinese government might follow the same routine as Japan and South Korean to import foreign technology at the early stage for technological development and also intervene to boost the development of self-developed technologies to improve its competitiveness.

Consequently we could construction a proposition as follows:

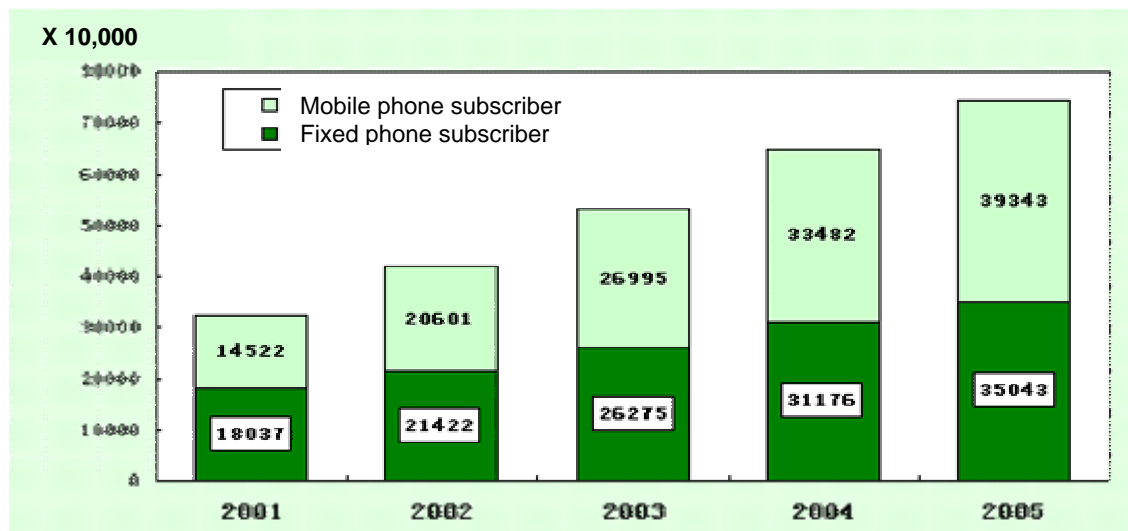
Proposition 3: Government would work actively in importing foreign technology and pursuing new technology to improve the performance of telecommunications industry and catch up with the developed countries.

Chapter 3 China’s telecommunications industry examined

Following the analytical framework, this chapter will focus on the empirical findings in the process of China’s telecommunications industry. By introducing the major actors, section 3.1 will give an overview of the industry. Then, section 3.2, 3.3 and 3.4 will dedicate to major findings of government intervention on foreign investment, structural reform and technological development, respectively.

3.1 Overview of China’s telecommunications industry

In this thesis, China’s telecommunications industry mainly embraces both fixed-line and mobile telecommunications. The industry has recorded dramatic development in the past two decades. Figure 3-1 showed that by the end of 2005, China has registered a total of 350.43 million fixed line subscribers and 393.43 million mobile subscribers, respectively.



Source: National Bureau of Statistics (2006)

Figure 3-1: Fixed and mobile phone subscribers in 2001 to 2005

Actors to the telecommunications industry contain government regulators, telecom operators, equipment providers, cellular phone providers and content services providers, etc. They are all interrelated. However, before we proceed to find what did the Chinese

government do to intervene its telecommunications industry, we will first look into the major actors under discussion in this thesis.

Main actors

1) Under the control of State Council, the Ministry of Information Industry (MII) is currently the country's major telecom watch-dog. However, the Ministry of Science and Technology and the State Planning and Development Commission (SPDC) are also playing a part of regulatory role in the telecommunications industry.

2) For telecom operators, China has six major telecom carriers with two mobile telecom operators – China Mobile and China Unicom and four fixed-line operators – China Telecom, China Netcom, China Tietong and China Satcom. They are all controlled and supervised by the State-owned Assets Supervision and Administration Commission of State Council.

3) China has four major equipment providers including Huawei Technologies, Zhongxing Telecommunications Equipment Co Ltd (ZTE), Great Dragon Information Technology (GDT) and Datang Telecom Technology Co Ltd. They are manufacturing equipment for both fixed-line and mobile telecommunications ranging from the core networks to base stations. They are competing with leading international equipment providers such as Ericsson, Siemens, Alcatel-Lucent, Nokia and Motorola.

Among all the actors, telecom equipment manufacturing sector including fixed-line switching system, fiber networks, mobile networks and base stations is regarded as the peripheral factor while the telecom services operation sector such as basic fixed-line and mobile services operations and value-added telecom services operation is the core factor in the industry.

Main technologies

For fixed-line communication, China is currently using digital stored program controlled (SPC) switching technology:

■ SPC – The evolution of the telephone switch technology can be classified into three stages: the manual switches (1880s to 1920s), the electro-mechanical switches (1920 to 1960s) and the SPC switch (1965 till now)⁵. Due to its close-door policy, China remained in the electro-mechanical switches before the first digital SPC switch was imported and installed in the Fujian Province in 1981. (Mu and Lee 2005: 762-763).

