STATE-LED CATCH-UP:
CHINESE TELECOM EQUIPMENT INDUSTRY

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ABSTRACT

STATE-LED CATCH-UP:
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The aim of this dissertation is to investigate an alternative policy to the neoliberal development policy suggestion in the scope of the high-technology industrial catch-up of the latecomers with testing the hypothesis of "Chinese telecom equipment industry's catch-up is the success of the guidance of the state and the state-led development policies."

In this policy, the state's active and interventionist role is suggested in all phases of the catch-up. It is a triple system of state, foreign investment, and national industry-capital, and this system has a dynamic and interactive relation with each other.

Telecom equipment industry of China is chosen as a case study for this research. Study of Chinese high-technology catch-up with related theoretical approaches, which underline the importance of the "triple system", is the main contribution to the literature. Policy part of the conclusion chapter suggests an alternative catch-up way to the latecomer economies, rather than neoliberal catch-up policies. This model is managed by the state and "transfer of modern

technologies via JVs between MNCs and national companies", "funding of industrial activities by state-owned banks and markets" and "re-organizing or creating competitive SOEs in these industries" are the major characteristics of the model.

This system is named in this thesis as "generative state" in which the state creates and sets up all related institutions and processes which are necessary to development and catch-up in a continuous manner. State actively manages all these phases with state-owned instruments. This structure as a whole is the major finding of the thesis.

Keywords: State-led, catch-up, China, telecom, telecom equipment

ÖZ

DEVLET KAYNAKLI YAKALAMA: ÇİN TELEKOM EKİPMANLARI ENDÜSTRİSİ

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Doktora, Bilim ve Teknoloji Politikası Çalışmaları Bölümü

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Bu tezin amacı, geriden gelen ülkelere yüksek teknoloji içeren endüstrilerde yakalama ve gelişme fırsatı sağlayacak, neoliberal kalkınma politikalarına alternatif oluşturacak politikayı "Çin telekom ekipmanları endüstrisindeki yakalama, devlet yönlendirmesinin ve devlet kaynaklı yakalama politikalarının başarısıdır" hipotezini test ederek oluşturmaktır.

Bu politikada yakalamanın her aşamasında devletin aktif ve müdahaleci rolü ön plana çıkarılmaktadır. Bu yapı, içerisinde devlet, yabancı yatırımlar ve ulusal endüstri ve sermayenin olduğu ve birbirleriyle dinamik ve interaktif bir ilişki içerisinde oldukları "üçlü bir yapıdır".

Bu araştırma için Çin telekom ekipmanları endüstrisi örnek endüstri olarak seçilmiştir. Bu üçlü yapının önemini vurgulayan teorik yaklaşımlarla çalışılan Çin'deki yüksek teknoloji içeren endüstride yakalama çalışması, tezin literatüre temel katkısıdır. Sonuç bölümünün politika kısmı, neoliberal yakalama modellerine alternatif bir politika önerisi sunmaktadır. Bu model, bizzat devlet tarafından yönetilmekte olup, "ulusal firmalar ve çokuluslu

firmalar ile kurulan ortak girişimler sayesinde modern teknolojileri transfer eden", "endüstriyel faaliyetlerin devlet yönetimindeki bankalar ve pazar tarafından finanse edildiği", "endüstri içindeki kamu iktisadi teşebbüslerinin re-organize edilerek rekabetçi bir yapıya kavuşturulduğu" özel bir sistemdir.

Tezde bu sistem "doğurgan devlet" olarak tanımlanmış olup, devlet, gelişme ve yakalama için gerekli tüm kurum ve süreçleri doğurur ve onları sürekli olarak yenileyerek sürecin devamını sağlar. Devlet, tüm bu aşamaları kendi enstrümanlarıyla bizzat yönetir. Bu yapının tamamı ise tezin temel bulgusudur.

Anahtar Kelimler: Devlet-kaynaklı, yakalama, Çin, telekom, telekom ekipmanları

To My Family

Nursen, Selahattin and Sinem

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LIST OF ABBREVIATIONS

CCP	China Communist Party
USSR	The Union of Soviet Socialist Republics
IMF	International Monetary Fund
WTO	World Trade Organization
US	United States
UK	United Kingdom
G8	Group of Eight Nations
LTE	Long Term Evolution Technology
4G	4th Generation Mobile Communication Technology
EU	European Union
ECLA	Economic Commission of Latin America
ECA	Economic Commission of Africa
ECLAC	Economic Commission of Caribbean
FDI	Foreign Direct Investment
NIC	Newly Industrialized Countries
MITI	Ministry of International Trade and Industry
TNC	Transnational Corporation
SOE	State-Owned Enterprise
SHC	State-Held Sharing Enterprises
SEZ	Special Economic Zone
SASAC	State-owned Assets Supervision and Administration Commission
MOST	Ministry of Science and Technology
CAS	The Chinese Academy of Sciences
OECD	Organization for Economic Co-operation and Development
S&T	Science and Technology

GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
FTE	Full-Time Equivalent
WIPO	World Intellectual Property Organization
PCT	Patent Cooperation Treaty
R&D	Research and Development
CCP	Communist Party of China
TD-SCDMA	Time Division Synchronous Code Division Multiple Access
JV	Joint Venture
UNCTC	United Nations Centre on Transnational Corporations
MNC	Multinational Corporation
TMFT	Trading Market for Technology
3G	3rd Generation Mobile Communication Technology
CMTF	Chinese Telecom Manufacturing Firms
SPC	Stored Program-Controlled
MPT	Ministry of Posts and Telecommunications
ITT	International Telephone and Telegram Corporation
PTIC	Posts and Telecommunications Industrial Corporation
BTM	Bell Telephone Manufacturing Company
BISC	Base Station Identity Code
EWSD	Electronic Worldwide Switch Digital
PDSS	Packet Data Switch Subsystem
TACS	Total Access Communication System
GSM	Global System for Mobile Communications
GPRS	General Packet Radio Service
CDMA	Code Division Multiple Access
W-CDMA	Wideband Code Division Multiple Access
ITU	International Telecommunication Union
PLA	People's Liberation Army
PBX	Private Branch Exchange
CNY	Chinese Yuan

SPC Switch	Stored Program Controlled Switch
SDH	Synchronous Digital Hierarchy
IPD	Integrated Product Development
ISC	Integrated Supply Chains
UMTS	Universal Mobile Telecommunications System
HSPA	High Speed Packet Access
CATT	China Academy Telecommunication Technology
USTR	Office of the United States Trade Representative
CAE	China Academy of Engineering
EVDO	Evolution-Data Optimized
TD-LTE	Time-Division Long-Term Evolution
HSDPA	High-Speed Downlink Packet Access
PRC	People's Republic of China
CFIUS	Committee on Foreign Investment in the United States
MSS	Ministry of State Security
ESOP	Employee Stock ownership Program
LTEF	Luoyang Telephone Equipment Factory
CIT	Center for Information Technology
AVIC	China Aviation Industry Corporation
AIA	Airbus Industry Asia

CHAPTER I

INTRODUCTION

The central topic of the thesis is to signify the possibility of state-led catch-up in high-technology industries via merging know-how spillover from foreign investments, local industrial capabilities under the management of the state authorities with the nations' own dynamics. This method will bring an alternative solution to the hegemonic view of neoliberal catch-up and the development policy suggestions for latecomers.

Since 1980s hegemon view insists on widespreading neoliberal development models and prescriptions through the world. Specifically after the collapse of the USSR, this view increased its effect on world economy, also on developing countries. Thus, market economies and state's regulatory role (minimum intervention) are presented as the best way for development. The "state" which symbolizes bureaucratic and inert public sector is seen as an obstacle to dynamic and competitive market economy. That view is imposed as a common fact globally against state-led development models. In fact, laissez-faire and free market policies are arranged in order to provide the sustainability of neo-liberalism and regulatory role of the state. Defenders of this view emphasize that there is not any other rational choice in order to afford economic development and social welfare.

In this framework, Washington Consensus was announced as reference model in 1989 by John Williamson from the Institute for International Economics in Washington, D.C. This view is systematically imposed by IMF, World Bank and WTO with strong support of G8 countries in recent decades. Williamson listed ten certain generalizations related to economic growth in

developing countries. The three of them are underlined as follows[1] with the negative effects on national development.

*redirection of public spending from subsidies toward education and healthcare services:

Thus, latecomers' policy of subsidizing strategic industries is prevented and these financial sources are used to purchase imported products/services of the developed countries.

*trade liberalization; eliminating tariffs and protection of the national industries:

Through this policy, newly emerging national industries of latecomers had disadvantages compared to the developed industries of forerunners in the fierce competition. Thus, these industries could not catch-up, if there is not any protection system, at least during their periods of emergence and growth.

*privatization of the state enterprises:

State loses its control on economy and market as an active player, and market directs national economy with short-term, profit-oriented decisions. The economy is manipulated and controlled by multinational and national private firms.

Washington Consensus and its prescriptions suggest a shift from state-led dirigisme to market oriented policies as Gore (2000) underlined. Privatization, liberalization and passive regulative state give the control to the market in economic growth for the developing countries. Although these policies could not succeed real economic growth in developing economies, the policies also created industries which are strongly dependent on developed countries. In those industries, value-added phases are managed by the developed (core) countries, and latecomers (periphery) are either seen as low-cost manufacturing opportunities or as new market potentials as indicated in "division of labor" analysis of Wallerstein's world-system theory.

[1] Williamson, J.(1989) "What Washington Means by Policy Reform", in: Williamson, John (ed.): *Latin American Readjustment: How Much has Happened*, Washington: Institute for International Economics.

Against liberal and free market policies, in fact, state played its effective role in each period of time through different models. Today's developed countries, which suggest minimalist role of the state, also used "state" as an active development instrument during their development and catch-up periods. G8 countries could be given as an example of powerful defenders of neoliberal development models; the US, the UK, France, Germany, Italy, Canada, Japan and Russia after the collapse of the USSR. Almost all of these developed countries still use "interventionist" policies especially in strategically important fields and industries via illegal subsidies, protectionist policies etc. For instance, technological revolutions in some recent industries; computer industry, aircraft, pharmacy, defense, biotechnology, nanotechnology have been achieved with the aid and leading role of state in those countries. This role of the state is not indicated explicitly because of the international rules which are imposed on the latecomers.

The effect of the state could change based on the state's role and involvement in the system. Namely, in some cases, "state" could be seen as a risk-taker, and it invests in strategically important, however risky industries instead of private sector. State could also define strategies as the supreme authority and does not involve in the activities of the industry. On the other hand, the state could actively involve in any phase of the development with the state-owned players and manage all phases of the development in the industries. China, which is the case study part of the thesis, will be evaluated in this last group.

Today's developed countries still use the "state" as an active instrument and intervene in the industries with different models, however, hegemon organizations, that are managed by these countries, obstinately insist on the "neoliberal" policies and the passive role of the state during the catch-up and the development of the economies. This contradiction has to be declared, and diversionary policies should not be assumed and applied by the latecomers. Otherwise, these latecomers could never attain a real economic development and close the gap between them and the developed capitalist economies.

By following this view, the "state" and its "role" should be defined with a general perspective. State is the main authority, and it certainly manages the economic system with active policies, tools and actors by taking into consideration the society's benefits and interests. This main authority ensures benefits only with "interventionist" policies, rather than passive regulatory policies, because there are not any fair markets in the world such as those mentioned in the neoliberal theories. There are two main groups of countries; developed and non-developed. Those developed have significant advantages like accumulated knowledge, financial sources, market advantages etc. than compared to the latecomers. However, the latecomer is "late comer" in each of these headlines, and by implementing free-market policies, latecomers could not close the gap in this scenario. Thus, "state" is the sole factor which could decrease the impact of the advantages of the forerunners. Latecomer economies should certainly give a proactive role to the state. Active involvement in newly emerging strategic fields with state's policy and state financial sources is a critical priority for latecomers.

This thesis is a timely contribution to do ongoing debate regarding the role of the state in development and catch-up for latecomers. This research aims to prove the important role of the "interventionist state" during catch-up of the latecomers in order to protect the national industries from free market policies which are imposed by the developed countries and hegemon authorities.

The thesis will bring a different sight to the problem of "latecomer development" discussion. Against neoliberal and free market policies and suggestions of hegemonic organizations, the thesis aims to show the alternative way of catch-up under the active management of the state authority. This "state-led" development policy suggestion is also studied with a high-technology industry case –telecom equipment industry. Re-emergence of the importance of the active role of the state instead of the widespread hegemony of the neoliberal policies, and the case study with the Chinese telecom

equipment industry catch-up is the novel part of the thesis. Hereafter, the thesis will contribute to the "state-led" policy discussions.

Additionally, the thesis discusses one of the popular high-tech industries of the 21st century around theoretical framework related to state-led theories of before 1900s, 1940s and 1970s. Thus, this characteristic of the thesis contributes to the literature with a different glance and discusses catch-up theories with macro state theories. In fact, all these theories which will be discussed in the theoretical framework chapter assigns different meanings to the "state". In the following chapter, it is also discussed that the historical role of the state of China and the role of the state today are quite different from the similar ones in the world. The state manages and also directs all parts in the economy directly or indirectly. There is a strong state control on the national economy. This characteristic of China is also underlined in the thesis. From this point of view, China's catch-up in telecom industry is not the sole case, instead, there are also other strategic and popular industries (aircraft, automotive, computer technologies etc.) in which China attained successful development stories. All these are the output of the interventionist state policies in each phase of development. Thus, the thesis draws theoretical framework around state-led development discussions.

In this perspective, the thesis is based on a theoretical framework which focuses on the development of the latecomers. These major theories suggest alternative models for the latecomers in order to catch-up with the developed nations. These models include views of liberal policies, Marxist view and also state-led hybrid catch-up theories. Theories are studied in a broad perspective with related cases and examples. Although all these theories and model suggestions are beneficial for the study, the thesis is not based solely on one model, instead a new model is presented in order to clarify the succession of Chinese high-technology catch-up in recent decades, which will be used as a reference by the other latecomers.

China is selected as the case country of the thesis, because China is under strong state authority since the socialist economy period of Mao and the reformist period of Deng, as well. Although after 1979, China applied an open

economy model, China did not follow free market policies and fully liberal policies, rather, China continued its development period under strong authority of the Chinese state and the Communist Party of China. With this new strategy, China was integrated into the capitalist economies, and achieved significant economic growth rates and industrial catch-up.

Telecom equipment industry is the case study of the thesis because this industry has a significant impact on the communication world especially since 1970s. Communication between the people and the countries are settled on telecom technologies and equipment industry covers the range of products from telegraph and telephone technologies to today's 4G (LTE) mobile communication and data network. These technologies also become strategic both for national security concerns and for commercial perspectives. Thus, specifically developed countries have focused on the development of telecommunication technologies in the recent decades.

In sum, China's transformation since the reform in 1978 and the relevant changes of policy and their effects on the industry are discussed briefly in the thesis. Detailed case study of the Chinese telecom equipment industry is presented to explore the specific role of the state in each phase of the catch-up, and it underlines the relations between the state authority, the national capital/companies and also the foreign investments under a triple system. A summary of the structure is presented by Figure-1. This mechanism is studied comprehensively in separate chapters.

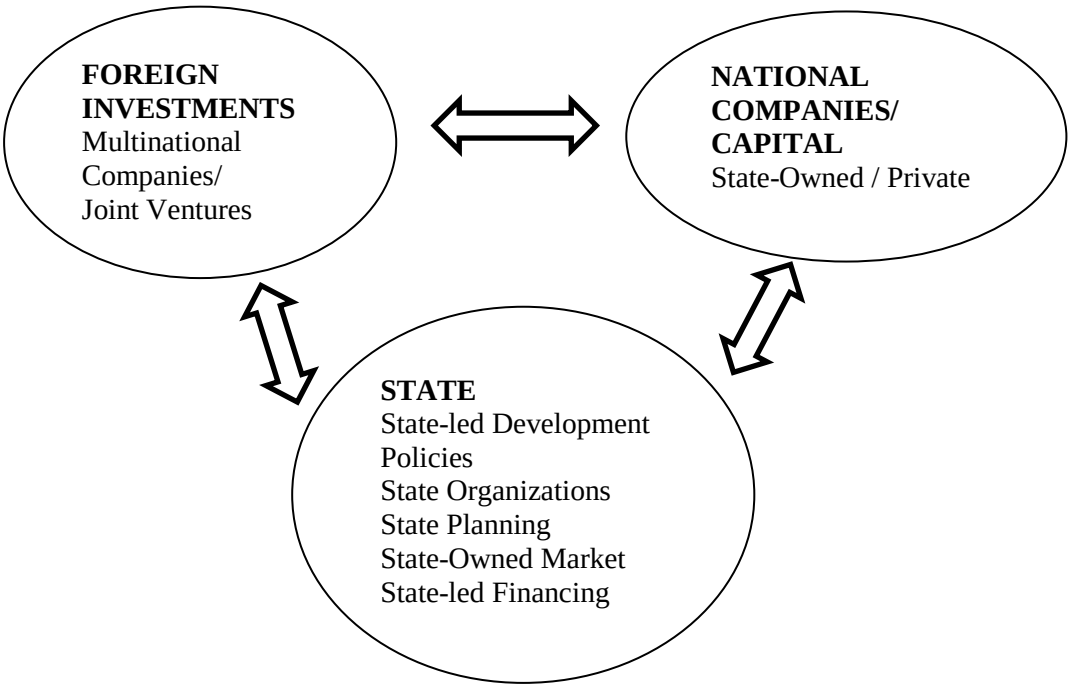


Figure 1: Triple System-Major Actors for Chinese Telecom Equipment Industry Catch-up

Finally, neoliberal scholars and hegemon organizations as World Bank indicates that Chinese case is the result of the successful free market policies. China should expand the privatization, apply free market policies and eliminate the effect of state on domestic market. Recently published report of World Bank (2013) "China 2030: Building a Modern, Harmonious, and Creative Society" also aims to encourage China to apply capitalist economy rules and creates free domestic market without state intervention.[2]

[2] This report makes two points: first, that government should encourage increased competition in the economy, including by increasing the ease of entry and exit of firms as soon as possible; and second, that public resources should be used to finance a wider range of public goods and services to support an increasingly complex and sophisticated economy. Reforms of state enterprises and banks would help align their corporate governance arrangements with the requirements of a modern market economy and permit competition with the private sector on a level playing field. This would create the appropriate incentives and conditions for increased vigor and creativity in the economy in support of China's successful transformation into a high-income society. (WorldBank, 2013:21)

However, the thesis does not defend these hegemon approaches and aims to disclose the role of "state" and "interventionist policies" as the major factor behind Chinese successful development since 1978. The thesis discusses this policy in a historical context analyzing the evolution of the Chinese socio-economic transformation, as well. This study merges theoretical framework within related chapters in order to prove the importance of the state authority, the role of the foreign investments and the national capital and the enterprises during the catch-up of the national indigenous industries.

Thesis methodology is determined as "discourse analysis" which assists to find out the main reasons behind Chinese development and catch-up in strategic industries after Deng's reform period. The related industrial documents, official reports, national strategy documents, intelligence agency reports, company strategy and annual reports, newspaper and journal articles will assist to clarify the key points behind this succession of China.