While for mobile telecommunications, technologies could be classified to 2G and 3G⁶:

■ 2G – Compared to the first generation of analog mobile phone technologies in late 1970s in the US and early 1980s in Europe, second generation (2G) of wireless technologies are digital solutions for communications which consists of four major wireless systems.⁷ China is adopting both GSM and CDMAOne as 2G wireless systems.

■ 3G – There are three major ITU-acknowledged 3G standards, including the European-based WCDMA, the US-based CDMA 2000 and the Chinese TD-SCDMA. WCDMA is considered as the natural migration for GSM to 3G, CDMA 2000 for CDMAOne. Unlike the other two standards, TD-SCDMA has yet to have any commercial usage.

Development stages

The process of China's telecommunications industry can be classified into three major stages – first stage (1978 to 1993), second stage (1994 to 2000) and third stage (2001 to present). The reason to separate the process into the three stages is because the industry witnessed a comparatively slow development before 1994, characterized by the wholly

⁵ The first manual switch stage includes magneto telephone switchboards and common battery exchanges. There are two types of electro-mechanical switches. The first that appeared was the 'step-by-step switches', after which the 'crossbar switches' emerged. The third stage product, the electronic stored program control (SPC) switch, can also be divided into two phases: the analogue automatic switches and the digital automatic switches.

⁶ Chinese mobile telecommunications industry is currently based on second generation (2G) of mobile telecommunications system. 3G technologies boast better services, richer functions and higher efficiency. China's 3G scenario was affirmed by a high-ranking Chinese official from the MII in November 2006 that China would offer 3G-based telecom services when the Olympic Games held in Beijing in 2008 (Li 2006). In a global context, Japanese telecom operator NTTDoCoMo was the first in the world to introduce 3G in October 2001. Ever since many world leading mobile operators have all conducted similar migrations such as British Vodafone, French Orange, US Verizon Wireless and Japan KDDI.

⁷ The four systems are GSM (Global System for Mobile Communications); CDMA (Code Division Multiple Access) IS-95, more commonly called CDMAOne; PDC (Personal Digital Cellular) and Digital AMPS (Advanced Mobile Phone System), which is now called TDMA (Time Division Multiple Access) (Steinbugl 1999: 2).

centralized and monopolistic operation. While a surging development was recorded during the second stage when China firstly started introducing competitions to the industry in 1994. The third stage marked China's entry into the World Trade Organization in 2001 which indicated a further liberalization of industry exposing to the international competitions. The following empirical findings in the three different perspectives in the section 3.2, 3.3 and 3.4 will all be presented based on the three stages respectively.

3.2 Government intervention on foreign investment

3.2.1 First stage

Since China shifted its focus to the economic development in 1978, foreign investment has become one of the most distinctive characters in nation's economic development. In line with the country's general FDI policies, the government first promoted FDI by adopting a policy of "taking whatever is available on the table" during 1978 to 1986 to promote its telecommunications industry (Tan 2002: 20). FDI was realized mainly through the establishment of telecommunications equipment manufacturing JVs in the early 1980s. The first large JV in China's telecom manufacturing business was Shanghai Bell Telephone Equipment Manufacturing Corporation (Shanghai Bell) in 1984 (ibid.: 21).

And then the policy changed to "selective promoting and accepting" in 1987, which include the policies towards each type of product and the whole industry (ibid.). For the former, it chose to select the best partners and limit the number of JVs. The policies were then mainly applied to the manufacturing of central office switches and other products like optical fibers and optical communication systems (ibid.). For the entire telecommunications industry, there was a government guideline for foreign investment in telecommunications, which was renewed regularly (ibid.: 22).

3.2.2 Second stage

Almost all the international telecom equipment providers enhanced their investment in China during second stage in the forms of JVs, research and development centers and high-tech industrial parks.⁸ Motorola has become the largest foreign investor in China by making an accumulated investment of USD 3.4 billion in 2000. Motorola, Nokia and Ericsson were the top three mobile handset manufacturers in China, occupying a market share of 31.9, 29.4 and 21.4 percent respectively (Chang et al: 2005 115).

In the government guidelines for foreign investment in telecommunications in 1995, FDI projects were divided into three categories under the labels of “encouraged”, “restricted”, and “prohibited” based on the country’s telecommunications development and market demand (Tan 2002: 22). FDI projects were welcomed for those most needed sectors such as digital wireless system, digital microwave systems, asynchronous transfer mode (ATM) switching system and communication software development (ibid.). Restricted category included TV and radio broadcasting systems and non-ATM central systems (ibid.). While the operation and management of posts and telecommunications services are prohibited (ibid.).

While despite China’s tight control on foreign investment in its telecommunications service, foreign telecom operators was able to get into China’s telecommunications operation via the establishment of China Unicom in 1994 via the company’s “Zhong – Zhong –Wai” financing project in 1995.⁹ In the model, a Sino-foreign JV was able to join a Chinese telecom operator to participate into operations such as equipment leasing, consulting and royalties.¹⁰ Many large foreign telecommunications such as Bell Canada, Intel, NTT and Sprint signed contracts with China Unicom’s ventures. “These indirect financing arrangements funneled approximately US\$1.4 billion into Unicom’s business ventures since 1994” (Zita quoted by Mueller and Lovelock 2000:738). However, the

⁸ Nokia, for example, established a joint venture in 1994 in Beijing to manufacture GSM equipments and handsets. In 1998, Nokia established a global research and development centre in Beijing. And in the year 2000, Nokia invested more than RMB 10 billion to build up an industrial park in Beijing's Economic and Technological Development District.