The thesis aims to find the answers to the research question and to test the hypotheses below.

Research Question

Which policies have made the Chinese telecom equipment industry catch-up succeed in the past thirty years?

Hypothesis

Chinese telecom equipment industry's catch-up is the success of the guidance of the state and the state-led development policies.

Sub-hypotheses

1. Telecom equipment industry has been defined as a strategic industry by the Chinese state that actively managed all phases during the development of industry.

2. Foreign investments and Joint-ventures had played one of the most important roles during emergence and catch-up of the Chinese telecom equipment industry.

3. Chinese potential domestic market financed the stages of the emergence and the growth of the national telecom equipment industry.
4. "State-led financing by state-owned banks" policy funded national industry for both domestic and export operations.

This thesis consists of seven chapters. The first chapter is the introduction to thesis with a summary of aim of the thesis and a general view of the study by referring to the following chapters and the discussion topics. In this chapter, today's neoliberal policies and the real impact of these policies on the latecomer countries are presented as an introduction. Additionally, the state's role on the industries and the national development is also mentioned with recent examples.

The second chapter reviews theoretical framework and major development theories in the scope of the role of the "state". Under this chapter, modernization theory, dependency theory, as a sub-part of the Latin-American Structuralism, List's and Gerschenkron's State-led developmentalism and the catch-up policies are also discussed. Additionally, reclaiming state-led catch-up policies with successful industrialization cases are also studied as a sub part of the thesis with the case studies of the Soviet Union, East Asian region and also China.

In the third chapter, transformation of China in two main reform periods of 1949 (Mao) and 1978 (Deng) is studied. These periods' state policies and significant socio-economic instances are quite strategic in order to analyze the socio-economic transformation of China and its effect on China's evolution.

The fourth chapter covers foreign investment and its effect on national indigenous capabilities by aim of discussing the role of the foreign investment for latecomers during catch-up period and creating national indigenous capabilities. Spillover effect of the foreign investment, the empirical evidence,

the effect of the foreign investment on China and the related state-policies in order to attract foreign investment to China specifically after 1978 are the major topics of the chapter.

The fifth chapter provides a brief analysis of the Chinese telecom equipment industry which is the case part of thesis. In this chapter, the industry is analyzed in a historical context. Technological evolution of the telecom technology in China and the effect of this evolution on Chinese telecom industry and market are studied in the region of China. Chinese major telecom equipment manufacturers are also a sub-part of the chapter. National programs for science and technology and their effects on the telecom equipment industry, Chinese telecom equipment market in the scope of the service operators and the effect of the state on the operators are also studied. Additionally, the relationship between the telecom equipment manufacturers and the telecom operators in the scope of state-polices are another important point of the chapter.

Chapter 6 is the case study part which includes the research question and the hypotheses. Official reports of the state, national strategy documents, intelligence agency reports, company strategy and annual reports, newspaper and journal articles, which are related to the Chinese telecom equipment industry and its development period since 1980s, are used as research tools in order to answer the research question and test the hypotheses of the thesis.

Chapter seven is the conclusion part of the thesis. Contribution of the thesis is presented in this part by policy recommendation for latecomers in the scope of the state-led catch-up in the high-technology industries. This suggested model is formed by the milestones of the Chinese telecom equipment industry catch-up. The model is the result of a triple system of state, foreign investments and national industry and capital, and this mechanism has a dynamic and interactive relation with their sub-parties.

Additionally, similar catch-up successes of China in other high-technology industries (commercial aircraft, automobile, computer industry) are also discussed. The main point is that similar policy tools are seen in similar periods for each industry in China. This is the output of the national catch-up strategy of China after the reform in 1978 which underlines the “state” as the central authority that manages all phases directly or indirectly during catch-up and development. State is a policy maker, enables integration with other markets and economies, a financing mechanism to protect and support the local industry, also a market with its state-owned demand.

CHAPTER II

THEORETICAL FRAMEWORK

Latecomers' catch-up has become one of the major discussion points for scholars in time. This chapter intends to study related major theories and attempt to draw the theoretical framework around these models. Surely, these theoretical approaches analyze the economic and national development as a whole with macro policies; however, the impact of macro policies certainly has a deterministic role during the catch-up of national industries.

In that framework, Chinese emerging high-tech industry (telecom equipment industry) and its worldwide success is studied around these theories instead of industrial catch-up models; because China has a strong central authority and macro policies which are defined by Communist Party and other state organizations directly influence the industries as a whole.

The emergence and development periods of Chinese telecom equipment industry is certainly affected and directed by China's macroeconomic policies and catch-up strategies. Thus, this part studies the literature that examines how latecomers could catch-up in emerging industries via the effective role of state with other sub-parties.

The advanced countries' long-term domination on world political economy became much effective because of their technological superiority specifically after Industrial Revolution. As soon as a struggle, latecomers also try to catch-up and upgrade their position within international political economy by promoting indigenous capabilities for each period.

There have always been milestones and breaking points during nations' continuous socio-economic transformation periods; one of the most important is industrial revolution and also the rise of capitalism. Through these policies,

development gaps and differentiations between nations became much explicit; as the groups of developed and latecomers. In time, latecomers have attempted to close this gap within different strategies; there have been successful and also unsuccessful examples.

On the other hand, this "development" and "catch-up" problem emerged as a research field and is studied by scholars from different socio-politic backgrounds. In those studies, one of main discussion points has become the role of state. States have various forms which depend on social and political factors, internal structures, role in production, relations to society etc. The state's determinative and leader role became one of the major aspects of economic and political discussions for hundreds of years. Liberal scholars defined a passive role for the state (regulative, limited role), on the other hand state also had an active interventionist role in the state-planned development models. Liberal scholars impose ruling, hegemonic liberal/neoliberal policies as the sole way to catch-up and economic development for latecomers. Despite successful examples which prove the important role of state, however, liberal/neoliberal view insists on regulative and limited role for the state. Today, laissez-faire and free markets are arranged in order to provide the sustainability of neo-liberalism and regulative role of state. This approach is certainly opposite to any kind of intervention to economy and market system. The defenders of this view emphasize that there is not any other rational choice in order to afford economic development and social welfare.

Against hegemonic free market doctrines, state-led mode of development (state-led development is analyzed under socialist planning and capitalist developmental state versions) is studied within different aspects and defined as a development instrument. In that view, state directs the catch-up period as a higher authority and also applies the pre-defined strategies with its interventionist active role.

Development strategies of latecomers and related macro policies have major effect also on industrial developments. In that perspective, state uses the strategies of "guidance of state", "financial subsiding" as effective policy tools

for latecomers' economic and industrial development. It is clear that, this development period is not independent from the growth of capital accumulation; for instance, state funding mechanism is strongly relevant with national strategic priorities. These state-led policies have also been used in some of countries with different industries; South Korea – electronics, Italy- automobile, Finland- mobile technologies, France- automobile, EU-collaboration project for aircraft industry and so on.

As a conclusion, macro state policies determine the industrial developments, specifically state-led development policies. On this way, related major theories will be discussed in order to draw the theoretical framework of Chinese high-tech catch-up in recent decades by moving telecom equipment industry.

2.1 Theoretical Debates

Distinct groups of First World and Third World countries and their struggle mainly emerged after World War II. Third World countries could be defined according to various definitions of development problem; developing, undeveloped, underdeveloped and these groups could be lasted. "Third World" is also used by many social scientists and this definition mainly covers Asia, The Middle East, Africa and Latin America countries except First World countries as Japan, Western countries etc. These Third World nations are politically and economically backward in a common perspective. For instance Cardoso describes "national underdevelopment" as a situation of economic subordination to other nations and includes political attempts to overcome "national interests" through the state and social movements which aims to preserve political economy. (Cardoso, Faletto, 1979: 21)

There are also debates on definition and causes of "underdevelopment", "undeveloped" and also "developing" terms. Nearly 150 countries are

classified as developing countries and despite the term confusion, shared characteristic of these countries is being economically and politically backward according to developed ones. On the other hand, this terminology is mostly relevant with political view; such as; “developing” has much positive and optimist effect than “underdevelopment” perspective, thus, hegemonic view uses “developing” in a broad sense.

Historically, latecomers (the group of countries without developed ones) have tried to close the gap with developed countries in order to converge among social and economic perspectives. The scholars also aimed to set development theories to attain to common most appropriate models against the destiny of undeveloped or developing countries and capitalist exploitation system with alternative catch-up theories.

Latecomer countries are structurally different than developed countries and have various problems within many aspects. Thus, the scholars studied on these problems via analytic policy recommendations, especially the period between 1940 and 1970. As a recent hegemon model, in 1980s, neoclassical development model has become popular and was imposed as the common model for both of developed countries and also the rest of the world.

In fact, there is no standard model which promotes growth aspects for all latecomers in same levels because of country-specific conditions. However, there is considerable development succession in recent decades with the assistance of state-led development models against hegemonic neoliberal policies, specifically in Asia region. Thus, importance of state-led development polices increased in recent decades. Additionally, because of special role of state in China, development theories will be mainly discussed around state’s role and these models will be used during drawing the theoretical framework of thesis.

2.2 Development Theories Discussion

Debate around "developmental state" has created main variations over 60 years. After World War II, international community suggested state-led development model specifically for newly emerging states of Africa and Latin America, with industrial and entrepreneurial operations. As an extension of this approach, The Economic Commission for Latin America (ECLA) in 1948 and The Economic Commission for Africa (ECA) were settled in 1958. Those state-led development strategies were under attack especially in late 1970s in Africa, Eastern Europe and Latin America. Inefficient state enterprises, people's own interests and rents created problems and the national economic crises were the final point for decreasing the importance of state for economic development and catch-up.

Meanwhile, in early 1980s, hegemonic view and its policymakers and theoreticians defended market-based economy instead of state-led development models. In that perspective, set of neoliberal economic policies were modeled and suggested to latecomers by the assistance of the guiding authorities; World Bank and IMF under the name of Washington Consensus. Main points could be summarized as trade liberalization, more passive role for state by reducing the control on the economy and greater role for private sector in the economy.

Since mid-1970s, neoliberal approach began to widespread through the world. Neoliberal programs were implemented through both of developed and developing countries with the policies of privatization, limited role of state and liberalization etc. Neoliberal approach indicates the efficacy of the free markets and additionally oversimplifies the central planning and state intervention with claiming that state intervention is inefficient and counterproductive manner. In order to overcome most of the problems, "deregulation" and regulative role of state is proposed. The theoreticians imposed that free market and minimum direct state intervention would make economies much more flexible, creative and beneficial to overcome long-run economic problems.

Washington Consensus and common neoliberal policies mainly apply "one size fits all" strategies without being aware of differences between nations; sociopolitical, economic structure, cultural background etc. However, there are different histories for each nation and these nations and their economic systems are evolved within different ways; for instance, German and Japanese market economies emerged within different manner than American capitalism.

Moreover, World Bank defines the limits on state policies with World Bank 1997 and 2001 Reports. According to 1997 Report, effective state is vital for providing goods and services and "state" is central to economic and social development however not a direct provider of growth, only a catalyst and facilitator.

World Bank Development Report 1993 also declares the East Asia's catch-up successions around its neoliberal vision and demonstrates the market forces as the promoter of development. The report also underlines that private domestic investment and human capital are principal engines of growth.

Against hegemonic neoliberal discourse, in 1990s a different experience for state-led development emerged, specifically in several of East Asia countries. Asian Tigers; South Korea, Taiwan, Hong Kong, Singapore have attained to rapid economic catch-up and socioeconomic transformation. The common characteristic of these countries is that all of them were agrarian societies in 1960s, however, created high-technology industries and now produce high-value added commodities since 1990s. In fact, states have played major role in technological catch-up period of East Asian countries.

Fritz and Menocal (2006) support that approach and have a different view concerning the role of state rather than World Bank for explaining the success of East Asian countries. According to Fritz and Menocal's summary;

- State-led development was encouraged and performed specifically in 1950s and 1960s.

- State-led development was under attack because of creating inefficiency and macroeconomic instability specifically with the cases in Africa and Latin America regions.
- Structural adjustments and market-oriented reforms are executed as a significant part of Washington Consensus
- State's role in development is re-emerged because of extraordinary unusual success stories of state led-development specifically in Asian countries since mid-1990s.

After this general introduction, major development theories will be discussed in the scope of "state" role.

2.2.1 Modernization Theory

By the end of World War II, economic expansion and polarization period was introduced to the world. The theoreticians began to study on Third World nations in the scope of economic development and political stability. In that respect, Modernization School of development has emerged. This theory mainly emphasizes that development could be achieved through phases which have been previously followed by current developed countries. This theory particularly builds change into social and economic systems according to developed countries' dynamics, conditions and variables.

Walter Rostow is one of the major theoreticians of modernization theory via his book of *The Stages of Economic Growth* was written in 1960. In this book, Rostow defines five-stage model of development for Third World countries. He considers particular linear and sequential phases of modernization and assumes that Third World countries have to follow the same stages for a real development. These models are;

The Traditional Society: This society and related economic condition are mainly dominated by agricultural activities. The system is mainly shaped with

unscientific insight and traditions. There is a clear hierarchical system in society and the working activities do not require significant knowledge flows. *The Preconditions for Take-Off:* The country begins to take into consideration modern science and the development is conducted by single authority and government. This phase emphasizes the transformation from agricultural society to industrial conditions by industrial revolution. The economic development becomes faster via increasing rate of investments. *Take Off (Watershed Stage):* The country attains to self-sustained dynamic economic growth with no exogenous input with a few leading industries. *The Drive to Maturity:* Technical progress is the main difference of this stage from the previous ones. After takeoff position, the countries will attain to technological and entrepreneurial skills in any industry. Besides, social and economic welfare will increase via emergence of new science-focus industries. *The Age of High Mass Consumption:* In that phase, the societies of those countries achieve prosperity and economic welfare. The world's North and the West region countries mainly experience that stage. (Rostow, 1960)

Rostow's theory mainly assumes that strong alliances between US, Western Europe and developing countries will bring the followers to takeoff position. To brief, Rostow's and also modernization theory's particular goal is to set these stages as uniform and present sole way for development. Additionally, theory aims to transfer developed countries' transformation experiences to developing countries and make them more imitative. Thus, the nations would resemble each other and the convergence among societies would occur.

In sum, modernization is a systematic and transformative process, do not include revolutionary characteristic. While Europe and U.S. are presented as model countries, Third World's traditional values should be adapted to modern society values (Western values) in order to close the gap and to be developed countries.

This model was under attack around two main points; this theory admits one possible model of development and presents this model-US development model- to Third World. However the countries' entire evolving course is unique and quietly different from each other. Thus, a single perfect model could not be presented within that respect. Additionally, the problem of "underdevelopment" does not take place in the theory; there is one stage of backwardness and all the nations begin to develop from that stage and follow the similar phases. Lewellen (1995) also criticizes the point of defining universal stages of development in the theory and finds it questionable to follow the same path traveled by US and Western Europe.

The other major deficiency is related to "values". Third World's traditional values need to be transformed through developed countries' "modern" values. That is also irrational, the societies have their own shared history, values, culture etc. and these characteristics differ all the nations from each other. If a nation aims to impel the national dynamics, only the own values could achieve within historical context.

On the other hand, the catching up process of Third World is quite difficult with modernization paradigm in practice, because, while developing countries are following the previous development paths of developed countries, First World will attain to a higher level of advancement on newer technologies. Thus, the gap between these two groups would widen with "follow the leader" model.

Against modernization, dependency school emerged from left view in order to suggest development and catch-up policies for latecomers. Those alternative theories gave a certain role for the state with different degrees of interventionist models.

2.2.2 Dependency Theory

The dependency theory emerged specifically on debates of Latin America on the problem of "underdevelopment". Neo-Marxism and Latin American discussion on development (of ECLA) has two main sources of dependency school. The concept of neo-Marxism also includes a dualist structure; one is related to development discussion around Eurocentric view. The second background of dependency school is Latin American oriented underdevelopment discussions. The Great Depression of 1930s triggered the scholars for Latin American economic development.

The dependency approach advocates that underdevelopment was caused by Western exploitative and expansive policies and continues by unequal power relations between advanced and Third World nations. In that perspective, external factors and the position of nation in international system is more important than internal dynamics of nations.

During last years of 1940s, Latin American economists in ECLA (UN Economic Commission for Latin America) criticized the international trade theory and its effects on development via arguing that this theory increases the gap between center and periphery countries with their trade activities. Meanwhile, in world conjecture, American modernization theories were under heavy attack, there was unfair war to Vietnam, national struggle movements were dense as in Cuba and China's revolution, and especially after Second World War some of nations gain national independence against colonialism. All of these triggered the opponent movement against US origin modernization theories.

Originating from those discussions, theory of dependency emerged mainly in 1960s to investigate especially Latin America around left political view. Theory signs the developed countries' unequal exchange policies as the reason of underdevelopment of Latin America and aims to comprehend the historical development course of developing countries. The history of Latin

continent is the main source of Latin countries' similar reaction to foreign attacks especially to imperialism.[3]

Dependency school explains "underdevelopment" of Latin America from external relations perspective, instead of internal dynamics and feudalism. The theory principally focuses on imperialism instead of capitalism, because the theory defines the dependency as one nation's exploitation of another nation's resources in international approach. Dependendistas (dependency theorists) do not accept Modernization Theory's view of Third World countries should follow the same development paths, as Western nations had, to attain to developed countries classification with economic and social advancement.

A known fact that most of today's developed countries did not encounter with strict competition during their industrialization and development periods, however, today's latecomers have to compete against to First World as US, Japan, EU, Canada etc. Thus, dependency theory mainly focused on international political and economic relationships rather than internal dynamics through redefining economic development model.

> The dependentistas were very radical politically. When one looked at the economic program recommended by the dependentistas, however, it was disappointing; it was simply one more proposal for state action, with perhaps a greater insistence on "delinking" than in other variants. As of 1970, the dependentistas were as optimistic as anyone else. They looked forward to significant change in a relatively short run, one that could truly achieve the prosperous world for everyone. In that sense, the dependentistas were as surprised as anyone else by the pessimistic turn world events began to take in the 1970s, becoming worse in the 1980s. (Wallerstein, 1996: 356)

[3] The dependency paradigm takes an opposite point of departure. From this perspective, underdevelopment was caused by Western expansion and persists because of the unequal power relationships between the First World and the Third World. The focus here is not the internal structure of the individual country but the country's place in the international system; the causes of the underdevelopment of a particular country are, thus, external.
…that development will take place through transfers from the First World; indeed, such transfers are motivated by the self-interest of the industrial countries and simply reinforce dependency and powerlessness. (Lewellen, 1995: 50)

Theotonio Dos Santos, Brazilian economist, defines the dependency as a historical condition which shapes world economy via favoring some countries, on the other hand also limits the economic development possibilities of the others. (Santos, 1971: 226)

To analyze the problem of development from historical view; Dos Santos describes three forms of dependence; **colonial dependence**-trade monopolies, colonial monopolies of land, mines, labor, **financial-industrial dependence**- significant accumulation of capital in centers, production of raw materials and agriculture products in periphery-, **technological-industrial dependence**- especially after Second World War the multinational corporations began to establish industries which target the domestic markets of those dependent countries. Dos Santos's approach is mainly related to third stage (technological industrial dependence) and he formed "New Dependence" via this approach. Santos introduced the term of "New Dependence" in order to explain the failure of import substitution strategy. In time, North American investment in Latin America changed the direction from raw materials to industry and Santos describes that new period as international division of labor with incorporating the periphery to imperialist system.