⁹ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

¹⁰ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

project was abolished with the new regulation in 1998 which prohibited foreign involvement in telecommunications services in the forms of JVs (Mueller and Lovelock 2000: 738).

Despite the fleeting “Zhong-Zhong-Wai” model, Sino-US bilateral agreement for China’s entry into the WTO was signed in 1999, allowing China to join the world trade club in 2001 which indicated an easier access of foreign investment to China’s telecommunications sector are foreseeable.

3.2.3 Third stage

China’s WTO entry in 2001 enabled foreign investors to get into the telecommunications services operation sector. China’s key telecommunications services market in Beijing, Shanghai and Guangzhou opened immediately after the WTO entry. Foreign investors are allowed to hold 49 percent of the shares in the telecommunications service sector and 50 percent of shares in value-added telecommunications service in two years. Table 3-1 shows China’s telecommunications industry’s detailed commitments to the WTO.

Table 3-1: China's commitment to the WTO in its telecommunications industry

Year after WTO entry	Chinese telecom industry's commitment to the WTO
Dec. 2001 to Dec. 2002	<p>For value-added telecom services and paging services, foreign investors were allowed to set up JVs in the areas of Beijing, Shanghai and Guangzhou. Foreign investors were able to command 30 percent stake in JVs.</p> <p>The geographic restrictions for both value-added and paging service would be gradually lifted to 14 cities including Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Nanjing, Ningbo, Qingdao, Shenyang, Shenzhen, Xiamen, Xi'an, Taiyun and Wuhan. Foreign investors were allowed to take utmost 49 percent of JVs on value-added services</p> <p>For the mobile voice and data businesses, JVs were allowed but also restricted in Beijing, Shanghai and Guangzhou. Foreign investors were allowed to take 25 percent shares in JVs. The geographic restrictions for mobile voice and data business would also be gradually lifted to the 14 cities. Foreign investors were allowed to take utmost 35 percent of JVs .</p>
Dec. 2002 to Dec. 2003	<p>The geographic restrictions for value-added and paging services had been fully lifted. And foreign investors were allowed to take utmost 50 percent of JVs on value-added and paging services</p>
Dec. 2003 to Dec. 2004	<p>For fixed-line, JVs were allowed for the domestic business and international business of basic telecommunications. Foreign investors were allowed to take 25 percent of JVs in Beijing, Shanghai and Guangzhou. Foreign investors were allowed to take 25 percent stake in JVs.</p> <p>Foreign investors were allowed to take utmost 49 percent of JVs on mobile voice and data businesses.</p>
Dec. 2004 to Dec. 2005	<p>No geographic restrictions for value-added and paging services.</p>
Dec. 2005 to Dec.2006	<p>No geographic restrictions for mobile voice and data services. For fixed-line, JVs for domestic business and international business were expanded to 14 cities with foreign investors taking utmost 35 percent.</p>

Source: Ministry of Information Industry (2005)

During this stage, China's major telecommunications operators all get listed overseas to absorb foreign investment. China Unicom went public in New York and Hong Kong in 2000 and the IPO raised USD 5.653 billion. China Telecom and China Netcom also got listed in New York and Hong Kong in 2002 and in 2004 respectively. Foreign investors

therefore could penetrate into the telecom services operation sector by chipping in the stocks of major telecom operators. Vodafone Group wrapped up strategic investment in China Mobile by purchasing shares of China Mobile for USD 2.5 billion in 2001 and for USD 750 million in 2002, making it command 3.27 percent of China Mobile's shares.¹¹ Foreign investors were keen on buying shares in Chinese telecom operators since then.¹² The moves were new milestones in the opening up of China's telecom market after the country's accession into the WTO. In the past five year, China Mobile, China Unicom, China Telecom and China Netcom has all gone public and raised a total overseas capital of USD 30 billion.¹³

3.3 Government intervention on structural reform

3.3.1 First stage

China's telecommunications industry was under the control of the former Ministry of Posts and Telecommunications (MPT) during 1978 to 1993, who had the exclusive monopoly in providing telecommunications services to the public (Loo 2004: 700). The former China Telecom, an operating arm of MPT was responsible for constructing and providing telecom services to the public. MPT was then monitored by the State Council and former State Planning Commission. On the other hand, MPT also co-operated with the former Ministry of Electronic Industry who was in charge of all electronics manufacturing and information system applications (ibid.).

Besides the general telecommunications services provided by MPT, some other ministries and organizations also had their own private networks for communications such as the Ministry of Railways, Ministry of Power, the Chinese Academy of Sciences and the State Education Commission (ibid.). Most of private networks focused on

¹¹ Zhao, Yi (Media Manager, China Mobile). Note taken during the interview, Beijing, September 21, 2006

¹² Spain's Telefonica in June 2005 acquired a 2.99 percent stake in fixed-line carrier China Netcom for about USD 300 million. Telefonica has later increased the stake to 9.9 percent. SK Telecom bought a stake of 6.6 percent in China Unicom Ltd in June 2006 (Li 2006). Commonwealth Bank of Australia started buying shares of China Telecom in September 2006 and become the second largest shareholder by occupying 8.23 percent in just one month (Liu 2006). Other foreign investors such as Japan's NTT DoCoMo and France Telecom all chipped into the telecom operators via shares investment.