This theory was built on three major sources; American-Marxist view (Paul Baran, Paul Sweezy, Andre Gunder Frank), UN's ECLA (Economic Commission for Latin America and the Caribbean – Prebisch, Singer, Furtado) and Marxist political view.

ECLA economists; as Prebisch, Singer, Furtado, claimed that "unequal exchange in world trade system" is the reason of underdevelopment in Latin America; exportation of low-priced raw materials and importation of high-priced machinery and technology and the existence of multinationals. Thus, ECLA's proposed strategy was import substitution and capital accumulation models. Moreover, ECLA economists aimed to prove that "underdevelopment" does not have the same meaning with "undevelopment". Underdevelopment is clarified as specific situation that causes to underdevelopment in one part of world and to development in another part.

Dependency theory mainly focuses on interrelationship between nations. According to theory, developed, undeveloped or developing countries are defined as core and the periphery countries and there exist strong exploitation relation between these two groups. In sum, against the foresights of modernization theory, dependency theory emphasized that; in this conjecture the real economic development in Latin America and in similar regions is not possible, the strong political and trade relations with developed countries would reproduce the underdevelopment everlastingly.

> The origins of the center-periphery relation are strictly technological and determined by the international division of labor. In other words, the center produces manufactured goods for itself and the periphery, whereas the periphery produces commodities mainly for the center as well as maintaining a relatively large subsistence sector. (Vernengo, 2006: 554)

Ancochea (2007) emphasizes that ECLAC's theory of underdevelopment is mainly based on historical analysis of capitalist development. Initial process of capital accumulation and diffusion of technical progress are not equivalent in various countries which are center countries (US, Europe, Japan etc.) and periphery countries. In center countries technical progress widespread to the sectors, however, the periphery countries focus on production of primary goods for export. Ancochea also adds that Prebisch underlines the importance of industrial development as "an unavoidable prerequisite for development". (Ancochea, 2007:21)

Furthermore, there are two main approaches in dependency school. First group is mainly dominated by American Marxists; Paul Baran, Paul Sweezy and André Gunder Frank, additional works of Samir Amin and Aníbal Quijan. The second group of dependency theory is named as Latin American Structuralist School that includes the works of Celso Furtado and Aníbal Pinto at the Economic Commission for Latin America and the Caribbean (ECLAC). Fernando Henrique Cardoso, Enzo Faletto, Peter Evans and Conceição Tavares are the most popular theoreticians of this movement. The following thoughts

were also affected by dependency school; Wallerstein and his followers' Modern World System Theory could be counted. In fact, while American-Marxist tradition of dependency theory emphasizes the importance of external forces, however, structuralist approach advocates the importance of internal forces through dependency relations and development discourse.

Socialist economists Baran and Sweezy are more radical and indicate the imperialism as the major reason for underdevelopment of Third World. Baran also criticized the capitalist system and introduced the idea that "underdevelopment" was an active process following development periods in the center. (Baran, 1968)

Paul Baran in his famous book of *The Political Economy of Growth* classifies the world countries as advanced capitalist and underdeveloped economies by emphasizing the interrelationship between these two groups. Baran underlines that monopoly capitalism in developing countries impedes the development of undeveloped countries within that economic system; capitalism and adds that monopoly capitalism is irrational, and creates an environment for developing countries according to advantages of developed ones. Baran criticizes the importance of local bourgeoisie and emphasizes that imperialism encourages agrarian capitalists and mercantile comprador class.

> Like all other historically changing phenomena, the contemporary form of imperialism contains and preserves all its earlier modalities, but raises them to a new level. Its central feature is that it is now directed not solely towards the rapid extraction of large sporadic gains from the objects of its domination, it is no longer content with merely assuring a more or less steady flow of those gains over a somewhat extended period. Propelled by well-organized, rationally conducted monopolistic enterprise, it seeks today to rationalize the flow of these receipts so as to be able to count on it in perpetuity. And this points to the main task of imperialism in our time: to prevent, or, if that is impossible, to slow down and to control the economic development of underdeveloped countries. (Baran, 1968: 197)

In sum, Baran's economy politic analysis brings a solution; a political revolution against monopoly capitalism was the sole way for the development of underdeveloped nations.

Other significant contributor to dependency literature is, Gunder Frank and his famous approach of "development of underdevelopment". There are two groups of countries in that definition; metropolis and satellites. Metropolis are target of merchant capital, on other hand, satellites feed the metropolis according to market requirements. According to Gunder Frank, there is certain distinction between undevelopment and underdevelopment. Undevelopment is the initial stage of economic and social systems; however, underdevelopment assumes the exploitation of poorer countries by wealthy ones. (Lewellen, 1995:61)

Frank positioned against modernization theory, because he advocates that wealthy countries were never underdeveloped, thus the First World's historical path is not realistic and appropriate for Third World catch-up and socio-economic development.

Also Frank assumes that capitalism should be comprehended as a system in its historical course. Modernization's dualistic structure do not imply significant support; because capitalism develops in world scale as a whole and in this system each part of world economy has to be entitled as capitalist without any distinction as feudal or capitalist. (Brewer, 1980: 160) While Modernization school searches the causes internally for Third World countries such as overpopulation, cultural problems, investments, motivation of work etc., Frank blames the effect of external forces; as history of colonialism.

Through a final sentence, developed countries' modernization period caused to underdevelopment of Third World. According to Frank, developing countries could develop by delinking the relations between developed countries and offers a radical solution that is the periphery countries could not attain to developed countries level without a socialist revolution.

In sum, this school intends to describe underdevelopment and dependency from Third World perspective and mostly emphasizes external factors as the reasons of backwardness in the scope of core and periphery distinction. Socialist revolution and de-linking from international systems are offered as solution for underdevelopment problem. On the other hand, in

literature, the main critiques of dependency school are; insufficient empirical evidence, giving importance only to trade relations in order to analyze the underdevelopment of nations and do not emphasize the internal dynamics of nations through latecomers' economic development attempts. For another critique, the theory focuses on hierarchal relation between center and periphery, and does not expose the production relations. "Value circulation", which depends on effective organization of international monopoly capital, is brought in the foreground. Edelstein (1981) claims that the one of the main insufficient points of dependency theory is lack of "labor process".

2.2.3 Latin American Structuralism

A different fraction of dependency school- second dependency tradition- distinct from traditional form is named as Latin American Structuralism. Studies of Raul Prebisch, Celso Furtado and Aníbal Pinto at the Economic Commission for Latin America and the Caribbean (ECLAC) were important for the school.

One of the main sources of Latin American structuralism is Prebisch's study[4] of "El desarrollo económico de la América Latina y algunos de sus principales problemas" of ECLAC. The study aimed to analyze the economic structure of Latin American countries via emphasizing that the world economy is an integrated system with developed and developing nations.

Fernando Henrique Cardoso, Enzo Faletto and Jose Serra are other major scholars of the movement. The subsequent contributions are from Peter Evans, Osvaldo Sunkel and Maria da Conceiçao Tavares. Other schools of that thought were also influenced by dependency school, as world-systems theory of Immanuel Wallerstein and his recent followers.

[4]The approach developed by Prebisch has four analytical components (Bielschowsky, 1998): a historical approach, based on the binary opposition center-periphery; an analysis of the international insertion of Latin America; the study of the domestic determinants of economic growth and technological progress; and an evolution of the arguments in favor and against state intervention. (Caldentey, E. P., Vernengo, M., 2007:216)

Although Marxist Dependency School and Latin American Structuralism have differences, there is certain agreement on core and periphery distinction. Both of the theories accept that dependency between core and periphery prevents the autonomous innovative capacity of the periphery.

The main decomposition point between these groups concern that orthodox dependency school pessimistically advocates that Third World's governments could not have actual autonomy related to development strategies; however, structuralist school believes that dependent development could be possible in a different manner. The classic dependency theorists mainly implies the effect of external forces on developing countries about establishing national policies, however, structuralists, specifically Cardoso and Faletto, emphasizes the importance of domestic internal forces as a significant variable in development discourse.

> So the analysis of structural dependency aims to explain the interrelationships of classes and nation-states at the level of the international scene as well as at the level internal to each country. Dialectic analysis of that complex process includes formulation of concepts linked to the effort to explain how internal and external processes of political domination relate one to the other. It cannot be conceived as if considerations of external factors of foreign domination were enough to explain the dynamic of societies. (Cardoso, Faletto, 1979: xviii)

Against Frank's studies, Cardoso believes that "dependency" and "development" could be evaluated together.[5] Cardoso's model of "associated-dependent development" emphasizes the importance of the idea of alliance. This model contains expansion of three sectors of the economy; domestic private, the foreign and the public. Fernandes and Cardoso's "dependent development" approach presents the alliance between the multinationals, state

[5]Cardoso claimed that the external forces would have very different impacts, depending on the dissimilar internal conditions (history, social structures etc.). In contrast to Frank, he regarded the national bourgeoisies of the dependent societies as potentially powerful and capable of shaping development, with a result not Amin's autocentric reproduction but a development in dependency, also referred to as dependent, associated dependent. (Martinussen, 1997:93-96)

and the local industrial bourgeoisie in order to attain to dependent capitalist development. This approach also rejects that capitulation of local capital to imperialism. Local industrial bourgeoisie has specific economic and political advantages rather than multinationals and this predominance provides bargaining power to local bourgeoisie.

After World War II, Latin American governments mainly focused on industrialization and economic growth. Capital accumulation and industrialization were seen as the key factor for overcoming the "underdevelopment" of those region countries.

Peter Evans in his popular book of *Dependent Development- The Alliance of Multinational, State, and Local Capital in Brazil (1979)* makes significant contributions to structuralism literature. Evans defines "dependent development" with three main actors of multinationals, state and local capital. Evans also underlines that there is a division of labor among these three allies and it needs to be defined. (Evans, 1979: 53)

Dependent development approach emphasized the important central role of state in order to foster the accumulation. State enterprises are one of major discussion point than the regulatory role of state; state's central active role in order to promote the local accumulation. Additionally, state has a sponsorship role as a source of investment capital in specific circumstances which local capital is unable to invest. Dependent capitalist development succeeded in Brazil during the late sixties and early seventies. The triple alliance structure redefined the Brazil's relations with center and the other periphery regions, because local production of capital goods provides new opportunities for state and local capital in order to expand and develop. (Evans, 1979: 315)

> Dependent development is a special instance of dependency, characterized by the association or alliance of international and local capital. The state also joins the alliance as an active partner, and the resulting triple alliance is a fundamental factor in the emergence of dependent development…this in turn

> is based on the triple alliance of the multinationals, the state, and the local bourgeoisie. The three partners and their interrelationships are the starting point for any analysis of the institutional basis of dependent development. (Evans, 1979: 32-4)

Moreover, Evans defines multinational corporations as "the organizational embodiment of international capital" and adds that if multinationals engage manufacturing operation in periphery, this situation creates opportunity of a new partnership with the national bourgeoisie. (Evans, 1979:38)

The common goal is to move the periphery countries to developed group; and, the structuralists believe that national capitalist development could be possible with foreign investments, also with "dependent development" policies. These investments could inspire the national endogenous growth in related sectors. Thus, national capitalist development could be possible with technological knowledge spillover from FDIs. Besides, nations' own dynamics could occur within a systematic perspective, such as national innovation system. Brazil's Fernando Henrique Cardoso underlines that some of developing countries achieved the industrialization through active intervention of the state and the linkage of domestic firms to multinationals. Cardoso also defines this process as *associated-dependent development*. (Handelman, 2010: 20)

On the other hand, internationalized bourgeoisie and its investments stimulate local accumulation within different models; joint ownership is one of most common methods. Specifically international bourgeoisie require joint ventures with local bourgeoisie which has comparative advantages in specific industries. Finally, Vernengo underlines that importance of technology, role of multinationals during technology transfer and the role of the state in encouraging technological innovation through industrial policies are the focal points of Latin American Structuralists. (Vernengo, 2006: 558)

However, dependency school's radical suggestions "political revolution against monopoly capitalism" and closed-door "import substitution" models

are politically insufficient for 21st century. Instead of these radical policies, "national bourgeoisie" has a considerable role with its productive investments and external linkages. Meanwhile, bourgeoisie has to attain to accumulation of productive capital, thus, bourgeoisie creates itself as national bourgeoisie. As Evans (1979) highlights dependent development is the association or alliance of international and local capital and the state is the active partner of this model.

The foremost critique of this school is that current analyzes are at mainly nation-state level. International connections and global division of labor are not mentioned in this literature. Thus, Wallerstein and his followers developed the latest theory related to this literature. Immanuel Wallerstein in his famous book of *The Modern World System* studied global network of capitalist economic system as a whole instead of analyzing nations individually. While dependency theory gives a look to the world moving from underdevelopment problematic, World System Theory underlines the importance of taking world system as a whole.

Wallerstein considers that there are worldwide forces to determine the destiny of underdeveloped nations, thus, single national analysis is not sufficient in order to study development phenomenon especially for Third World countries comprehensively. He assumes that modern capitalist world system is a global phenomenon and works on "market" focus.

This theory points out that capitalist economic system begins in 16th century and its historical period is also called as "modern world system". World system consists of two social systems; world empires and world economy. Wallerstein defines modern world system, as capitalist world economy and implies that world empires were resolved through periphery regions in the capitalist world system. Especially after the emerging of certain capitalist relations, powerful countries began to search for raw materials and market for their final products. Periphery countries mainly transferred raw material and agricultural goods to core countries and purchased manufactured

goods with high budget payments, thus sufficient capital accumulation could not be succeeded in periphery to use for modernization investments.

Wallerstein's theory creates international division of labor between nations; core, periphery and semi-periphery. Developed capitalist countries are named as core, the old colony regions (being exploited politically and economically) are periphery, only economically be exploited regions are semi-periphery.

Core countries could be characterized as modern, fully industrialized, capital intensive production oriented, and wealthy nations; as US, Japan and several Western European countries. Previously, Western European was much more important in this group nonetheless after mid-twentieth century US became dominant. Semi-periphery countries have some commonalities of core and periphery ones. These countries are more independent than periphery countries and there is mixed industrialization strategy. In 16th century Venice and Spain, in 20th century Brazil, Argentina and South Africa and today South Korea, Argentina, Taiwan could be exemplified for semi-periphery group.

The main difference between dependency school and world system theory is that, dependency school studies on nation-state level and mainly concentrates on periphery, however world system studies on worldwide perspective and focuses on all of three groups equally; core, periphery and also semi-periphery. Although this theory was a revolution in development discourse, also there are also significant critiques. One of them is that "world system theory" exaggerates the external factors related to development discourse and do not take into consideration the national factors sufficiently. Additionally, there are critiques on core-periphery distinction in the scope of qualification; qualified labor in core and unqualified labor market in periphery countries. By labor perspective, Wallerstein[6] had advocated that periphery and

[6]It is the fundamental difficulty in Wallerstein's argument that he can neither confront nor explain the fact of a systematic development of relative surplus labour based on growth of the productivity of labour as a regular and dominant feature of capitalism. In essence, his view of economic development is quantitative, revolving around: 1. the growth in size of the system

semi-periphery countries did not have qualified labor force. However, that definition is not appropriate for 21st century labor profile, because, the semi-periphery and even periphery countries have qualified and well-educated labor force, however, this potential might not be incorporated into innovative activities of high-technology industries in those countries effectively because of predefined domestic capacity and international division of labor.

After dependency school, List and Gerschenkron and their state-oriented industrialization theories are studied around capitalist developmental perspective. List and Gerschenkron specifically focuses on latecomers and the problem of "industrialization" for these countries. At first, the scholars determine the socio-economic situation of their terms and after suggest state-led catch-up theories to latecomers without the discussions of "underdevelopment" of left discourse.

These theories and the state-led development approaches are beneficial for the theoretical framework of thesis.

2.2.4 Friedrich List -Listian State-led Developmentalism, Gerschenkron- Economic Backwardness

List was a nationalist rather than internationalist theoretician. According to him, strong army and strong state approaches were inevitable to defend the national interests.

Friedrich List mainly studied concerning the case of German catch-up with England. While List highlighted protection of infant industries, also paid attention to the policies related to accelerating the industrialization and economic growth. Most of policies were related to learning about new technologies and applying these policies in catching-up countries. List also

itself through expansion; 2. the rearrangement of the factors of production through regional specialization to achieve greater efficiency; 3. the transfer of surplus. (Brenner, 1977: 31)

advocates that industries should have close relations with the formal institutions of science and education.

List wrote his famous book of *The National System of Political Economy* in 1841 with the main idea of infant industry as a strategy for economic catch-up. He suggests protectionist trade policy based on system of tariffs in order to enable the national economic development for latecomers. List's theory could be named as a prototype for latecomer related models. In his book, List also emphasizes that Britain's restrictions, privileges, and encouragements prove the importance of protectionist industrial policies to promote domestic industry.

List criticized the libertarian economics of Adam Smith and his followers. Three fundamental features of his catch-up industrialization and developmentalism are government intervention with tariff regimes to protect infant industries, economic development that emphasizes manufacturing power and nationalistic ideology. (Suehiro, 2008: 33)

List believed that specific strategies are required in order to protect the industries of developing countries, however he was also aware that copying the strategies of previously industrialized countries was not sufficient. Therefore, List gave the leadership role to the state with its own dynamics during latecomers' industrialization period.

Implementation of Listian policies specifically in Japan and Germany has been certainly strong alternative for neoliberal policies and imposition focuses on national growth and development. According to List, the main role of governments is to define what would bring wealth for nations in long term period. This approach was mainly related to encourage and promote scientific discoveries, technology, education and national industrial policies.

According to List, free trade was a significant tool of political power. Britain uses this gun in order to exploit the other states via using its comparative advantageous[7].

List was influenced by American System of 19th century which required creating national banks, credit for government to development activities; such as support and being sponsor for agriculture, industry and science activities. Additionally, high public land prices and external tariffs are settled in order to create resources for government projects and protect domestic industries against developed rival nation states.

Namely, today's American neoliberal policies strongly aim to expand neoliberal policies for latecomers, however, nineteenth century American policies were mostly relevant with protectionist view. Henry Clay was an influential politician in 1800s in America and actively promoted external tariffs in order to protect national economy and industries, established national banks. In those years, Henry Clay emphasized that:

> Free trade! The call for free trade is as unavailing as the cry of a spoiled child, in its nurse's arms, for the moon, or the stars that glitter in the firmament of heaven. It never has existed, it never will exist. Trade implies, at least two parties. To be free, it should be fair, equal and reciprocal. But if we throw our ports wide open to the admission of foreign productions, free of all duty, what ports of any other foreign nation shall we find open to the free admission of our surplus produce?... Gentlemen deceive themselves. It is not free trade that they are recommending to our acceptance. It is in effect, the British colonial system that we are invited to adopt; and, if their policy prevail, it will lead substantially to the re-colonization of these States, under the commercial dominion of Great Britain. (Clay, 1831)

This approach created sphere for US against Britain exploitative policies and today's powerful state was created with these protectionist and state-led policies. Nonetheless having different political and economic

[7]Rather, it was the lack of free trade that seemed to be most beneficial to German producers – most notably during the Napoleonic Continental System where a European blockade of British imports created a space for domestic industries to grow where British imports had previously dominated. Though the end of the continental system in 1812-13 brought back a flood of cheap British goods into Europe, List was convinced about the benefits of a large internal unified market protected from more powerful competitors (and also convinced about the importance of a strong army and in particular a strong navy to support economic interests through military force) (Breslin, 2009:18)

backgrounds, after US, Germany and Japan (1960s) also followed similar protectionist and state-led policies during their industrialization period. Lastly, East Asian newly developing countries also attained to significant success stories about economic growth and created high technology industries with state-led policies according to their national dynamics.

List's followers adapt his approaches in order to enlighten recently catch-up countries with strong state-led potential, are named as Neo-Listians. Neo-Listians present alternative policies for developing countries instead of neo-liberal policy vision. Against Washington Consensus and its approach of reducing role of state in economic activities, neo-Listian argument strictly advocates that catch-up and development requires extensive state intervention, additionally advocates state disciplining labor.

Hegemonic neoliberal discourse follows market-oriented strategies however neo-Listians interiorize state-oriented policies. While Washington Consensus suggests decreasing interventionist role of state in economy, Friedrich List and his recent followers mainly criticize neo-liberal vision and assign a central role to the state.

Ha-Joon Chang's famous book of *Kicking Away the Ladder: Development Strategy in Historical Perspective* emphasizes that previously advanced countries also used similar protectionist policies to accelerate development, however, they do not offer similar protectionist policies for today's developing countries – wool manufacturing in 15th century in England could be exemplified.

Moreover, Atul Kohli as a neo-Listian studied on state-society relations in the book of *State-Directed Development: Political Power and Industrialization in the Global Periphery*. Kohli advocates that protecting the strategically important sector is not the sole duty of the state, besides, state also directs the resources and organizes industrial sectors to engender competitive companies.

Gerschenkron had also considerable contributions to literature in the scope of state. Specifically Gerschenkron emphasizes that late development is initiated and sustained by active state intervention through the market.

Alexander Gerschenkron is one of the key scholars of catch-up literature, studied on latecomer approach in the scope of late industrialization with the hypothesis of *advantageous of backwardness*. Gerschenkron's model mainly settles on Britain, Soviet Union and Germany experiences in the nineteenth century. In this group, Britain was forerunner and had achieved Industrial Revolution, Germany followed the forerunner Britain and attained to industrialization level as a *moderately backward country* in the middle of the nineteenth century. After, Soviet Union emerged on world scene as an *extremely backward country* in the late nineteenth century. In his study, Gerschenkron discusses "backwardness" term and catching-up strategies of these countries. He concludes that accumulated capital and entrepreneurial activities had played the major roles in Britain's industrialization period. Germany also achieved its succession by the financial support of universal banks and in Soviet Union the state took the control and directly managed the financial operations and industrial activities during catch-up period.

Gerschenkron firstly described the "advantages of backwardness" in the literature. In his model, Gerschenkron defines "backwardness" as;

> The typical situation in a backward country prior to the initiation of considerable industrialization processes may be described as characterized by the tension between the actual state of economic activities in the country and the existing obstacles to industrial development, on the one hand, and the great promise inherent in such a development, on the other. (Gerschenkron, 1962:8)

Gerschenkron highlighted that latecomer industries could acquire and use the latest technologies by inward investment from abroad, transfer agreements and recruitment of skilled people. Gerschenkron famous schema has the relations between the state, finance sector and industry sector which are governed by "the level of backwardness". He mainly stresses the structure with three conditions; government's leadership role, organized financial institutions and nationalistic ideology of industrialization. His schema is mainly abstracted

from historical experience of catch-up with Britain by Germany and Russia. In this situation, Britain sets a reference point and the latecomer countries Germany and Russia follows. (Shin, 1996: 23)

According to Gerschenkron, when latecomers stay in direct competition with the advanced countries, they choose to specialize in most modern technologies. The late industrialized countries such as Germany, Japan had some advantageous according to previously industrialized countries. These countries succeeded catching-up by transferring the modern production techniques, as in Soviet Union case. Gerschenkron also explicated Soviet economic and industrial succession by "the advantageous of backwardness".

Gerschenkron identifies his model via using the experiences of earlier European industrialization with state intervention and based on interaction of technological and institutional factors. Latecomers' development process requires industrial financing and the state is the most effective and powerful institution for providing financial sources.

Gerschenkron specifically implies that having a strong and autonomous state is required in order to apply coherent policies for catch-up which presupposes effective state intervention in the market (specifically in the scope of industrial policies). Moreover, Gerschenkron (1962) discusses that focusing on rapidly growing and advanced technologies provide significant advantage for latecomer countries. Besides, the catch-up process also has its own dynamics and depends on the degree of backwardness of nations.

> The more backwards a country's economy, the more likely was its industrialization to start discontinuously as a sudden great spurt proceeding at a relatively high rate of growth of manufacturing output. (Gerschenkron, 1962: 353-4)

In sum, Gerschenkron's state policy provides greater advantage to backward countries during catch-up period of national industrialization. The state has a more critical role for this development period of latecomer nations

and has the role as an entrepreneur, because these nations do not have a well-developed capitalist class. The state has active investor role as a risk-taker with its state-owned financial sources.[8]

Gerschenkron also analyzed the nineteenth century Russian industrialization. In fact, Russia was a quite backward country according to European economies (specifically to England). In that perspective, state took part as an active instrument through development period; state sponsored railway construction, machinery, industrial materials and thus became the fifth largest industrial economy in 1913. Finally, Russia became the latest developer of Europe in 19th century with state-led development strategies.

In sum, Gerschenkron's studies are quite important source of technological catch-up studies. Gerschenkron's strategies could be summarized as (Sylla, Toniolo, 1993); catch-up countries should target rapidly growing and technologically advanced industries, intensive investment in mature industries is recommended and latecomer countries could benefit from scale economic in production. Hobday (2003) indicates that Gerschenkron also advocated that each latecomer economy might come across with different external environments and conditions; in the scope of market, technologies, opportunities etc. Thus, every catch-up could not be based on same set of preconditions. Hobday (1995) emphasizes that in order to obtain foreign technologies there are various methods/ways for developing countries, such as licensing, subcontracting, purchase of equipment, foreign direct investments, establishing joint ventures, strategic alliances, hiring foreign labor force, acquisition of foreign firms and research and development activities.

> Since it was the government that had fulfilled the function of industrial banks, the Russian banks, precisely because of the backwardness of the country, were

[8]In Gerschenkron's argument, the state is still addressing the problem of risk-taking, but the provision of a generally predictable environment is no longer sufficient. Lacking both individual capitalists able to assume risks at the scale required by modern technology and private institutions that will allow large risks to be spread across a wide network of capital holders, the state must serve as investment banker, bringing together the necessary funds and encouraging their application in transformative activities. (Evans, 1995: 31)

> organized as “deposit banks”, thus resembling very much the type of banking in England… In short, after the economic backwardness of Russia had been reduced by state-sponsored industrialization processes, use of a different instrument of industrialization, suitable to the new “stage of backwardness”, became applicable. (Gerschenkron, 1962: 22)

Gerschenkron’s study regarding catch-up approach around Russian and German steel industries in 19th century is one of the basic references for catch-up literature. Therefore, he will be one of the main references of the research that studies the emergence and improvement periods of Chinese telecom equipment industry; as a latecomer industry.

2.3 Reclaiming State-led Catch-up Policies with Successful Industrialization Cases

Neoclassical economics advocates the role of state as essential for economic growth; however the minimal limited role of state, also that role is an exogenous factor and could be defined in the scope of black-box functions. Neoclassical view gives a role for state for instance to maintain macroeconomic stability, provide physical infrastructure, supply public goods (defense, education, health, legal system), offset/eliminate price distortions.

Classic liberal approach and free-market doctrines are combined within neoliberalism. For decades, World Bank commonly proposed “reliance on market” and “dismantle the state intervention” strategies for latecomer countries. The political hegemony of neoliberalism and its policies have become effective specifically since end of 1970s.

Moreover, interventionist policies mainly emerged with the forms of infant industry protection, import substituting industrialization, creating state-owned enterprises, financial support of state-owned financial institutions. Advanced countries had also used protectionist strategies during their industrialization periods, however, these countries now deny this fact and suggest free market and liberal policies for latecomers. For instance in 15th

century, English authority promoted British wool manufacturing industry with related regulations to resolve the dependence on wool imports from Western Europe. After, mid-19th century (Corn Laws in 1846) British state prepared and applied related laws and strategies in order to promote domestic manufacturing base. US and England, which are the main defenders and missionaries of liberalism free-trade policies, also used protectionist policies during their early development years. Specifically after World War II, many European countries as France, Austria, Norway set up state-owned enterprises in their strategically important sectors.

Import substituting industrialization (ISI) and export-oriented industrialization (EOI) with active state intervention are strategic methods for latecomers' industrialization strategies. ISI aims to reduce the dependency of nations on imported manufactured goods by producing more goods for home market. ISI could be defined as the development strategy of Latin America in 1930s. Initial point of that strategy was the international economic crises -US and Europe decreased the purchasing of primary goods from Third World because economic depression, and those nations could not have stocked required foreign exchange for their import of consumer goods, so began to manufacture for their home markets. However, in time this crises strategy transformed through being as a long-term strategy for industrial development of latecomers. Latin American and East Asian nations mostly used that strategy; however, East Asian nations transformed their strategy to EOI and began to fulfill the export-oriented manufacturing in recent decades. East Asian latecomer governments forced their local companies to be export-oriented and more competitive in world market. In time, after the succession of East and Southeast Asian countries, Latin American and other latecomer nations began to use that strategy and increased their export capabilities.

> Neoliberals often claim that SOEs are inefficient because they operate as monopolies, and therefore do not face competition in product markets. In many countries, SOEs compete vigorously with private-sector firms. For example, in France the auto manufacturer Renault, which was nationalized

> following the end of World War II and remained an SOE until 1996, faced direct competition from the private firm Peugeot as well as from foreign producers …The Korean SOE that produces steel, POSCO, became the most efficient producer in the world barely ten years after the firm was established in the early 1970s. (Chang, Grable, 2004: 86-7)

Specifically in 1982- debt crisis-, state and interventionist policies were under heavy attack both at theoretical and practical levels with anti-interventionist theories. This period was supported by liberalization programmes among developing countries with the policies of privatization, deregulation and liberalization. Specifically in 1990s hegemonic view dispersed the neoliberal policies and its effectiveness with the assistance of IMF and World Bank.

Despite the popularity of liberal/neoliberal policies, there are successful case countries which rejected hegemon development policies and used state-led development and catch-up policies with various kinds of state policies. Although hegemonic view highlights the market-oriented and neoliberal development models, there are nations that evolved from being economically backward by using state as a development instrument. East Asian countries, Japan, Soviet Union-Russia and China could be exemplified as cases of state-led development after World War II. It is obvious these countries have different socio-economic backgrounds, however, in time used state as an active development instrument in different models.

> Effective state intervention is now assumed to be an integral part of successful capitalist development. The classic interpretations of Polanyi and Gerschenkron have brought the state to the fore in the analysis of European industrialization, puncturing the myth of the original industrial revolution as a purely private process. (Evans et. al., 1985: 44)

2.3.1 Soviet Union

Soviet socialist economic system and industrialization could be evaluated as a case of state-led development. This economic system was a

command economy and had the characteristics of limited markets and private properties in national borders and this structure is certainly contrary to free-market system. State has mainly owned and managed means of production. According to Gregory and Stuart (1994) by this command system Soviet Union from 1928 to 1984 grew at average rate of 4.3 percent a year, on the other hand US attained to annual growth rate of 3.1 percent for the same period.

There was central planning authority which coordinated all the economic activities in a chain of command. The planning authority directed all investments and R&D efforts through the strategically important heavy sectors (the most advanced technology sectors of the period); as steel industry, electricity generation and equipment, heavy engineering and machinery. These strategically important key sectors would lead and support the rapid growth of national economy with its backward and forward linkages with other industries. However, consumer goods industries did not get sufficient importance for the central authority.

Soviet Union's state-led development[9] under socialist planning also confronted with the problem of being closed and isolated from world market economies and this problem became one of the main reasons for disengagement of Soviet planning from world's trend. In time, Soviet Union had limited foreign trade and investments because of socialist protectionist state policies and Western embargo. Thus, information flow was not succeeded concerning newly emerging trends, modern technologies and industries.

Amann and Cooper (1982) summarizes the missing point as; specifically in 1950s and 1960s Soviet Union had focused on traditional

[9] Over the ensuing years, new generations of central planners did attempt to modify the traditional heavy-industry-centered model in the orthodox socialist theory and, in practice, to introduce new industries into the Soviet economy… The central authority could not afford to experiment with potential new industries, as high opportunity costs were involved with re-arranging economy-wide investment priorities. The soviet central planners assigned high priority to a new industry or industrial branch only when its beneficence and importance were fully demonstrated in the West. This further explained the significant delay in the introduction of new industrial segments or new sectors in the Soviet economy. The delayed development of the polymer and petrochemical industry in the Soviet Union was a good example. (Tan, 2005:61)

industries as iron and steel[10], whereas Western countries and their industries began to research on new technological paradigm of fourth long wave. Therefore, aircraft, computers, polymers, petrochemicals, automobiles became the new focal points of Western companies and their investment roadmaps.

In sum, closed and non-interactive economic system, limited connection with Western countries, insufficient information flow from external markets, not perceiving consumer goods market as a strategic investment field, additionally; wrong guidance from central authority could be counted as the main reasons why Soviet growth could not have sustained and updated its industrial achievements with newly emerging technologies and related industries. Berliner also underlines that there were certain restrictions on flow of technological information in USSR. His cases proved that it was very difficult for Russians to transfer the innovations from space and military projects to general industries. (Berliner, 1976:514)

2.3.2 East Asia

Most of today's developed countries of capitalist system achieved industrialization in eighteenth and nineteenth centuries. However, latecomers of East Asia began to industrialization barely in mid-twentieth century. East Asian economies attained to significance catch-up achievements among fourth long-wave technological revolution. Substantially, East Asia has attained to remarkable industrial and economic success during the past three decades, thus, attracted the attention of researchers.

[10]Soviet growth collapsed, not because the Soviet planning hierarchy could no longer mobilize high capital growth in the later years. Fixed capital increased by an average of 7.6 percent a year in the Soviet during the period between 1960 and 1981, much higher than 3.6 percent in the US and 3.4 percent in the UK during the same period... Rather, Soviet growth collapsed, because the planning authority guided the capital flow to the wrong place, due to the failure of information at the center. (Tan, 2005:62-3)

First of all, East Asia is defined in literature as Japan and first-tier NICs (Newly Industrialized Countries) of South Korea, Taiwan, Hong Kong, Singapore, as in that study. Additionally second-tier NICs of South East Asia, Thailand, Malaysia and Indonesia and finally China and Vietnam could be also included in that group. Active state intervention (without Hong Kong) is generally the common characteristic of the region's industrial catch-up strategies.

East Asian succession mainly divides the scholars into two groups; one group mainly features the importance of the role of strong and autonomous state, the other group advocates the pluralist approach which cares efficient market and competitive environment. The discussion is also related to political view; statist scholars specifically emphasize the role of state in the catch-up period, however, hegemonic neoliberal view directs the discussions around market factors. However, it is clear that market factors has not created sufficient environment on their own for the rest of the world in order to attain to a similar catch-up achievement around newly emerging technologies and related industries. Namely, today's neoliberal and free market policies are the common hegemonic arguments around the developing countries in all regions; however, East Asian successful catch-up cases could not be replicated in other regions.

East Asian countries were at much behind of western industrialized countries in mid of 20^{th} century, as 19^{th} century of Russia. The countries assigned a central authority role for the state during catching-up periods as in Gerschenkron's thesis.

In that perspective, East Asian countries commonly selected the state as instrument for industrialization. "State" played active and autonomous role by determining focal strategic fields, public investment position, foreign investment policies, taxes and tariffs etc. In this framework, East Asian countries applied similar strategies during their industrial catch-up and development.

Chalmers Johnson in his famous book of *MITI and the Japanese Miracle: The Growth of Industrial Policy: 1925-1975* historically analyzed Japanese development and emphasized the role of "developmental state" to explain East Asian achievement. Developmental state includes strong state intervention, regulating and planning characteristics. Johnson defines Japanese state as planning, outcome and effectiveness oriented; additionally, the Ministry of International Trade and Industry (MITI) is described as a significant and powerful authority for planning and execution phases.

After World War II, Japan lead the country's industrial development in the scope of state-led development policies and attained to significant successes statistically on export and economic growth, also South Korea applied similar development strategy as Japan. State-led catch-up strategies actively intervened to the development and investment period, fostered local industrial conglomerates and selected strategically important sectors in order to support these industries with investments, subsidies and tariffs. According to Handelman (2010), East Asian developmental states actively intervened in the economy. South Korea, Taiwan, Singapore, Indonesia and other industrializing nations in the same region applied similar policies with Japan's state-guided capitalist development model. By the developmental state policy, the governments directly intervened to the economic sectors, industries and also specific companies. (Handelman, 2010: 285)

As emphasized, state mostly played active role in development periods of East Asian NICs, however with variations of "developmental state", state owned enterprises and state institutions, planning strategies become effective in those development periods. Specifically, Gerschenkron's approach could be evaluated in Japanese development case. Japanese state institutions provided investment capital because of lack of capital market after World War II and also determined investment decisions effectively.

> As Gerschenkron (1962) observed, in spite of many handicaps, the relatively backward countries have the one great asset of the technological knowledge

> accumulated by advanced countries. However, developing countries cannot take advantage of this asset unless they develop the technological competence to search for appropriate technologies and to select, absorb, adapt, and improve import technologies… Hence, the role of government in facilitating the process of acquiring technological competence is crucial (Aoki et. al. 1997: 101)

Japan, Four Tigers- South Korea, Taiwan, Hong Kong, Singapore and newly industrialized economies (NIEs) of Thailand, Indonesia and Malaysia are the group of countries which attained to successful economic and industrial catch-up in East Asia. After Japanese success (postwar period), Four Tigers followed the similar state-led export-oriented economic development model which raised their per capita income significantly and NIEs also narrowed income gaps with other industrialized countries. According to Stiglitz (2001), South Korea, Thailand, Hong Kong, Singapore had annual per capita above 5% between 1973 and 1996. State policy played a strategic role for these countries' important growth rates. Additively, Stiglitz advocates that, investment for education, production and dissemination of knowledge and technologies, cooperation between government and business and advanced industrial growth could be counted as the other reasons of the success.

South Korea and Taiwan began to upgrade their industrial capabilities in 1970s and both of these countries (Taiwan computers, peripherals, South Korea consumer electronics, semiconductor, and telecommunications) had knowledge-intensive industries in early 1990s[11]. During the development periods of those industries, different degrees of state interventionism occurred in the scope of policies, strategies, linkages between state and society.