¹³ Figures from Ministry of Information Industry <http://www.mii.gov.cn>

Internet connection during the 1980s while the major goal for MPT was to offer universal fixed-line telephone services and therefore the former China Telecom maintained a monopoly state.

The former China Telecom first launched its analogue mobile service in 1987. Government figures showed that the mobile subscribers stood at 3.63 million by the end of 1995. The slow development of mobile business could be attributed to the high handset prices and service charges. To purchase a handset from the operator and get connected in 1992, “users incurred costs amounting to RMB 25,000 or USD 4,300, which was equivalent to fourteen times the GDP per capita in the same year” (ITU 2001: 14). Only a very few people could afford the services like business people and foreign corporations.

3.3.2 Second stage

With the rapid development of China’s telecommunications, the deficiencies of a monopoly operation have become apparent, especially to the market demand and resources allocation (Chang et al. 2005: 110).

To break up the monopoly of the former China Telecom, China Unicom, a new mobile carrier, was set up in 1994 and started operation on July 1995. The establishment of China Unicom had greatly boosted the mobile sector by introducing competitions to the previously solely mobile operator.¹⁴ By the end of 1995, mobile subscribers in China surged to 43.3 million. The figure skyrocketed to 84.5 million in 2000.

However, there was no fair competition since former China Telecom owned both a nationwide fixed and mobile operations while China Unicom at the very beginning could

¹⁴ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

only operate in limited cities.¹⁵ In the meantime, MPT, the parent of China Telecom still performed as both regulator and operator (Loo 2004:702-703).

To encourage fair competitions, the Chinese government separated former China Telecom from former MPT and formed an independent regulator – the Ministry of Information Industry (MII) in 1999 based on former MPT and former Ministry of Electronic Industry. Also in 1999, MII separated former China Telecom into four separate firms – China Telecom, China Mobile, China Satellite and China Paging, which means China Telecom since deal only fixed-line business after the restructuring.¹⁶ China Paging and the railway telecom firms (which were previously under the Ministry of Railways) were later absorbed by China Unicom.

Meanwhile, to further break China Telecom's monopoly in the fixed-line services, another new operator China Netcom Corporation Ltd was unveiled in 1999 by the Chinese Academy of Sciences, the Ministry of Railways, the State Administration of Radio, Film and Television and the Shanghai municipal government (Hou 2002).

3.3.3 Third stage

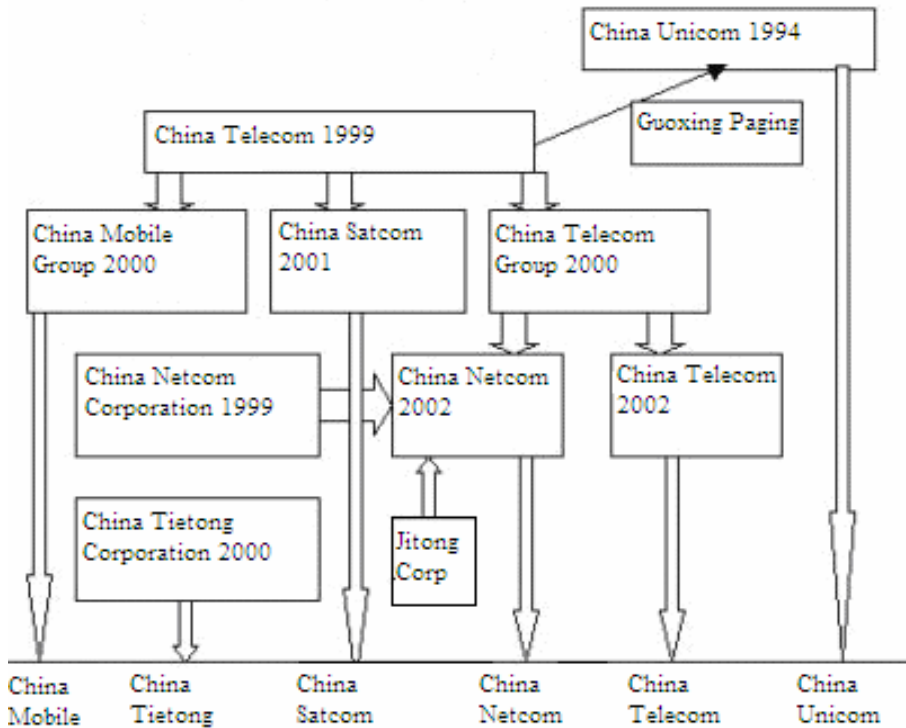
After the industry reshuffle in 1999, MII undertook a new round of restructuring in 2002 to form two major fixed-line operators – China Telecom Group and China Netcom Group by splitting the former China Telecom. China Telecom retained its fortress in the Southern part of China while China Netcom absorbed the northern part used to belong to China Telecom (Hou 2002).