[11]From the very beginning of its first semiconductor project launched in 1974, the state in Taiwan created key state agencies such as state-run research institutes… after 1974, the state in Taiwan has exercised total control over the developmental process of the semiconductor industry through these organizations….The Korean state was a major promoter of the semiconductor industry with a primary emphasis on exports in the 1960s. During most of the 1970s, the state drew and implemented numerous ambitious plans to develop domestic semiconductor manufacturing industry as a part of heavy and chemical industrialization program. (Hong, 1997: 6-7)

Furthermore, active state intervention policies provide a suitable environment to support and encourage specific companies in strategic fields, particularly. The firm selection strategy in specific industries and special subsiding policies created successful industries in South Korea[12]. The sectors created their own multinational firms in chemical, steel, electronics, cars, shipbuilding by the macro policies related to export-oriented industrialization.

While main policies are directed by legal development committee in the scope of investment, trade, foreign investment, Taiwan is much more market-oriented than South Korea and Japan. On the other hand, Singapore government has settled authority in development period by state agencies; however, Singapore selected foreign investments as the major engine of development. Through this policy, foreign companies were invited to operate in Singapore for foreign capital, technology and access to foreign markets. The government analyzed the multinationals and evaluated their benefits to Singapore. Singapore is also called "the state as venture capitalists." (Tan, 2005:71)

Wade (2004) in his book of *Governing the Market*, studies theoretically on East Asian states (Japan, South Korea, Taiwan) in the scope of their achievement on industrialization and economic catch-up. In his analysis, Wade studies on national catch-up objectives, foreign trade, foreign direct investment strategies and regulations on domestic firms. Additionally, sectoral upgrading policies based on technology transfer strategies and close coordination between firm requirements and state investment strategies is another major research point of Wade's study. Wade concludes his study concerning East Asian growth with policy proposals for catch-up strategies of latecomers. His suggestions are; to use national policies to promote industries and channel investment into industries which are important for economy's future, use protectionist policies for industries, give priority to export promotion policies,

[12]South Korea's highly trained state technocrats worked closely with the country's all-powerful business conglomerates (chaebols), such as Hyundai and Samsung. (Handelman, 2010: 286)

attract multinationals for export and promote bank-based finance system under state control.

Chang and Grabel (2004) indicate the significance of protecting the strategic industries to ensure long-term national economic growth in the book of *Reclaiming Development: An Alternative Economic Policy Manual*. In the study, education of population and qualified workforce, using FDI to national development strategy, managing financial sector to national development needs (for instance state-directed lending) are quite important headlines for successful catch-up. East Asian countries such as Japan, South Korea and Taiwan used mix of state intervention and market incentives to support domestic industries. Governments also used policies of infant industry protection, export and other business subsidies, credits from state-owned banks to strategic industries and support for R&D and training. (Chang, Grabel, 2004: 75)

Chang and Grable (2004) also mentions about the role of FDI and TNCs role in national development strategy. According to study, Japan, Korea and Taiwan also designed their policies in order to encourage FDI only in sectors where TNCs would transfer beneficial technologies at right price and maximize technology spillover from TNCs to local producers.

In sum, industrialization of Soviet Union was succeed with strict socialist planning in a closed system and limited interaction with western economies, however, East Asian countries succeeded industrialization by state-led export oriented industrialization strategy and strong international relations with Western markets. These countries also followed Japan in many aspects and produced consumer goods penetration strategies for western markets. These direct linkages with foreign markets enabled knowledge flow to East Asia in the scope of sector, consumer-demands, emerging technologies, R&D operations and joint-venture opportunities with foreign partners. East Asian markets generally has low-income profile and limited potential, thus, integration with western markets created the opportunity for expanding the market potential for East Asian origin products. Additionally, these firms have

taken the advantage of absorbing advanced technology and knowledge flows via joint investment linkages with the advanced economies and East Asian export oriented companies had competitive characteristic because of competitive environment of western markets.

2.3.3 Introduction to Chinese Catch-up

People's Republic of China closed central planning period was between 1949 and 1978. This period was similar to Soviet-style state-led, closed, non-market economy, industrialization with traditional sectors as iron, steel, railways etc. This industrialization and economic development policies mostly focused on urban regions rather than rural areas. During nearly those thirty years period, China was certainly isolated from market competition and capitalist economic system.

Determining the position of China's socialism within a historical perspective and the experiences of world's socialist movement has become the main purpose of China Communist Party. China's reform strategies in 1980s and open market decision also took the roots from socialist background. In this new model, China chose the way which criticize and also compete with the globalization and advanced capitalism. Thus, China would try to benefit from capitalism's own strengths.

During new democratic revolution and new state organization period between mid-1930s and 1950s, China Communist Party customized Marxism's basic principles according to China's realities and created an original democracy theory. This new theory's economic system was a system under the leadership of state, additionally; cooperative economy sector, private capitalist economy and state capitalism would also work together.

After closed and non-competitive economic environment period, by open economic policy of 1978, China achieved rapid economic progress. In China Communist Party's 12^{th} congress (September, 1982), Deng Xiaoping

claimed that Chinese modernization movement had to derive from Chinese own realities. (Guoliang, Guangqing, 2010). Even after this open-economy decision, former centrally planned economy with large size state-owned enterprises become the driving force of national economy. State's active leadership role and export oriented strategy- similar to East Asian tigers- become the dominant strategies.

Although Soviet Union and China comes from similar communist economic traditions, however, their transition to open economy occurred within different manners. Russia (new government after SSCB) disabled the state control on economy rapidly, applied full price liberalization and mass privatization. After disintegration of USSR in 1991, whole of state owned enterprises transformed through independent profit-driven enterprises with privatization policies in Russia. However these enterprises had operated under central planning by state directly, before open economy decision. Contrary to USSR, China partially liberalized the economy and continued to plan major economic activities under the authority of government organizations with the guidance of China Communist Party.

On the other side, during this transformation China had significant problems (huge debts, inefficiency) with SOEs especially in traditional industries. Thus, after mid of 1990s, the state privatized small and medium state-owned enterprises in traditional industries, however, large size state-owned enterprises in strategic industries (which are the major driving force of national economy) have stayed under the control of Chinese state. In this framework, Chinese government applied liberalized policies in the periphery, south region of China, and these policies provided rapid industrialization in these rural regions. During that period, the term of "privatization" has never been used in official documents. Private enterprises mainly operated in light industries as service sector, light labor intensive industries for producing consumer goods for both of domestic and abroad markets. The shared characteristic of these industries is that most of them do not require certain amount of start-up capital.

Chinese modernization with the investments on high-tech oriented and newly emerging industries were held by these large state-owned (SOEs) and state-held shareholding enterprises (SHCs; more than 50 percent share is held by state). Additionally, local governments also played strategic role in this transformation period as implementing plans of central government authority and as managers of regional economies with great power. The central government focused on setting new high-tech industries (as information-communication, nanotechnology, pharmaceuticals technologies) and expanding the previously settled key industries as aerospace, steel, oil industry etc. with large SOEs in order to operate in both of domestic and international markets. On the other hand, local governments, specifically in coastal regions, concentrated on export of manufactured low-end consumer goods for international markets.

While state-led development and export oriented strategies have significant role in Chinese success, however, China has never fully embraced privatization and liberal policies. Chinese government does not believe the free-market system. Nevertheless, "cradle-to-grave" socialism was changed in China. This open economy policy brought foreign investments and foreign partners through Chinese market. These linkages with western enterprises brought opportunity of advanced technologies, corporate governance, organization management etc. Additionally, foreign direct investments and joint ventures forced Chinese SOEs in order to be more competitive and efficient for domestic and export markets. Additionally, there is clear advantage of magnitude of domestic consumer and labor markets of China; domestic market provides suitable environment for capital accumulation and analyzing the consumer demands properly and labor market brings labor cost advantageous and thus become much more competitive in western markets according to multinational rivals.

Although national economic ideologies, state management and control are quite different, Soviet Union rapid industrialization for postwar period, East

Asian recent industrialization and China's modernization could be given as remarkable latecomer catch-up examples in the scope of state-led development. Additively, East Asian and Chinese economies applied state-led development strategies, however, one of the most important differences is that China has more strict state authority, for instance all the largest enterprises in strategic sectors stayed under the control of Chinese state and were not privatized. Thus, China has used the strategy of higher control and planning on its strategically important industries without free market strategies.

2.4 Discussion

After World War II, with the emergence of the modernization theory, one single model of development was introduced for latecomers without considering own dynamics of the nations. Meanwhile, the dependency school and the related theories emerged against the modernization paradigm. This view was a critical theory sourced from left discourse and Latin America and "underdevelopment" problem. The radical theoreticians- Marxists- strictly emphasize that latecomers had to delink from previously developed nations for an intrinsic catch-up and development. On the other hand, as a part of the dependency school, structuralist school settles the theory on triple alliance of foreign investments, state and local bourgeoisie. One of the foremost theoreticians, Evans (1979) advocates the form of "dependent development". Following the structuralist school, Wallerstein and his followers focus on certainly international division of labor on the distinction of core-periphery-semi-periphery. These theories are sourced from left discourse in general manner and criticize neoliberal policies and its predecessor modernization theory.

Friedrich List and Alexander Gerschenkron also discuss catch-up and development around state-led approaches. List and his followers (neo-Listians) are nationalists rather than internationalists. While Washington Consensus aims to reduce the state activity in economy in recent decades, Friedrich List and his recent followers criticize mainly neo-liberal discourse and assign a central role to the state for industrial development. Furthermore, Alexander Gerschenkron focuses on banking and the financial side of the development of the "backwardness"; as he claims that the state is an investment banker.

Although theories assign a specific role to the state, they were affected by their own periods and socio-economic conjecture. Dependency theory and other theories aimed to find a solution for Latin America in 1960s with political revolution, delinking with advanced nations etc. under the management of the state authority. List studied the late industrialization of Germany and Russia against previously industrialized England of late 19th

century. Gerschenkron focused also on the late industrialization of the European region and Russia and the "advantageous of backwardness". As a summary, all these major development theories are compared in Table 1.

Table 1: Comparison of Major Development Theories in Theoretical Framework of Thesis

Theories	Research Focus	Theoretical Heritage	Level of Analysis	Major Theoretical Structure	Key Factors in Development Problems
Modernization	"Third World" Development	Evolutionary Functionalism Smith, Rostow	National	Tradition versus Modernity	Primarily Internal
Dependency	"Third World" Development	Marxism,Baran, Samir Amin	National and international relationships	Core versus periphery, Dependency	Primarily External
Structuralism	"Third World" Development	ECLA Program, Frank, Dos Santos, Cardoso	National and international relationships	Core versus periphery, Dependency	External and Internal
World-System School	Development across multiple "worlds"	Dependency theorists French Annales, Braudel, Wallerstein	World-System	Tri-modal – Core, semiperiphery and periphery	External and internal for nations, but main focus on worldsystem
Listian and Gerschenkron Development	Development of Latecomers	Alexander Hamilton and Protectionist Theories	National	National Development	External and Internal

Source: Adapted from: So, Alvin. 1990. Social Change and Development: Modernization, Dependency and World-System Theories. Newbury Park, CA: SAGE Publications.

In conclusion, while this literature defines macro policies for the state-led catch-up, the state interventionism affects certainly whole economy with industrial segmentation as in China. Thus, this literature is quite beneficial and instructive for the theoretical framework of the thesis and the case study of the Chinese telecom equipment industry.

In fact, all countries have own dynamics and there is not any single model which adapted to all nations and achieved industrialization. Chinese experience is also different; China declared mainly the alternative mode of governance for hegemonic neoliberal development models. In this model, China merged the communist tradition with capitalist development mode and as a result, the state-led development model emerged from China's own dynamics. Thanks to those state-led macro-economic policies, China has had significant attempts for high-technology catch-up in recent decades, specifically after open-economy policy of the late 1970s. The high-tech catch-up succeeded with the collaboration of the state-owned enterprises, the state's financial resources and the effective management of the public organizations.

China has own dynamics (the combination of communist tradition and capitalist mode of development), therefore, none of these theories could explain Chinese state-led catch-up separately. Namely, China's catch-up in high-technology industries is the result of the state's certain interventionist (state-owned enterprises, state-banks, subsidiaries) and open-economy policies (managing foreign investments, export-oriented strategies). Although China is still managed by the Communist Party, a different combination of communist tradition and capitalist mode of development has become China's new system after open economy strategy.

Under this theoretical framework, Chinese telecom equipment industry upgraded its position according to international division of labor theory; improved its position from a periphery country (low-cost manufacturing operations) to a core country (R&D oriented strategies and technology of exports to other countries). From the structuralist perspective, the industry set an effective model as a triple alliance of multinational investments, domestic firms and the state. Could this catch-up model be named as the "dependent development" of Evans? Does state-led financing for Chinese telecom equipment industry prove Gerschenkron's thesis of state as an investment banker? These questions will be answered in the related chapters separately.

Finally, although all these mentioned development theories have major contributions to the literature, radical views have lost the importance for today's global economic system, hybrid models could be much more successful than these previous models. For instance, neoliberalism, which takes its roots from the modernization theory and Adam Smith, strives for increasing the hegemony of the developed nations by obstructing the development opportunities of the latecomers. If a nation uses neoliberal development (non-development) strategies, it could only attain a limited rate of growth which would be insufficient to attain significant catch-up stories. Neoliberal policies make latecomers as a potential market for the developed countries and their multinationals. Latecomer's role in this division of labor is being responsible for low-value added manufacturing operations. Thus, neoliberalism is not a way to prevent the destiny of poverty and backwardness. On the other hand, although radical socialist experiences attain a significant growth success for a time, it could not be sustained in the hegemonic capitalist system of the world economy. Specifically, by delinking with global economy, socialist economies could not have competed with profit and exploitation oriented capitalist economies of advanced countries as shown in previous examples in history. Therefore, the thesis focuses on a model which is mostly covered by the policy suggestions of the Latin American Structuralist School under the triple system of the state, the multinationals and the local capital. This system also takes place in a similar manner with the name of the "dependent development", additionally China's socialist background and strong state authority characteristics also create a different hybrid model.

Following chapter will be beneficial in showing the transformation of China from Mao to Deng and the importance of the strong state authority will be emphasized in the development and the catch-up periods.

CHAPTER III
TRANSFORMATION OF CHINA: INDUSTRIALIZATION AND TECHNOLOGICAL PROGRESS (1949, 1978)

This chapter clarifies industrial and technological transformation of China in historical and economic perspectives. During this study, two milestones, which are 1949 -Mao Zedong's socialist revolution and 1978 - Deng Xiaoping's reformist policies, will be main subtitles of the chapter.

This chapter will answer the below questions;

*Which historical and socio-economic forces drove China to a planned economy after 1949?

*What are the major effects of Mao's socialist transformation on China under the leadership of Communist Party?

* What are the reasons and driving forces which prepared appropriate environment for Deng's reform around domestic and international conditions?

*What are the main effects of two great transformations of Mao (1949) and Deng (1978) on China's industrialization and technological progress and catch-up?

*Why was China successful in transforming from planned economy to market economy?

* What are the main effects of Deng's policies on Chinese telecom equipment industry which is the research field of the thesis?

China has been one of the leading players in world history since ancient times. Specifically four great innovations; papermaking, printing, gunpowder, compass had significant effects on China's and world's civilization. After long

years from these inventions, China sustained its effect on world historical and political environment for 20th and 21st centuries. In recent years, China has strengthened its powerful position and now one of the most impressive countries which affect world economic system.

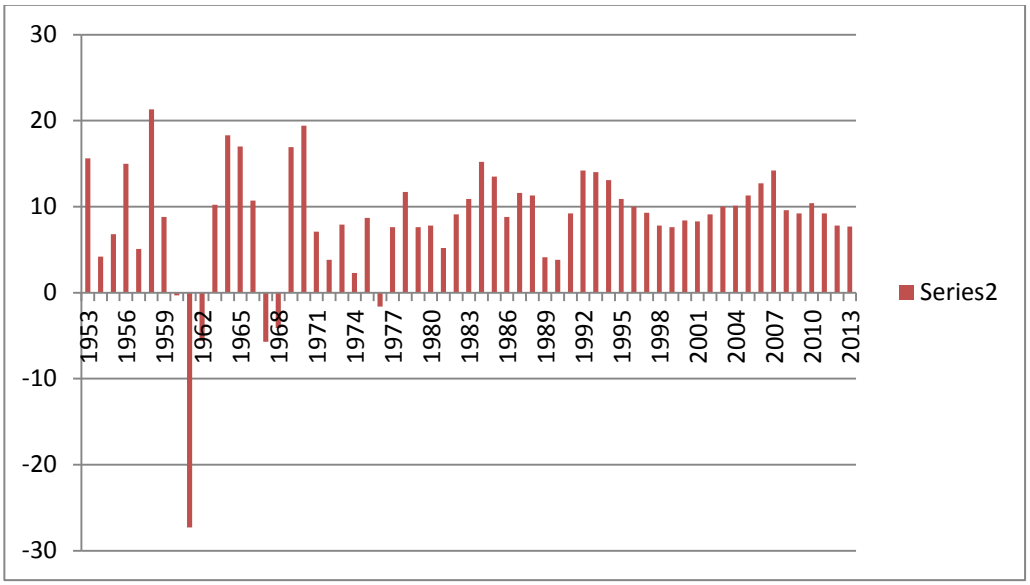
Specifically two historical facts transformed China in a great manner. The country has experienced two main transformations; 1949 -socialist revolution of Mao Zedong and 1978- open economy and market socialism reforms of Deng Xiaoping. In both of command economy and reform period of after 1978, central government has taken leadership role in industrialization and economic progress of China. As a fact, tradition of centralization is common fact of China for thousands of years.

China prepares itself to transform through being a core country with its peripherals via state capitalism strategy of last thirty years. In recent decades, China's economic growth has been mainly triggered by reformist policies of foreign investments for low-cost labor and export-oriented strategy. This strategy accumulated significant amount of capital under state capitalism policies, specifically since 1980s. Accumulated capital is directed to fund strategic industry investments through reorganized state-owned enterprises and this strategy has been applied as a state-policy. On the other hand, Mao's "iron rice bowl"- guaranteed lifetime employment in state enterprises- was counteracted by new reform period and thus labor market was created. New labor profile had to work with lower wages and under worse working conditions. This reform not only affected China's labor profile, global labor markets and wages were also negatively affected by this new strategy of China.

Meanwhile, state-owned enterprises were renewed with young professionals via removing the tradition of choosing the managers from Communist Party members. The state still holds the major share in those enterprises which operate in strategic industries and these industries have already been determined by central planning authority.

Behind those reforms, over recent thirty years one of the most significant features of China is rapid and sustainable economic growth. China's

real GDP growth attained to approximately average annual rate of 9.85 percent between 1978 and 2013. China GDP growth rate averaged 14.2 percent reaching an all-time high of 14.2 Percent in 1992 and 2007 and a record low of 3.8 percent 1990, as indicated in Figure 2.



Source: National Bureau of Statistics of China (2009), National Bureau of Statistics of China (2010), National Bureau of Statistics of China (2012), National Bureau of Statistics of China.

Figure 2: China's GDP figures for 1953 - 2013

Since 1978 (after open-economy policy), Chinese economy has grown at an average rate of approximately 10 percent per year and there is no any nation that has attained to a similar success in modern world history. Although economic statistics indicate this succession specifically in economy, however, there are significant problems also specifically in social perspective, for instance, insecure conditions for working population is one of the secret problems of this new system. Market conditions as labor efficiency eliminate social welfare and job guarantees of Mao's period. According to Meisner (1999) there are approximately 200 million who are joined to unemployed workers group, when state factories are closed or sold. Besides, Communist regimes' free services of education, health, free living conditions etc. have been removed from state warranty as in other capitalist countries.

Communist Party of China has the most important role during both reforms of Mao and Deng. Communist Party was founded in 1921 in Shanghai, when China had been fractionalized and political authority had been dispersed. Whole the country was quite poorer in feudal system and had problems related to socio-economic development. Communist Party aimed to transform whole country with a new system against feudalism (in national borders) and imperialism (international perspective). Advanced nations named the revolutionist China as the source of instability and set limited diplomatic relations after socialist revolution. On the other hand, Third World nations perceived this new model as a combination of socialism and nationalism around a new development model with its own national sources.

Meanwhile, Communist Party should have taken strategic decisions and defined the new national strategies in order to expand the society's support and build new social structure. Thus, triple management model was applied; party, government and the military.

> The defining character of the Chinese political system since 1949 has been the leading role played by the CCP. Since its inception, the government of the PRC has operated under the Party's centralized, unified direction. There are party branches in almost all institutions, including factories, offices, shops, schools, colleges and army units… The leading role of the Party is a key feature of all communist systems, but in the Chinese context should be qualified by the unusually important part the military has played in political affairs…. Most leaders, including Mao Zedong, Deng Xiaoping, and Lin Biao were also military figures. (Hunter, Sexton: 1999: 101-2)

In this socio-political environment, between mid-1930s and early of 1950s Communist Party adapted the basic theories of Marxism to China and created original democratic theory with new development model which was the transition phase between semi-feudal society and socialism. New democratic system brought revolutionary approaches in subjects of politic, economic and culture. The politic side could be described as the new system would grow up with the agreement of labor and villagers and would put together all the different ethnic groups in the country. This new politic system would be

against imperialism, feudalism and bureaucratic capitalism and develop with China's own dynamics independently. Moreover, the new economic system would be managed under the dominance of public by the state, additionally; state enterprises, cooperative economy sector, private capitalist economy and state capitalism would operate together. This new state would not eliminate whole the subjects of capitalism, instead, would encourage the private enterprises which contribute to independent national economic development of China under the state control. The state would also control the foreign trade in order to protect the national economy from exploitation of advanced capitalist states. (Guoliang, Guangquing, 2011)

Through this perspective, in early 1950s, Communists aimed to transform the Chinese empire through a modern nation state with its great population and their strong national identity. In this perspective, agrarian revolution was started with "land reform" in 1952. Foundation of strong central authority, creating national market, eliminating pre-capitalist social and economic relations and regional unification of country prepared a suitable environment for development of modern socialist productive forces.

China's great transformation from an agrarian society to industrialized nation is a significant success story under socialism. Some examples could be given within this perspective for the period of 1952 and 1976. [13]The output of steel grew from 1.3 to 23 million tons, coal from 6.6 to 48 million tons, electric power from 7 to 133 billion kilowatt-hours, crud oil-from nothing to 28 million tons, and cement from 3 to 49 million tons. Despite several failings and unsuccessful attempts, Mao's term was China's modern industrial revolution period. [14]National income grew five-fold between 1952 and 1978; from 60 billion to over 300 billion Yuan, on a per capita basis the index of national

[13] Data drawn from U.S. Central Intelligence Agency, *People's Republic of China: Handbook of Economic Indicators* (Washington D.C., 1976); U.S. Department of Commerce, *The Chinese Economy and Foreign Trade Perspectives* (Washington D.C., 1977); and Joint Economic Committee of Congress, *China: A Reassesment of the Economy* (Washington D.C., 1975), as compiled by Mark Selden, *The People's Republic of China: A Documentary History* (New York: Monthly Review Press, 1979) Tables 13 and 14, pp. 135-136.

[14] Lardy, 1983: 130

income (at constant prices) increased from 100 (in 1949) to 440 (in 1978). Most of this success story was achieved by China's own national sources, with outside assistance and support from Soviet Union and this financial aid from Soviet Union was totally repaid in mid-1960s. It is clear that Mao's industrialization was achieved without foreign loans and investments.

> Maoism insisted that the means of modern economic development be reconciled with the ends of socialism and that this take place in the here and now… Maoism insisted that progress toward socialism was to be measured not simply by the level of economic development but also by reductions of "the three great differences" – by progress in pursuing the classic Marxist goals of eliminating the age-old distinctions between mental and manual labor, between workers and peasants, and between town and countryside. (Meisner, 1999: 420-21)

3.1 People's Republic of China under the reforms of 1949 and 1978

After eight-year battle against Japan invaders and following civil struggle between Communist and Kuomintang (Chinese National Party) groups, People's Republic of China was founded in 1949. Meanwhile, the country's economy and social structure had been destroyed by war and great inflation.

China was an agrarian society with most of population living in rural regions. Thus, development of modern economy and industry became one of the most important and prioritized headline for early periods of People's Republic of China. After socialist revolution, in early years of 1950s, China chose the way of planned development of national economy by transforming the means of production to public ownership and building a socialist economic model. Economic development under central planning was popular for traditional socialist countries in those years. The similar strategy was applied for China, specifically with Mao's leadership to rebuild the national economy and relations of production.

After the foundation of People's Republic of China, capitalist world indicated the "New China" as the one of the biggest threats for capitalist system. The Secretariat of United Nations' Dean Acheson explained the stance of capitalist world for China's revolution. In order to overcome this threat, Acheson proposed that China should have been given up from communism utopia and delinked with Soviet Union and be included to capitalist bloc with peaceful strategies, not martial operations. (Tse-Tung, 2007: 427-28)

In early years of the socialist revolution, People's Republic of China has suffered from considerable diplomatic isolation of United States. Meanwhile, Soviet Union and China's relations began to get stronger; namely, China clearly interested in Soviet development model. To transform and settle the new economic system, Soviet Union's experiences should have been used.

China determined the industrialization as an immediate target in the way of catching up the advanced countries and strengthening the national independence. It was a common view that planned industrialization policies were the main factor of Soviet Union's succession. Additionally, Soviet Union was also willing to share its experience and cooperate in technical issues with a newly transforming socialist country.

As one of milestones on the way of socialism was that leader Mao travelled to Moscow in early 1950s in order to analyze Soviet socialist development model and secure Soviet aid for China's modernization. At the end of this visit, 20.000 Chinese people went to Soviet Union to be trained; moreover, Soviet Union sent 10.000 scientists and engineers to China for modernization activities. Soviet Union and People's Republic of China became strategic partners and China imported latest technology infrastructure from Soviet Union.

Soviet planners and advisors worked to construct a new system for China. The critic objective of the new system was to raise the domestic savings via collecting resources from rural sector and using these sources in order to fund the industrial investments and economic growth. Extensive state ownership model, new government institutions, five-year development plans,

control over prices, management of input-output and financial flows by central authority could be counted as major characteristics of this new model. Communist leader Mao also revised the proposed Soviet Union's development system according to China's own national dynamics. In fact, despite major and minor differences between Soviet Union and Chinese communist development models, People's Republic of China's development model could be described as "Soviet-type" development economic system.

By following this strategy, First Five Years Plan (between 1953 and 1957) was prepared in line with Soviet development model. First Five Years Plan mainly targeted on high growth rates, industrialization- specifically heavy industrialization, capital accumulation and investment and institutional transformation in agriculture and other industries. In this strategy, industrial plants would be imported from Soviet Union and these plants would be constructed and operated by the assistance of Soviet technicians and engineers. In fact, these investments focused on heavy industrialization; such as, nearly half of these investments were used only for 150 projects. For instance, Soviet bloc's technical aid was provided in order to establish new industries; truck manufacturing, power plant equipment and telecommunication.

In sum, first Five Year Planning Period (1953-1957) prioritized the industrial construction; specifically heavy industry investments. Through this plan, Soviet Union approach to economic development was announced. The main objective of this plan was attaining to high rate of economic growth by concentration on industrial development at the expense of agriculture and specifically focusing on heavy industrialization and capital intensive technologies. In this planning period China proved its capability via achieving the objectives which had been defined previously by central planning authority. This Soviet-style development strategy attained to a significant success with average annual real growth rate of 9.3 per cent. Finally, China took the way in heavy industrialization with great amount of investments.

One of the most initial decisions was related to land reform and this state policy increased public support to Communist Party. Between 1949 and

1952, People's Republic of China introduced land reform and forced the landlords to surrender the land to the farmers. Thus, China's economic reconstruction was started in villages via the visionary land reform policy. Mao had believed that land reform was precondition for socialist transformation in all the country. Moreover, Mao collected the dispersed and unconscious villagers into communes in order to increase the effectiveness and efficiency in agriculture which was the most important sector in order to fund the heavy industrial investments with the strategic partner of Soviet Union.

In 1952, land reform was evaluated and it was a statistical fact that most of the targets, which had been defined in pre-reform period, were achieved; innutrition and starvation in rural regions were nearly eliminated, economy attained to pre-war production capabilities. Despite the structural problems of agricultural economics and efficiency issues, land reform created significant political support for Chinese Communist Party.

In June 1953, Chinese Communist Party declared that New Democratic stage was completed and the new stage was shift to socialism. Central authority and its plans had begun to guide the economy. Planning had taken the role of market mechanism about resource allocation and investment decisions.

At last, by the leadership of Mao, China founded a command economy on Soviet development model. Nearly all the industries were state-owned and agriculture was managed within collectives. In this strategy, the economic growth was supported by rapid development of heavy industrialization and this strategy was directed by the central authority, State Planning Commission. These policies mainly aimed to catch-up and overtake the Western countries with Chinese national capabilities. This strategy had been originated by Stalin's view of building socialism via protecting domestic industry from foreign competition by a state monopoly.

The Communist Party took the control in urban region and urban economy in early 1950s. The capitalists who cooperated with Communist Party allowed to be state-employed managers of their enterprises, however others and Nationalist Party members escaped from China. The Communist Party

took the control of all government, military and communication systems. In this system, all Chinese people were included to the system of work units "*danwei".* In this system all factories, farms, companies, schools were organized into work units which were directed by The Communist Party. By these work units, Communist Party began to increase the control over the people which could not change their jobs and travel without permission.

Despite considerable achievements in economy, the industry was suffered from inefficiencies from Soviet-style central planning; rising output could be an achievement however quality and assortment problems, focus on investment goods rather than consumer goods and not taking into consideration customer requirements, neglect of innovation, excessive vertical integration, fluctuations in output and investment could be exemplified (Rawski 1980). Additionally, China's isolation from international economy also increased the gap between Chinese national industries and the capitalist world because of lack of information flow.

Besides all these insufficiency and problems, "the capital accumulation" was the most prominent topic for the central authority.

Great Leap Forward

China's modern industrial heritage was inadequate because of feudal background and the industrialization was the foremost problem. Socialist China should have invested through industrialization. In this perspective, agriculture was the main source for capital accumulation and the funding the strategic industrial projects. The central authority's target was to finance industrialization via surplus from agricultural production. However, the results did not satisfy the central authority, there were some problems related to collectivization of the system and farmers. Therefore, Mao took the decision of a new strategy, the Great Leap Forward with the target of catching up the industrialized world. Although the successes of five-year plan in urban industry, Mao aimed to improve rural industrialization with the strategy of "walking on two legs".

> The experience of enthusiastic and often successful war-time improvisation in the 'liberated areas' had convinced Mao that the rural workforce, under-employed on mainly seasonal tasks, was an untapped resource a poor country could use to pull itself up by its bootstraps. In 1957 these ideas gave birth to a new policy initiative which became known as the Great Leap Forward. (Hunter, Sexton, 1999: 28)

Great Leap Forward is one of the most assertive national targets of its period. According to Mao, this period would end up with the transformation from socialism to communism. Meisner (1986) expresses that Mao was certainly influenced by Trotsky's permanent revolution and believed that interruption could not exist in revolution period and the progress is a requirement through the communist society.

This time, leader Mao Zedong was strongly influenced by Soviet premier Nikita Khrushchev and its certain target of overtaking the US by total output of manufactured goods in 15 years. Similar to this strategy, Mao settled a new target in 1957 to overtake Britain in the level of output of iron, steel and other manufactured goods within 15 years. Similar to Khrushchev's targets, Mao aimed to overtake Britain in two years about iron and steel output, overtake Soviet Union within four years and United States within ten years.

The Great Leap Forward aimed to increase the output of labor intensive (light) industries. Through the plan, the socioeconomic structure of rural regions would be transformed and industrial development would be accelerated. The strategy for Great Leap Forward organized the farmers into "communes" and family farmers were transformed through cooperatives. Finally, all the farmers were located in new commune system in which farmers worked together as a team (The farmers were organized into cooperatives in order to increase the national production and marketing capabilities). The Great Leap Forward put high targets for national industry, as 25% increase in growth per year. Through this plan, unemployment in urban region would decrease and additionally, the development of light industries would overcome the sectorial unbalances. (Lippit, 1975)

In 1959 real growth on GDP was only 8.8 per cent (was 21.3 in 1958) and the assertive targets were revised by the government because of the real

ratios of previous years. Uncomfortable working conditions, long working durations made the labors repining. Additionally, natural calamities also decreased the output of agriculture. The poor weather conditions caused to great nutrition problem in 1959-60. Problems of drought and flood affected nearly half of agricultural lands in China. Meanwhile, the central authority could not analyze the seriousness of the situation because of the lack of information flow and continued to insist on the previously defined exaggerated targets. At the end, the starvation and social insurrection emerged as significant problems for the central authority, again. These problems not only affected the agriculture, additionally, the light industries which use the agricultural outputs were also affected negatively.

Moreover, the problematic relation period between Soviet Union and People's Republic of China since second half of the 1950s also negatively affected the performance of Great Leap Forward. At the end, in 1960, Soviet leaders withdrew the Soviet aid from China with its 10.000 engineers and scientists, because of the working conditions and social effects of The Great Leap Forward and Soviet model's criticism attempts. Thus, specifically heavy industrialization was damaged. Lippit (1975) indicates the external factors (as weather conditions, problems with Soviet Union) as the major reason of unsuccessfulness of Great Leap Forward.

Finally, People's Republic of China's growth rate in 1961 was negative 27.3 per cent with an economic crisis as indicated in Table 2. Moreover, the failure of The Great Leap Forward produced the greatest famine in world history; between 1959 and 1961 thirty million Chinese died because of starvation and diseases (great famine).

Table 2:China's GDP 1958-1965

Year	growth % at current price	real growth %
1958	22,3	21,3
1959	10,1	8,8
1960	1,2	-0,3
1961	-16,2	-27,3
1962	-5,7	-5,6
1963	7,4	10,2
1964	17,7	18,3
1965	18	17

Source: National Bureau of Statistics of China (2009), National Bureau of Statistics of China (2010), National Bureau of Statistics of China (2012)

Failure of Great Leap Forward negatively affected political popularity of Mao. At the end the president was chosen from the rightists and reformists of Communist Party members; Liu Şao Çi.

Between 1962 and 1965 economy and system was revised and normalization period started. In 1964 Premier Zhou Enlai declared government's targets to succeed "four modernization"; industry, agriculture, defense and science and technology. However, this "four modernization" strategy was not applied until economic reform period of 1978, with the effect of Cultural Revolution. The Sino-Soviet split and the isolation from both of communist bloc and West encouraged China to develop its national technology in 1960.

In 1958 target of steel production was raised from planned output of 6.3 million tons to 10.7 million tons. To achieve this target was impossible because of lack of production capacity and resource limitations. However, central authority insisted on this target and nearly ten million labors were transferred to steel production. Addition to failure on targets, mobilized workforce also affected negatively the production capacity of other sectors. Chinese government – after the death of Mao- also once again tried to accelerate the economic growth via setting targets which were quite difficult with possible maximum capabilities. These unscientific and unrealistic targets were prepared

similar to Great Leap Forward period. This period continued until the Third Plenum of the 11th CCPCC in December 1978.

In sum, China's industrialization was planned and implemented by central authority before reform period. In this period, direct government support and participation is seen clearly within industrial activities. During this period, rapid industrial expansion was achieved by centrally planned strategies, however, in time low efficiency, sectoral imbalances, low level of technological progress, sharp annual fluctuations in growth rates were emerged as the problems of central planning period.

Cultural Revolution

Cultural Revolution affected millions of Chinese who organized protests against the existing authority and their policies. In fact, besides these protest movements, there was a secret bureaucratic war between two different political views in Chinese Communist Party.

The failure of Great Leap Forward and deteriorating relations with Soviet Union caused to conflict in Communist Party. The reformist group by the leadership of Liu Shaoqi and Deng Xiaoping tried to take control in government authority from Mao. Finally in 1959 Liu Shaoqi became the president of the state.

After, Mao began to struggle against hegemonic bureaucracy outside the Party with millions of Chinese. First of all, Mao called the students in order to revolt against the national despotism and dictatorship. University and high school students, that had already had many problems with education system, began to protest the system as a whole. Additionally in 1967 labors joined to the protests with their own demands by great labor strikes.

The Great Proletarian Cultural Revolution was the period between 1966 and 1976. Socialist Education Movement between 1962 and 1966 was the first step for Cultural Revolution. In this period western culture and Confucianism were totally refused and revolutionary music, art, literature and theatre did not contain any bourgeoisie items. In the Cultural Revolution's earlier periods,

China had overtaken the most of the problems of Great Leap Forward period and began to increase the growth rates, agricultural and industrial outputs and had paid the previous debts for Soviet Union.

During that period, party and politburo (in predominance of reformist policies) was against Mao's view and strongly focused on developing the policy according to global perspective. Against Mao's new socialist humanity approach, the party insisted on education which would serve for accelerating urban industrialization, innovative young generations. The political war between two groups (Mao's radicalism and Liu's revisionism) in the party became violent. These groups conflicted about the most appropriate way for national industrialization.

By this movement, The Chinese government administration and economic system was under attack by millions of Red Guards. This political movement also had negative effect on economic growth; in 1967 negative 5.7 per cent and in 1968 negative 4.1 per cent as indicated in Table-1.

Finally, Mao decided to stop the Cultural Revolution because the conflict between groups was a civil war in all the country. Cultural Revolution was a great inimitable social movement with millions of students, labors, intellectuals and villagers. Capitalist view was eliminated and the China would continue to development within socialist model.

One of the most important targets of Cultural Revolution was creating collective human, radically change the logic of people and creating socialist society and proletariat culture, so new human and new culture. This aim could be succeeded with mobilizing the mass and inside a practice of war. Great Proletariat Cultural Revolution is the main theme of the model of Marxist Revolution. This revolution had not been realized in any bourgeoisie or feudal society, and was the first revolution of the upper structure of the socialist countries.