As a result, a new structure of China's telecommunication industry was formulated – two mobile telecom operators (China Mobile and China Unicom) and four major fixed-line operators (China Telecom, China Netcom and China Tietong and China Satcom). Though they are all operated under the guidelines of market economy, the State still has the controlling shares of all the telecom operators and their operations are currently

¹⁵ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

¹⁶ Zhao, Yi (Media Manager, China Mobile). Note taken during the interview, Beijing, September 21, 2006

supervised by the State-owned Assets Supervision and Administration Commission of State Council established in March 2003. Figure 3-2 shows the formation of the six major telecom operators.



Source: Sina.com.cn (2004)

Figure 3-2: Restructuring process of Chinese telecom operators

However, further structural reform is within expectation as the country is embracing a new challenge brought by the upcoming 3G development. With the fixed-line operators losing their competitiveness to the mobile operator, China Telecom’s chairman and CEO expressed his desire to get involved in mobile operation to deal with its falling revenue (Li 2007). “It is better to reshuffle the telecommunications industry before 3G is actually rolled out in China.” (Chen 2006).

3.4 Government intervention on technological development

3.4.1 First stage

Since the technology is gaining increasing importance in the national economic development, “many developing countries governments tend to intervene through various types of regulation, thereby affection the diffusion of new technologies (Gruber & Verboven 2001: 1190). China has no exception. To enable domestic players to upgrade their technology and gradually reduce independence on foreign imports, the government “formulated a four-step strategic policy: import, digestion, absorption and creation” in the early 1980s (Braidne 2005: 49).

In the first stage, foreign technologies and products in fixed-line and mobile telecommunications were introduced dramatically from outside China such as switching system, digital networks, data communication gateways and various enhanced services increased as well (Chang et al. 2005: 107). Since the primary aim of the MPT, China’s telecommunications regulator till 1999, was to enhance the coverage of the fixed-line services in China, it introduced the first set of SPC exchange in 1982 in Fuzhou, Fujian Province by Fujitsu from Japan in 1981 (Tan 2002: 23). As mentioned in section 3.2.1, the first telecommunications JV Shanghai Bell with Belgian Government was established in 1984. In 1986, the JV manufactured the first set of S1240 SPC exchange, which has laid a solid foundation for China to develop its own digital SPC exchange (Liu: 2006).

On the other hand, despite the dominant foreign digital switching system in the Chinese market, there were increasing domestic telecommunications equipment manufacturer who were striving for technological development. ZTE established in 1985, Huawei Technologies in 1988 and Great Dragon Telecommunications in 1994 are all engaged in equipment manufacturing such as switching system, optical transmission, data communications and mobile equipment. Most of Chinese equipment providers were at developing stage in later 1980s.

To support the domestic firms, the Chinese government provided various market protection and incentives for the development of domestic products. For example, the government in 1996 started imposing tariffs on imported communication equipment and at the same time promoting the domestically made equipment (Mu & Lee 2005: 778). Meanwhile, an annual coordinating conference was convened by MPT and the Administrative Bureaus of Post and Telecommunication to encourage the purchase of domestically made equipment (ibid.).

For the mobile telecommunications, compared to the European and US markets¹⁷, first generation of analogue mobile service in China was not available until 1987 based on British TACS system. The service was solely operated by former China Telecom under the control of MPT.¹⁸

The steps of “Digestion, absorption and creation” were mainly reflected in later 1990s and early 2000s which will be depicted as followed.

3.4.2 Second stage

As for digestion and absorption parts, following the establishment of Shanghai Bell, many domestic firms were set up to deal in switching systems. Prior to the official establishment of Great Dragon Information Technology in 1994, the company in the preparation developed China's first public digital switching system – HJD04. The system has become extensively use for government and military telecommunications networks (Fan 2003:63). In November 1995, ZTE developed ZXJ10, large-scale public digital switching system which was deemed as the company's major products and enabled the company to grab a large share in the domestic market (Fan 2003: 58-61, Liu 2006). Similarly, both Huawei and Datang Telecom Technology Co Ltd developed their large-

¹⁷ Europe first introduced the analogue wireless service in 1981, when the Nordic Mobile Telephone System or NMT450 began operating in Denmark, Sweden, Finland, and Norway in the 450 MHz range. It was the first multinational cellular system. In 1985 Great Britain started using the Total Access Communications System (TACS) at 900 MHz. Later, the West German C-Netz, the French Radiocom 2000, and the Italian RTMI/ RTMS helped make up Europe's nine incompatible analog radio telephone systems. (Farley 2005:29) In the US market, analogue technology based on Advanced Mobile Phone Service (AMPS) was firstly commercially introduced by the regional Bell operating company Ameritech in 1983.

¹⁸ Zhao, Yi (Media Manager, China Mobile). Note taken during the interview, Beijing, September 21, 2006

scale switching system C&C08 and SP30 in middle of 1990s respectively, bringing a fast growth for the companies (ibid.).

As for the development of 2G in China, in order to upgrade its mobile telecommunications system and competition, China Unicom, the newly-established mobile operator was granted the permission to run both GSM and CDMAOne networks.¹⁹ This was compared to the only one GSM network for China Mobile. The two technologies have enabled subscribers to have one more choices while choosing a mobile communications services.