In sum, Chinese planned economy period from 1953 to 1978 was interrupted by political confusion; The Great Leap Forward and The Cultural

Revolution. China's economic growth could be analyzed within two main phases. The first stage is centrally planned phase and the period between 1952 and 1977. Angang (2011) describes this period as the first golden age of modern Chinese economic growth with average annual GDP growth of 6.1 percent. After the golden age, the economic growth tapered off until economic reform period of 1978. The gap between growth rates of twenty years occurred because of the Great Leap Forward and Cultural Revolution.

In order to summarize Maoist Legacy;

Mao Zedong's philosophy was mainly based on developmentalism, nationalism and socialism. Despite significant setbacks and problems sourced from Great Leap Forward and Cultural Revolution, Mao transformed China from a feudal poorer country to a rapidly developing economy and country. Besides, Mao attained to significant success stories specifically on agriculture, science and technology, industrialization, national defense, education, public healthcare etc.

Main critiques for Mao were related to making China closed and isolated from the rest of the world, specifically from West. However, strategic partnership with Soviet Union in 1950s, and normalizing the relationships between capitalist world US, Japan and Europe in 1970s were Mao's own plans. Isolated and closed economy decisions should be evaluated according to that period's own dynamics- protection of new revolution, capitalist pressure on socialist movement could be counted as major reasons.

3.2 Deng and 1978 Reform

Chinese Communist Party was one of the most important actors in order to clarify the position of Chinese socialism within a historical perspective and the experiences of world socialist movements. In this long history, Communist Party experienced boom-and-bust episodes. Specifically during problematic

periods major paradigm shifts emerged. The reformist policies of 1970s -under the leadership of Deng- were the result of these paradigm shifts.

China's national development strategy which required the delinking from world economy was continued until 1970s. During this course, China was choosing its development and modernization way via its own dynamics and disintegration with capitalist world economy. However, this strategy certainly restricted the China's capability to get external financial sources and know-how related to market based economies and related industries. The required capital accumulation for industrial catch-up would not be collected with internal sources. Additionally, information flow is limited to catch-up the advanced nations.

> Many writers would have us believe that technological process derives from capital accumulation. It has been argued that technological process is impossible without capital accumulation. (Onyemelukwe, 1974: 26)

In fact, China revolution was mainly socialist and nationalist revolution. Mao presented this revolution as an alternative for both of capitalist development and Soviet socialist modernization. Mao mainly aimed to catch-up the capitalist western countries and industrialization with being nationally independent. This catch-up and industrialization targets could not be fully achieved, because of huge investment share of heavy industrialization, waste of resources, inaccurate industrial foresights, insufficient information flow from developed capitalist industries could be counted as the reasons. Thus, a paradigm shift could be required.

China's transformation began in last years of Mao's period. Richard Nixon's visit to China was a milestone for the relation between China and the capitalist world. Between 1971 and 1974, China's foreign trade increased trebled. After Mao, following Hua Guofeng's strategy also encouraged import of foreign capital and technology. After Hua, Deng Xiaoping greatly accelerated China's transformation within a market- oriented strategy and open-door policies.

The major turning point for China was the death of Mao Zedong in 1976. China's political authorities were agreed on the need for "economic change", because China's backwardness in East Asia region was a fact in comparison with South Korea and Japan. Additionally, chronic food supply problem had continued during Cultural Revolution and this serious crisis was the most urgent item for the central authority. Thus, China's reforms began in the farm sector. This new strategy aimed to increase market awareness and efficiency within the state sector.

> To achieve the four modernizations and make China a powerful socialist country before the end of this century will be a gigantic task… Now, in our national construction, we must likewise act in accordance with our own situation and find a Chinese path to modernization.... From Liberation to last year, the average annual rate of growth in our industry and agriculture was fairly high by world standards. … Our scientific and technological forces are far from adequate. Generally speaking, we are 20 to 30 years behind the advanced countries in the development of science and technology. (Xiaoping, 1979)

Although the certain effect of Mao's contribution and his ideology on political life, after Mao under the leadership of Deng [15] radical political decisions were taken by Chinese government. In February 1978, National People's Congress was organized. In this congress, several radical policies were decided; Cultural Revolution committees were proscribed and a new Ten Year Development Plan was launched.

China Communist Party's December 1978 decisions created a paradigm shift and opened a new period in China and world history. Hereafter, China began to transform through an open economy model with integration to capitalist world. Communist Party used the terms of "reform" (gaige) and

[15] Deng Xiaoping himself was of course the most outstanding moderate reformer. To summarize his political and economic project: government policy should be pragmatic, always aiming at a stronger, richer, more powerful China. Policies which promote economic growth should be encouraged, even where they are heterodox by orthodox Marxist standards – for example, encouraging the free market, personal acquisitiveness and private ownership…. A limited re-evaluation of Party history should be permitted. Trade with the West should be encouraged, especially to facilitate the transfer of technology; cultural contacts, while not ruled out, were less welcome. (Hunter, Sexton: 1999: 110-11)

“open” (kaifang) in strategic planning documents. The Party began to change its historical role from “class struggle” through “economic modernization” and “development of productive forces with open door policy”. Instead of Soviet development model, central authority began to redefine the socialist development state with Chinese and world dynamics.

In the same year- December 1978- Communist Party declared a program of modernization for China on the base of “four modernizations”; industry, agriculture, science and technology and national defense. -Before his leadership, Deng’s modernization plan had already drawn the reaction of Mao and his followers. In this plan, Deng had advocated the development of modern science and technology with technology import and industrial rationalization.

Deng came to power with supporting “socialist democracy” via the popular support in cities among intellectuals and urban worker groups. Deng’s economic reform program aimed to combine “market forces” with “central state planning” in order to satisfy both of supporters of market-type reform and strong central authority.

In the ends of 1970s, growing popularity of Deng Xiaoping played the most important role in re-ordering the national priorities in order to achieve national reconstruction. According to Deng “… it doesn’t matter if the cat is black or white, as long as it catches mice!”, thus, Deng did not shrink to adapt to capitalist approaches to transform the Chinese economic situation. This new system was also named as “socialist market economy”.

> What I want to talk about now is ideological and political questions. The Central Committee maintains that, to carry out China's four modernizations, we must uphold the Four Cardinal Principles ideologically and politically. This is the basic prerequisite for achieving modernization. The four principles are:
> 1. We must keep to the socialist road.
> 2. We must uphold the dictatorship of the proletariat.
> 3. We must uphold the leadership of the Communist Party.
> 4. We must uphold Marxism-Leninism and Mao Zedong Thought.
> (Xiaoping, 1979)

Deng identified four main principles[16] for the Party and also China, however, in practice, reforms and radical changes of 1980s were less relevant with above four principles, specifically "socialist road" and "dictatorship of proletariat" remained ineffective, instead "state-capitalism" became the new road to development.

"China's isolation from capitalist world market" with hostility of US and "delinking from most of the Communist nations" because of deteriorated relations with Soviet Union in late 1950s had encouraged China to develop with its own resources during Maoist period. By the launch of "four modernizations", expansion of international trade, acquisition of latest technology from advanced capitalist countries and foreign loans and similar policies certainly abandoned the Maoist policy of "self-reliance".

Chinese socialism had emerged during the evolution period of semi-feudal and semi-colonial society. The productive forces were certainly underdeveloped in comparison to developed capitalist world. Thus, China would strive to close the gap between the forerunners and improve its productive forces. Specifically since ends of 1970s with the leadership of Deng, China focused on information flow from advanced capitalist countries related to economic, technological and management fields integration with world economy. This strategy was one of the most outstanding contents of China's open-door and reformist policies. Mao had also advocated the similar objectives in his *Selected Works*; the all strengths of the nations should have been learnt and absorbed in the fields of politics, economy, science, technology, literature and art, however in the boundaries of socialist economic model.

[16]This meeting is being held in accordance with a decision of the Third Plenary Session of the Eleventh Central Committee of the Chinese Communist Party. Beginning from this year, the Party must shift the focus of its work to socialist modernization. The Third Plenary Session solved a series of major problems left over from the recent history of the Party in order to rally the whole Party and army and our people of all nationalities to march forward towards the grand objective – the four modernizations. (Xiaoping, 1979)

China determined open-door policies as a long-term national policy on the road of socialism. Thus, China aimed to integrate with world economic system in order to catch up the opportunities of capitalist economy. The open-door policies were not only related to economic activities, instead, "science-technology", "education" and "culture" were the other major topics in order to set the relations between advanced nations. In this perspective, Deng aimed to learn from abroad nations and absorb these novelties and also internalized them through the Chinese socialist system.

In sum, Deng Xiaoping seized the control of Communist Party in 1978 with its reformist strategies. Chow (2007) determines the reasons for this reform; first, Cultural Revolution and its conclusion was unpopular, party and the authority believed to change something in order to regain the support of millions of Chinese. Secondly, shortcomings of central planning system were discussed and the novelties were required. Thirdly, East Asian recent success stories of Taiwan, South Korea, Hong Kong, Singapore with market economy could be taken as examples; market economy has worked better than planned economy specifically in recent decades.

By the assistance of those latest developments, China chose the way of struggle against capitalism with its own dynamics meanwhile tried to benefit from capitalism's strengths. China's insistence of staying on socialist way and however integration with capitalism's beneficial characteristics, created a different model for world economy politic history. China's decentralization of planning system, open economic model and market mechanism strictly transformed the existing closed model of China. By decentralization, the responsibilities and authorization have been also shared between central and local governments; the primary industries; education, public health, regional transportation, local energy, urban public infrastructure, agriculture etc. have been under the responsibility of local government. On the other hand, strategic industries and their related projects which have direct and important effect on overall national economy; energy, electronic, transprovincial communication and transportation networks, advanced agriculture, other high-tech industries etc. have been directed by central authority.

Since the early 1980s, China changed the prior direction from heavy industry to other industries which have direct relations to human and consumer markets. In reform period, Deng's industrialization strategy focused on light (consumer market oriented) and rural industrialization instead of heavy industrialization. Organization models and ownership status of enterprises were revised. Although Maoist heavy industrialization development model provided self-sufficient country in the scope of raw material, energy, textile, chemical etc., however, China was quite backward in comparison to market-oriented advanced western countries. Because of these strategies, development gap between urban and rural regions was great, thus, the new government gave priority to rural investments.

Thus, Chinese government analyzed the priority of shifting the enormous labor force of rural regions from agricultural activities to other industries. While this strategy was being executed, government paid attention to control the urban population against migration from the rural regions. In this approach, the policy of "leave the soil but not the countryside, enter the factory but not the city" was applied by the government authority.

By these reform policies, rural industry grew rapidly and income levels were also increased. Private, shareholding or other enterprises were established and millions of workers leave the farming activities and start to work for industrial activities of these enterprises. This macro transformation reshaped the economic and social structure of rural China.

To analyze Deng's political view, one of prominent aims of Deng was to see China as quite strong and prosper country and he was conscious that these goals could not be achieved by self-sufficiency and strict ideological framework. Deng Xiaoping defined the "four modernizations" and new system (democratic and legal systems) instead of self-development of socialist model. This new model socialist modernization is quite different than capitalist modernization. In practice, Deng Xiaoping used the strategy of rapid capitalist development with more nationalist and less socialist perspective.

According to Deng (1994), poverty was not the socialism and means of production should have been improved sufficiently in order to build the socialism in the whole country. The poverty and capital accumulation were the greatest obstacles for building superior socialist system. China had to set the socialist democracy and improve the standard of living of Chinese society.

> The socialist revolution has greatly narrowed the gap in economic development between China and the advanced capitalist countries. Which is better, the socialist system or the capitalist system? Of course the socialist system is better.... capitalism already has a history of several hundred years, and we have to learn from the peoples of the capitalist countries….While we will import advanced technology and other things useful to us from the capitalist countries, we will never learn from or import the capitalist system. (Xiaoping, 1979)

Deng also discoursed that China had its own dynamics and building Chinese socialism with market economy and integration to west would be quite different than previous attempts of socialist economies. Deng aimed to bring the market economy into the framework of socialism. New model would be between liberalism and traditional socialism. The new model of China has been the hybrid model of ideological liberation movement and re-evaluation of Mao Zedong doctrine. Traditional leftists strongly criticized the Deng and market socialism model because the leftist scholars advocate that this model would bring China to western capitalism, on the other hand, liberals also attacked the model in the scope of insufficient democracy, rule of law, individual freedom and liberation problems.

Industrial Transformation with Open-Economy Reforms

Chinese industrial technology was quite old-fashioned which had been acquired from Soviet Union in 1950s, thus, China urgently needed to modernize its industrial infrastructure to trigger development of economy in the scope of the policy of "four modernizations". Liao (1982) summarizes this situation as; in early 1980s China was using 1950s' steel and iron manufacturing technologies, scientific and technological level of electronic industry was also 15-20 years older than modern standards. Thus, next main

problem was that how the updated technology infrastructure would be acquired and financed, because, China had stressful relations with communist world and the western countries were unwilling to trade within these conditions.

These existing insufficiencies and "four modernizations"- industry, agriculture, science and technology, and national defense- encouraged the Party to take revolutionary decisions. In this position, Party admitted that seeking new technology from Capitalist West and Japan was the appropriate way for China to procure the latest technology to achieve catch-up and national economic development as a whole. In a general perspective this policy would also require integration to international markets. Thus, China changed the direction completely through the capitalist world.

Western countries and Japan were determined as the best alternatives for technology upgrade. Additionally, the plan was that these new technology investments would be financed by foreign exchange which sourced from export-oriented manufacturing activities of foreign companies' investment in China in the scope of joint ventures with state owned enterprises (SOEs). In this strategy, the attractiveness of Chinese market was certainly used as an instrument for foreign investments by Chinese government. Porter (2011) also underlines the importance of cheap labor and substantial domestic market in order to attract the foreign investments in China. Growing number of joint ventures became significant element to transfer the modern technology by foreign partners, thus, JVs upgraded existing technological infrastructure of China.

In this term, mainly joint ventures were established between foreign enterprises and local Chinese firms. In 1979, the National People's Congress legislated "Law of the People's Republic of China Concerning the Joint Ventures with Chinese and Foreign Investment". Through this law, China aimed to attract foreign investment and advanced technologies. In the early of 1980s, government authority had taken all the control of foreign economic affairs with strict control manners. In first years of reform period, Chinese central government began to give the authority for local governments with special policies for foreign trade. More importantly, SOE autonomy was

enlarged to have direct links with foreign traders by export-oriented strategies. Additionally, Ministry of Foreign Economic Relations and Trade was established instead of the Ministry of Foreign Trade in 1982. By the assistance of this new organization and policies, large SOEs began to engage in foreign trade with the permission of the Ministry. The critical point is that state control has been still a powerful instrument.

By following those strategies, China took the decision to open the economy through global parties. Therefore in years, China became the export leader of manufactured goods to Western countries by subcontractor agreements, joint ventures with foreign enterprises and wholly foreign owned subsidiaries. This export oriented and low-cost manufacturing capability increased capital accumulation and this source triggered the financing of advanced technology investments in China. Through this export oriented strategy, while technical capacity was growing up, additionally, interaction with foreign markets and enterprises increased knowledge dissemination for related industries.

China's industrial transformation through attracting the foreign investments also changed and revised the factory administration policies. In this new structure, state owned enterprises (SOEs) became responsible for their operations' management and (planning, purchasing, production, marketing etc.) financial position (profits or losses).

Moreover, related regulations and policies were also arranged to facilitate the trade. Effective commercial laws were prepared in order to regulate the activities of foreign enterprises in China. Moreover, Chinese government established four special economic zones[17] (SEZs) in late of 1970s and early 1980s in Shenzhen, Shantou and Zhuhai in Guangdong Province, Xiamen in Fuzhou and after Hainan Island in order to attract foreign capital

[17]In 1980, four 'Special Economic Zones' were created at Shenzhen near Xianggang, Zhuhai north of Aomen (Macao), Shantou and Xiamen. Their task was to initiate a new stage in economic development, by attracting foreign capital and experimenting with economic reforms. The largest and by far the most important of these was Shenzhen. Foreign firms were offered advantageous terms for investment, suitable sites and a supply of cheap labor. (Roberts, 2011: 292-3)

and investments with related beneficial procedures, taxes, and infrastructure facilities.

The main goals of attracting foreign investments were to introduce advanced technology, improve management and expand market opportunities. By these policies, three major forms of foreign investment occurred; as joint venture, cooperative and foreign enterprises.

Labor intensive manufacturing industries were the most popular for FDI during 1980s; these industries could be exemplified as textile, garment, and real estate. Since 1990s, capital and technology intensive sectors which could be counted as electronics and communication, machinery, chemical, transport equipment became much more popular.

Table 3 underlines the effects of foreign direct investment on Chinese economy with two major topics; external effects and domestic effects.

Table 3: The Effects of Foreign Direct Investment (FDI) on Chinese Economy

A. External Effects	**B. Domestic Effects**
1. China's comparative advantages	1. An increasingly important source of capital
2. Increased participation in the international segmentation of production	2. Create jobs
3. Impact on China's trade growth	3. Upgrade skills
4. Role of FIEs[18] in processing trade	4. Paid higher wages to employees
5. Comparative trading performance of FIE firms	5. Raise factor productivity and increased technology transfer
6. Building dynamic specialization	6. Modify China's industrial structure
7. Domestic penetration of FIEs	7. Foreign and domestic firms are different
8. Rising local content	8. FDI has increased domestic competition
9. FIE export competitiveness and exchange rate policy	9. FDI has increased industrial performance.
10.Domestic firms have lagged behind	
11. Regional disparities have increased	
12. Impact on China's balance of payments	

Source: Guo, 2009: 280
Note: FIEs= foreign (including Taiwan, Hong Kong and Macau) invested firms.

Specifically after open-door policy of 1980s, joint ventures were established with local firms. In time, while these joint ventures operated in Chinese market, indigenous firms were also emerged and began to design and produce their own products. He, Mu (2012) indicates the FDI's spillover effect and learning and absorption capacities of indigenous firms for a high tech industry of telecommunication industry as;

> Although many JVs were established in the telecommunication industry, FDIs' technological spillover to local partners was not obvious. However, the large-scale installation of imported switches in China's telecommunication networks and the presence of many JVs in China fostered the diffusion of technology and know-how across the country. This includes a broad ranging knowledge transfer and exchange involving R&D, production, sub-contracting, marketing, after-sales services, and local human resource training. (He, Mu, 2012: 277)

Deng claimed that in his speech in 1982; modernization movement should have emerged from China's own realities. The directly copying of previous successful development models of other countries would have not succeeded China. Marxism's general dynamics would be integrated with China's existing conditions and create its own development way and build a socialism specific to China. Especially after 1992, Deng Xiaoping claimed the importance of reform and faster economic growth, thus, market oriented new strategies were accelerated. Deng aimed to construct a socialist market economy with Chinese dynamics. On that direction, China began to adapt "modern enterprise system" with capitalist Western style on market-based arguments.

> Standing in marked contrast with the failures of Russia, which was to some extent based on a "blueprint" or "recipe" from Western advisors, has been the enormous success of China, which created its own transition path. (Stigliz, 1999:3)

Since the Congress of November 1993, People's Republic of China changed its strategy and began to downsize the public sector. This strategy was

implemented by encouraging other sectors without the state control and privatizing the state owned or controlled enterprises. The leader role of public sector and "socialist" characteristics of development were proceeded with holding the greater share in public control for strategic industries and do not privatize the large state-owned or controlled enterprises.