For the development of new technology, Datang Telecom Technology Co Ltd on behalf of the Chinese government raised TD-SCDMA to the ITU as 3G communications standard in June 1998. The standard was approved by the ITU as one of the 3G standards in May 2000.²⁰

3.4.3 Third stage

The development and expansion of Chinese firms was empowered by the government's general advocate of going overseas policies starting in 1990s. Leading Chinese telecommunications equipment manufacturers such as Huawei Technologies, ZTE, Datang Telecom Technology and GDT all have registered a quick development starting the new century. Through technological diffusion, Huawei and ZTE, for example has become a comprehensive producers who are not only command a high market share in the Chinese market, they also expanded to foreign countries and regions and earn a world reputation as very competitive equipment providers.

As for new technology is concerned, Starting 2001, the Chinese government resorted more efforts to develop its self-development 3G TD-SCDMA technology since it acknowledged by 3GPP, an international organization to promote 3G development.

¹⁹ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

²⁰ Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

Government's intensive efforts for the development of TD-SCDMA included preferential policies, huge investment and allocation of frequency resources and the establishment of industrial alliance, etc.

The Ministry of Information Industry in October 2002 allocated 155 Megahertz spectrum to TD-SCDMA which was in contrast to the combined 120 Megahertz for WCDMA and CDMA. MII had allocated a total of RMB 107 million capital for the TD-SCDMA system. Fund from the Ministry of Science and Technology and the State Development Reform Commission were RMB 113.9 million and RMB 83 million respectively.²¹

Also, it was under the joint efforts of the MII, MST and SDRC, a TD-SCDMA industrial alliance was established in October 2002 with the eight members including Datang Telecom, Huawei Technologies, Lenovo, ZTE and China Putian. In 2004, the industrialization of TD-SCDMA was launched with supporting capital of RMB 700 million from the three government sectors. In 2005, Datang Telecom Science and Technology Industry Group secured a loan of RMB 300 million from the State Development Bank to support the development of TD-SCDMA.²²

Stimulated by the government support, more and more foreign telecom-related investors joined the development of TD-SCDMA standards. A JV to develop chips for TD-SCDMA handsets and design of TD-SCDMA phones was established in 2003 by Datang Mobile, Philips and Samsung. Datang Mobile and Nortel Network established a joint lab to promote the commercialization of TD-SCDMA in 2003.²³ Datang Mobile signed a strategic co-operation in 2004 with Alcatel Shanghai Bell in which Alcatel Shanghai Bell would invest RMB 2.5 billion for the industrialization and research and development for TD-SCDMA system.²⁴

²¹ Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

²² Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

²³ Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

²⁴ Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

Chapter 4 Discussion

This chapter will apply the analytical framework constructed in chapter 2 to the empirical case and test the propositions. In section 4.1, government intervention on foreign investment will be discussed to reflect government role in nurturing its telecommunications industry. Section 4.2 will deal with government role in structural reform to gradually introduce an increasing competitive environment. In section 4.3, technological development with government support will be analyzed to show the importance of government intervention in the development of telecommunications industry.

4.1 Foreign investment

Proposition 1 suggests that government role on absorbing foreign investment in telecommunications industry might change from the peripheral telecommunications manufacturing sector in early stage to gradually expand to key factors such as services operation later on. Judging from the empirical case, we find that the proposition is rational as the foreign investment in China's telecommunications industry has witnessed a changing process since 1978. The Chinese government has adopted gradually opening up policies toward the industry by first allowing foreign investors into the equipment manufacturing sector and then moving to the partly lift its restrictions to the services sector and then opening wider in line with its commitment to the WTO.

In the early stage since 1978, the booming foreign investment in equipment sectors were mushroomed in China in forms of joint ventures, high-tech parks which contributed to the fast development of China's equipment manufacturing industry in 1980s and 1990s. The government's conservative policies such as "taking whatever is available on the table" during 1978 to 1986 and "selective promoting and accepting" in 1987 have greatly boosted the development of China's telecommunications equipment industry mainly in two ways. First it helped ease the capital shortage for the growth of the telecommunications equipment providers. on the other hand, it contributed to enhance the

technological development of domestic equipment providers which will be elaborated in section 4.3.

Meanwhile, deemed as highly important for national security, the telecommunications services have been under tight control by the state. To allow foreign investment in the telecommunications services sector may indicate that of losing national interest and jeopardizing the national security. Consequently, the Chinese government has developed policies like "Provisional Measures for the Administration of Examination and Approval of Deregulated Telecommunications Operation" by the former MPT in November 1993. Therefore, the telecom services remained untouched by foreign investors. On the other hand, under the general guidance of "crossing the river by touching stones", China in the early stage is unlikely to adopt wider market liberalization like in Eastern Europe and the former Russia, which partly prevented the involvement of foreign investment in its telecommunications services sector.

In fact, we can tell from the empirical findings that government policies toward foreign investment in telecommunications services changed accordingly starting 1990s. Government's hesitant opening up to foreign investment could be well illustrated by China Unicom's "Zhong-Zhong-Wai" project. With the help of the project, China Unicom managed to attract foreign capital for its development, though foreign investors were in principle asked to contribute capital, but "denied management or other oversight duties" (Harwit 1998: 190). However, the project was called to an end in 1998, as "the central government remains cautious about foreign involvement with the now near-monopoly carrier" (ibid.). By doing this at the stage, the state didn't seem to like introduce competition among domestic telecom operators, especially with the involvement of foreign investment in telecommunications operations.

We can find from the empirical case that in the later stage, China was more likely to be forced to open wider to foreign investors. Reasons for China's opening up could be classified into external and internal aspects. The major external factor is that the globalization of world economy has made China necessarily to join the WTO to sustain

its national economic development. The internal factor is that the government political will to build up a world leading telecommunications industry as China's telecommunications industry has already developed into one of the world largest market after years of development. Revenue for telecommunications industry in 2002, the first year after China's entry into the WTO, has reached RMB411.5 billion. It has registered 214.4 million fixed-line subscribers and 206.6 million mobile subscribers.

The policies toward foreign investment well reflected Johnson's "development state", in which the Chinese government tried to develop the telecommunications industry by using both developmental and protective tools. From the developmental side, the Chinese government adopted a policy of subsidizing telecommunications with postal service, enhanced its investment in telecommunications infrastructure as well as attracting foreign investment. From the protective side, it removed the restriction gradually in line with the development of China's telecommunications industry.

In summary, along with the transition from the planned economy to a market-oriented socialist economy, restrictions on foreign investment in telecommunications industry has been gradually lifted step by step first from equipment manufacturing sector and to services operation sector to favor the development of the development of the telecommunications industry and national economy.

4.2 Structural reform

Proposition 2 suggests that government control on telecommunications firms changes in line with changing market environment. Government intervention on structural reform helps bring in market liberalization by breaking monopoly and introducing competition in the telecommunications industry. We find that in the empirical case that the Chinese government follows the suggestion by carrying out rounds of structural reforms to enhance the competitiveness of telecom operators.

Chinese telecom operators have long maintained a very tight relation with the government. Former China Telecom, an operational arm of the former MPT dominated

the industry until late 1990s. The monopoly in the early stage helped the government to carry out the construction and maintain of nationwide telecommunications infrastructure as well as centralized management on network and information security especially when exposed to the gradual opening of telecommunications market. However, the monopoly of the former China Telecom also brought with negative effects such as “high prices and a narrow range of service options” (Yu et. al 2004: 716).

The first step the government undertook to invigorate the market was to establish China Unicom in 1994 to bring in competitions. However, by the end of 1998, China Unicom only accounted for about 5 percent of the country’s mobile telecommunications market (Song and Wang 2002). We can find that government was aiming to form a duopoly in the industry. The huge gap between former China Telecom and China Unicom only meant nothing but ineffective competitions. In fact, the former China Telecom was still affiliated to the MPT when competed with China Unicom in 1994. With the MPT acted both as regulator and operator, it tended “to adopt an asymmetric regulation that retained a favorable political and market position for the dominant China Telecom” (Gao and Lyytinen 2000). For example, China Unicom had restrictions on the access to the local phone network for interconnection and to share such public resources as phone numbers and radio frequencies²⁵. Nevertheless, we could see that introduction of new operators was a step forward to break up the monopoly and the introduction of China Unicom provided a possibility for the market to see full competitions.

The second step was made in 1999 with the establishment of MII, a comparatively independent regulator for telecommunications industry as well as the break up of former China Telecom. The breakup of former China Telecom was conducted like what the US government has done to Bell Company in 1982 to divide the conglomerate from comprehensive telecommunications operation to four companies in different specialized businesses such as mobile, fixed-line, satellite and paging (Song and Wang 2002). The independent regulator enabled the telecom operators to have fair play and more freedom to make decisions and more quick response to the market demand and changes.

²⁵ Liu, Nana (Media manager, China Unicom). Note taken during the interview, Beijing, September 8, 2006

The third major change was the further restructure in 2002 by forming two giant fixed-line telecom operators in southern and northern China demonstrated the government determination to bring in competitions among telecom operators with similar business operations. A major competition structure was then sketched between China Mobile and China Unicom in mobile business, China Telecom and China Netcom in fixed-line business. However, compared to the Japan's telecom market, for example, there is less competition in the Chinese market. In Japan, its mobile telecommunications market is mainly divided by NTTDoCoMo, KDDI and Vodafone.²⁶

In the 2000s, the government policies has changed from the direct intervention such as price regulation to the adjustment of market structure such as lowering the market access requirements and introducing competition mechanism to enhance firms' competitiveness (Song and Wang 2002). Since the mobile telecommunications has become a developing trend in China, the fixed-line operators are calling for licenses for the mobile operation under the condition that the Chinese government is going to introduce 3G operation during the Beijing 2008 Olympic Games. Therefore, we can expect the continuous restructuring trend for domestic telecom operators and more market competitions and liberalization are expected. The empirical finding suggested that China's reform on telecommunications industry was done in small steps which are in line with Wade's prescription for the developing countries in economic development (Wade 1990: 220).

In summary, we found the proposition 2 could not be falsified based on empirical case. In another word, there is a trend that the government has gradually loosen its control over state-owned telecom operators by breaking monopoly and introducing competitions which help drive the development of telecommunications industry.

²⁶ Taba, Shigeru (Fleet Management Service Group Director, NTTDoCoMo Inc). Notes taken during the interview, Tokyo, August 2, 2006.

4.3 Technological development

Proposition 3 suggests that government would work actively in importing foreign technology and pursuing new technology to improve the performance of telecommunications industry and catch up with the developed countries. Judging from the empirical findings, we found that the proposition is highly rational. The technological development of China's telecommunications industry first introduced foreign technology such as SPC exchange in early stage for its fixed-line telecommunications and then developed its own digital SPC exchange which then enabled telecom equipment providers to compete worldwide. The empirical case also found with regard to its mobile telecommunications industry, the government intervention were very successful in helping China to catch up with the leading countries by developing China's own competitive 3G TD-SCDMA technology.

In the area of importing foreign technologies, first of all, government's conservative policies such as "the four-step strategic policy: import, digestion, absorption and creation" in the early 1980s help domestic telecom equipment providers gain an access to import foreign technologies such as switching system and optical fiber. Huawei Technologies and ZTE are the two major examples for the domestic equipment providers to catch up with its international competitors. "China's success in establishment of a position in the telecommunications switching equipment market is evidence both of its ability to absorb technology to produce a reasonably competitive product and to leverage domestic policy tools, such as market quotas, to reduce the share of foreign firms" (Mueller and Lovelock 2000: 742). "China's switch market is an exceptionally successful example where the government policy on FDI has guided FDI's involvement to serve China's national interests" (Tan 2002:24) The four-step policy echoed Amsden's growth model of "late industrialization" in South Korea.

Also, we found that the government was playing an important role to decide which kind of standard to adopt to develop its telecommunications industry. In the era of 2G, the introduction of GSM technology for China Telecom and both GSM and CDMAOne

technologies for China Unicom have greatly boosted China's mobile telecommunications industry by bring in enhanced capacities and cheaper mobile phone services.

“Economic performance is intimately related to technological change, and by technological change we mean the acquisition, diffusion, and creation of new technologies” (Brunner 1995: 17). The government intervention in the development of China's 3G TD-SCDMA technology is a good example of its efforts to develop new technology to catch up with international players. Accepted together with the other two standards by the ITU in 1998, “TD-SCDMA stood as a milestone for the Chinese telecommunications industry as it is the first acknowledged international telecommunication standard proposed by China” (ITU 2006: 36). The 3G technology enabled China to get rid of high patent fees paid for importing the other two 3G technologies, though WCDMA and CDMA 2000 will be the natural migration for GSM and CDMA2000 into 3G era.²⁷

Compared to CDMA2000 and WCDMA, TD-SCDMA holds the greatest policy advantage since the central government awarded 155M spectrum to the development of the homegrown system and a large sum of fund for its industrialization and commercialization. The allocation of 155Megahertz spectrum will have great impact of China's 3G market as “its allocation will have a significant impact on the future course of the development of the mobile telecommunications market and the type of competition” (Taplin & Wakui 2006: 7).

In summary, we can say that the proposition 3 is highly provable and can not be falsified. The technological development of China's telecommunications industry has witnessed a process from importing foreign technologies to develop its self-owned leading technologies. We can also find that the Chinese government has long playing an administrative role in technological choice and development. “A continuing uneven diffusion of, and unequal access to, new technologies may lead to increased

²⁷ Li, Meng (Media Manager, Datang Telecom). Note taken during the interview, Beijing, March 21, 2007

marginalization of most, if not all, economically underdeveloped nationals” (Brunner 1995: 33). Generally, the government wanted to assimilate foreign technologies to become self-sufficient or even able to export its products to the outside world with the policies of import, digestion, absorption and creation. While at the same time the government is targeting to develop its own technologies to gain firm foothold in the international competitions.

Chapter 5 Conclusion and further research

Government intervention has actually become a strong and effective stimulus to accelerate the telecommunications industry in China. We can draw a conclusion that the success of government intervention for the promotion of telecommunications industry could be attained by effective intervention in three major aspects 1) foreign investment; 2) structural reforms and 3) technological development.

In the areas of foreign investment, restrictions on foreign investment in telecommunications industry should be lifted by opening the peripheral telecom equipment manufacturing first and then moving to central factor in telecomm services sector. For the structural reform, government should gradually loosen its control over state-owned telecom operators by breaking monopoly and introducing competitions step by step in line with the changing market environment. As far as the technological development is concerned, the government should import foreign technologies while develop its self-owned leading technologies starting in early stages to catch up with international competitors.

Therefore, the thesis could be interpreted that government intervention on foreign investment, structural reform and technological development are of vital importance to intervene the market to help boost the development of telecommunications industry in China. That would particular helpful for developing countries as they are normally embracing similar social and economic problems on their way of industrialization like what China has been gone through.

However, this is not to say that government intervention in the three aspects are the only ones needed for the sound development of China's telecommunications industry, there are other factors need to be taken into considerations such as market and demand. Also as the largest development countries in the world, we should bear in mind that the Chinese telecommunications industry has its unique structure provided by specific institutional endowments and regulations in China. "Government intervention and relative

authoritarian and centralized decision-making procedures all add distinctiveness to the Chinese telecommunications industry” (Fang and Yen 2006: 37).

However, riding on the wave of the development on telecommunications industry worldwide, the China case could be generalized for many developing countries that the government intervention is highly recommended in the development of its telecommunications industry by mulling preferential policies in the three major aspects. By doing so, the government changed its policies in line with the changing market situation both internal and external.

Further research could look at other factors concerning the development of Chinese telecommunications industries or the three factors in other industries and compare them to China’s telecommunications industries to see why some industries are changing faster than others.

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