Owing to this paradigm shift, the central authority began to privatize the state enterprises officially in 1995. This terms' slogan was "zhua da fang xiao" means "keep the biggest drop the smallest".

Central government declared that nearly 1.000 enterprises would stay under state control. Most of the privatized enterprises would not operate in strategic industries which had been previously defined by central authority. In 1995, 72.5% of enterprises in non-strategic industries were loss makers whereas only 24.3% of enterprises which operate in strategic industries do not get profit (Zhao, 1999). In sum, privatization in China followed a different strategy than communist Eastern Bloc (Communist Bloc). The privatization was not completed in one step, firstly small enterprises, after middle ones were taken in scope.

Green and Liu (2005) summarizes that reform of state-owned enterprises in China has occurred within three broad phases; devolution of management responsibilities, incorporation with state ownership and the sale of control rights. According to Huang (2003) in joint venture enterprises, state-owned enterprises generally has provided land and political capital, machinery infrastructure and also workforce, whereas, the foreign partners have supplied the technology, capital, managerial skills and also export market access.

To sum up, China applied a different strategy of open-door policy in the transition from socialist command economy to open-market. Although China did not apply a strategy to privatize all state-owned enterprises in one stage, tens of thousands firms were restructured, private enterprises and foreign investments were allowed. China did not apply a similar policy with Soviet bloc countries' privatization policy of rapid and mass sales of state-owned enterprises. In this new system, state-owned enterprises could get more

authority and managers could take profit-oriented incentives, however, the ownership status (majority of shares stayed in public control specifically for strategic industries) did not alter, mostly. Thus, both of state-owned and private enterprises have been in competition as in capitalist markets; state-owned and controlled firms' strategic relation with government has been one of the major problems of foreign investors.

> In 2002, the state controlled half the industrial output and SOEs still account for 35% of urban employment… The State Owned Assets Supervision and Administration Committee (SASAC) directly manage the top 190 or so SOEs, the biggest of which have international stock-market listings. Subsidies exist in all industries that the Chinese state and provincial governments considered economically or militarily strategic, including Resource Extraction, Steel, Computing, Software, R&D, Environmental Services and Conservation, and Autos. (United States-China Economic and Security Review Commission, 2006: 51)

After Mao, capital accumulation, economic development and socioeconomic models were determined by Deng's reformist policies. Mao's and socialist development model's popular approach of "class struggle" lost its significance. Materialistic and individualistic targets became much more popular. Reformists abolished all collective structure of socialist revolution period. People's Republic of China began to be transformed and integrated with capitalist economy under the leadership of Communist Party. Increasing influence of commodity economy and integration to world economy via foreign investments and export oriented strategies made the capitalist means of production sovereign in the whole country.

According to Angang (2011) the term of mind emancipation is sourced from Mao's idea of "seeking the truth from the fact". This idea strongly influenced the following leaders with the idea of "not use the books to guide the life". In this perspective, Deng Xiaoping was strongly influenced by Mao and his theories during determining the reform and open-door strategies. Firstly, Deng's one of the most strategic approach was the cat theory means that "it does not matter if the cat is black or white as long as it catches the mice" to use for rural region's development strategies. The second theory is

Chen Yun's theory of the "truth and fact theory" which indicates the importance of no blind obedience to superiors or books and emphasizes the importance of truth and facts. Third theory was the "theory of explanation" which was also named as "crossing the rivers by feeling the stones" The theory was also developed by Chen Yun and was declared same ideas by Deng Xiaoping.

3.3 Reform in State-Owned Industry

Pre-reform period, China's industrialization was directed and controlled by central planning system and the central authority. This system mainly provided the advantages of rapid development and transformation by direct state participation and obtaining resource mobility according to prioritization of the industries. In those years, China's industrialization was strictly affected by Soviet Union industrialization model in which Chinese state provided all the inputs necessary for production (for instance, labor, raw material, equipment, infrastructure etc.) and also the state was the sole owner of the all produced output and revenue. Despite the problems as low efficiency, insufficient technological progress and annual fluctuations in growth rates; this strategy enabled high growth rates for the industrial sector between 1953 and 1978; (average nearly 6.7 per cent)

Furthermore, industries which are under state-control have long history and tradition in China. According to the study of Guo (2009) the state-owned enterprises (SOEs) had five main roles in the Chinese economy;

*In many conditions, SOEs achieved to improve the efficiency and increased the technological competition.

*Against private enterprises, SOEs certainly took the role of being socially responsible for China.

*SOEs prevented oligopolistic collusion.

*SOEs assisted and mediated to the government in order to invest to the poor regions of the country without any profit motive.
*The government used the SOEs to manage the aggregate demand to operate countercyclical policy.

In 15th Party's Congress, reform strategies for state-owned enterprises were presented. The state-owned economy should have been rearranged and the state-owned economy should have continued to operate in critically strategic fields and sectors. Additionally, capital restructuring and structural adjustment would be completed in other fields, thus, readjustment of national economy would be achieved.

The reform of state owned enterprises were accepted in China's People Congress of 1980. In fact, this industrial reform had started in 1978 with a pilot project in Sichuan Province. The main goals of this industrial reform were giving autonomy of use of profit, production planning, sales of output, new product, capital investment and assigning measurable tasks for low-levels in enterprise, increasing the importance of market and delegation some of authority to local levels. State owned enterprises were the preeminent factor of command economy in China and in the late of 1990s SOEs were still the core of the China's industrial system.

> I have given five reasons for the success of the reform, including (1) the pragmatic approach of the economic reform officials, (2) the use of experimentation, (3) the support of the party and government officials as well as the population, (4) political stability, and (5) the capability of Chinese leaders, especially Deng Xiaoping. (Chow, 2007: 64)

After 1984 urban reforms, privatization of SOEs was being discussed by government in order to increase the effectiveness of these enterprises and improve market environment of these enterprises and related industries. In this approach, SOE managers would be responsible for sales, profitability, investments of enterprises directly, additionally, SOEs managers would be rewarded and also punished according to criteria of new contracting systems.

After new contracting system, a new decision was taken by the central government. By the policy of "keep the large and let the small go" (Zhuada Fangxiao), Chinese state retained the ownership of large state firms and decided to lease or sell the smaller firms, because the central government had been performing poorly and unprofitable. Vice-Premier Wu Bangguo explained that in December 1997 "Control of the (500) largest firms means we have a control of the largest chunk of the state economy".

"Gaizhi[19]" is a Chinese popular term means to "transforming the system" and this term is also used for structural changes of firms; ownership, organizational forms etc. The policy of "gaizhi" has also different forms which had also different outcomes related to types of enterprises. In "public offering" state retains the majority of corporate shares; "internal restructuring" includes restructuring and re-organization activities without changing the ownership, "employee-shareholding" was the most popular form of gaizhi, "joint-venture or merging with foreign firm provides opportunity for accessing to capital and technology.

According to data of Statistical Year Book of China (1981: 207-12), in 1957, there were 170.000 industrial enterprises (58.000 were state owned, 112.000 were collectively owned). After reform in 1981, there were 84.200 state-owned enterprises, 296.800 collectively owned enterprises, 185.500 commune-run enterprises.

> The long term aim of government policy is to create firms with sufficient resources to compete on the world market. Around 100 major companies have been selected, from among the more profitable and efficient firms in various sectors, including banking, transport and telecommunications, high technology, and defense. The plan is to concentrate financial support on these firms and encourage them to acquire subsidiaries and merge with other firms to form the backbone of a modernized industrial sector…The Korean strategy,

[19]Between 1995 and 2001, the number of state-owned and state-controlled enterprises in China fell from 118.000 to 47.000 and total employment in the SOE sector fell by 36 million. The number of jobs lost totaled 15 percent of urban employment in 2001. Over-employment had created a massive burden on SOEs now trying to shake off some of its excess workers during the *gaizhi* process. (Porter, 2011: 56)

> pursued over several decades, helped create a number of world-class firms, such as Hyundai and Samsung. The difference in the Chinese case is that the selected firms will remain state property. (Hunter, Sexton: 1999: 80)

Finally, Chinese authority has tried to find an appropriate way which meets both of market and state interests and also improve commercial capability of state-owned enterprises. In order to meet these expectations, State-owned Assets Supervision and Administration Commission (SASAC) has been established in 2003 reporting directly to State Council. The SASAC[20] was established to preserve and increase state assets. After this reform, most of medium and small sized SOEs control was transferred from central government to private sector or controlled by regional government or other large state-owned industrial groups. According to Feng (2010) Chinese government did not decide to give away its influence on industries. If government wants to get effect on firms, it has the potential. Additionally, most of domestic leader commercial banks are state-owned and could be effectively used when is necessary.

In recent years, Chinese government announced to increase the role of SOEs in strategic sectors. Defense, telecommunications, oil and coal, electric power, shipping, automobiles, information technology, iron and steel, civil aviation, construction, non-ferrous metals, chemicals are included in strategic industries group. Drake (2012) explains that SOEs use their market position to negotiate technology transfer opportunities with foreign partners in joint ventures. SOEs in strategic industries have obtained technology transfer opportunities from US investors with joint venture agreements.

[20] SASAC guides and pushes forward the reform and restructuring of state-owned enterprises, advances the establishment of modern enterprise system in SOEs, improves corporate governance, and propels the strategic adjustment of the layout and structure of the state economy. SASAC appoints and removes the top executives of the supervised enterprises, and evaluates their performances through legal procedures and either grants rewards or inflicts punishments based on their performances; establishes corporate executives selection system in accordance with the requirements of the socialist market economy system and modern enterprise system, and improves incentives and restraints system for corporate management. (http://www.sasac.gov.cn/n2963340/n2963393/2965120.html)

Moreover, from commercial side, most of SOEs' financing have depended on state-owned banks in China, specifically in strategic industries. Drake (2012) also adds that US Ex-Im Bank estimates that China Ex-Im and China Development Bank provide over $100 billion export credit for each year. Thus, strategic industries are funded by state-owned bank loans. For instance, major indigenous firms of telecom equipment industry Huawei and ZTE's relations with state owned banks and their loans are indicated according to statistics of US-China Economic Security Review and Commission Report of 2006.

> Huawei is ostensibly privately owned, although many of its shares are owned by the local state telecoms authorities to whom it has sold equipment. It enjoys a $10 billion low-interest credit line from the China Development Bank, whose mission is to make concessional loans in support of the state's policy goals. Huawei also has strong ties to China's military. (United States-China Economic and Security Review Commission, 2006: 56)

According to report, nearly half of these bank loans addressed to state-owned enterprises and most of these loans are never repaid to the banks. This strategy is another policy in order to subsidize the strategic industries.

3.4 Reform in Science and Technology (S&T) System

For long years, China stayed behind of advanced nations in the perspectives of industrialization, modernization and also science and technology. This insufficiency was also emphasized by the leader Mao in his popular work of "On Ten Major Relationships" in 1956. Mao defined the position of China as "poor" and "blank". According to Mao, China did not complete its industrialization process as Western countries and the agriculture was underdeveloped with insufficient techniques and strategies, thus, China was "poor". China was "blank" because China was as a blank sheet of paper and China's culture and scientific level did not attain to advanced nations' level, yet. Mao emphasized this view by this sentence of "we are like a blank

sheet of paper, which is good for writing on". Additionally, Mao refused to follow the track of other countries in technology development, instead, propose to break the path and focus on advanced technologies in his work of "Build China a Powerful Modern Socialist Country" (1964).

Specifically between 1950 and 1970, People's Republic of China prioritized "science and technology" despite its underdeveloped country profile. This term is named as socialist-era S&T system. In 1950s, Soviet development model was taken as the basic model for China and also adapted centralized structure of national system of research and innovation. China attained to rapid development in specifically emerging industries as space, nuclear technology and genetic engineering in 1960s and 1970s by this methodology.

Split between Soviet Union and China in early 1960s negatively affected Chinese technology potential, because China was strongly dependent to Soviet Union in technology import because Soviet Union was the sole technology source and there was not any alternative technology partner because of isolation from capitalist Western countries. Therefore, China began to apply a new strategy from mid 1960s to mid-1970s. This strategy was related to import the technology and take advantage of reverse engineering model and replicate the technology with national sources.

By reform period and open economy model, science and technology was defined as one of "four modernizations" by Deng in 1978. By opening the economy and integration with international economy, import of technology and foreign investments were enabled to radically update existing technological infrastructure. Simultaneously, China also used its own resources to develop its own national technologies. After reform period, one of the foremost changes in the system was new enterprise sector in which there were various kinds of enterprises; joint ventures, wholly owned foreign enterprises, township and village enterprises. There enterprises created competitive environment also for foreign and state-owned enterprises.

Ministry of Science and Technology (MOST) was established to take the role and responsibilities of State Science and Technology Commission. By this ministry, all national scientific and technical activities would be directed by government except military research.

As defined in Deng's four modernization title; Chinese government authorities recognized the important role of science and technology for catching up of Chinese economy with capitalist world. In this respect, in 1980s Chinese government formulated several programs in order to promote basic research and also technology diffusion and this strategy continued to be implemented in 1990s, too.

Funding mechanism has also been established to support projects financially in previously defined strategic industries. MOST funds research and development activities related to key applied high-tech fields by National High-Tech Research and Development Programme; shortly means "863 Programme", additionally MOST's "973 Programme"- Key Basic Research Programme also funds the basic research activities. Torch Programme is also responsible to establish the necessary links with industry and to build science parks. Additions to MOST's activities, many research investments from different disciplines are also funded by The Chinese Academy of Sciences (CAS). CAS' one of the most critical roles is to provide expert scientific advice to State Council and the Party. Table 4 summarizes the major national science and technology programs in China with year started and focus and objective of each program.

Table 4: Major National Science and Technology Programs

Program	Year Started	Focus and Objective
Key Technologies R&D Program	1982	Aims to solve the key and comprehensive problems concerning national economic and social development; covering agriculture, electronic information, energy resources, transportation, materials, resources exploration, environmental protection, medical and health care, and other fields. Investing the most funds and employing the most personnel, this program was the largest S&T program in China in the twentieth century.
National High-Tech R&D Program ("863" Program)	1986	The "863" Program includes twenty themes, such as biotech, space flight, information, laser, automation, energy and new material. The research agenda of the program is decided by panels of scientists, who are responsible for closely monitoring developments in international scientific research so as to set research goals and programs that warrant government support. Its results are intended to be quickly deployed to industry.
National Program on Key Basic Research Projects ("973" Program)	1997	Like "863", "973" focuses on enabling China's S&T capabilities to catch up with those of the OECD countries. However, it intends to focus on those issues that challenge China's economic and social development in the twenty-first century. These include basic research with a multidisciplinary approach in fields such as agriculture, energy, information, environment of resources, population and health, and materials.
Torch	1988	Focuses on the commercialization of new technologies, developing high-tech products that meet international technology standards, and establishing high-tech development zones across China, including the nurturing of entrepreneurship through incubators and science parks.
Spark	1986	Aims to revitalize the rural economy through S&T and to popularize science in rural areas. As of 2004, there were more than 100.000 scientific and technological demonstration projects being carried out in 85% of rural areas across China

Source: http://www.china.org.cn/english/features/China2004/107131.htm

These programs were started after Deng's reformist open economy model in order to sustain national economic and social development by supporting strategic industries and research fields.

Table 5: Summing up: A Simplistic Input-Output Account, 1995-2004/05

A. Increase in economic growth & R&D input (%)

- Average annual GDP growth (1995-2005): 9.5%
- Ratio of average annual capital formation to GDP (1995-2005): 38.6%
- Increase in higher education graduates*: 154%
- Increase in GERD: 362% (net increase in constant price)
- Increase in total researchers (FTE): 77%
- Increase in government R&D expenditure: 152% (net increase in constant price)
- Government budgetary appropriation on education: 217% (gross increase)
- FDI in selected high-technology industries** (1998-2004): 191% (gross increase)
- Foreign R&D centers: 1→750 (2005)

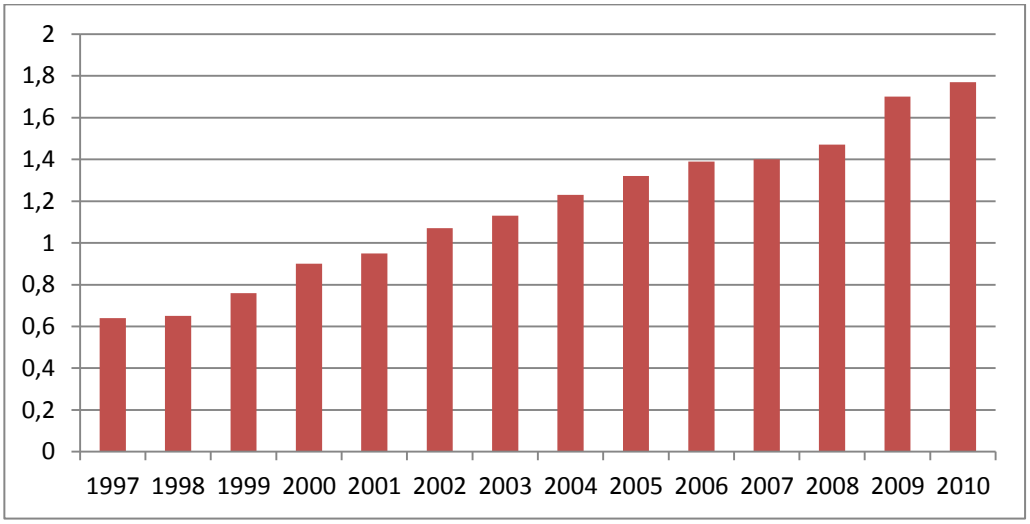
B. Increase in performance and output (%)

- Granted patents (domestic, all types): 261%
- 8th largest user of WIPO PCT system, accounting for 3% of all applications in 2006, up from 10th place in 2005
- International S&E publications (95-04): 322%
    - Rankings: SCI 5th and EI 2nd
- High-technology production value: 539%
- High-technology exports: 1 538%

o 1st ICT exporter worldwide since 2004

*In science, engineering, agriculture and medicine disciplines only.
**Electronics, telecommunication equipment (including mobile telephones), integrated circuits, and pharmaceutical industries.
Source: OECD *2008*, China S&T Statistical Yearbook 2005, China Yellow Book on S&T 2004, MOST homepage, and China Foreign Investment Report, 2005.

People's Republic of China's certain catch-up successes specifically in high-tech industrialization and other strategic industries is not a coincidence. As shown in Table 5, education related expenditures and research and development activities leap forward according to statistics. The reflections of these investments are also seen in industry specific scale; for instance, the thesis topic of telecom equipment industry could be given as example. This industry is certainly financed by government science and technology programs in the scope of specific next generation research projects, collaborative investments with government research institutions. Additionally, great number of educated qualified workforce also increases the customization capability of these firms in order modify their solutions according to consumer expectations.



Source: OECD Factbook 2013: Economic, Environmental and Social Statistics

Figure 3: Gross Domestic Expenditure on R&D of China, %, 1997-2010

Figure 3 indicates that specifically after 1998 gross domestic expenditure on R&D attained to increasing rate year by year according to OECD Factbook 2013 statistics. This proves the importance of research and development activities for the state policies in China. Specifically in 1990s, the government's industrial policy for high-tech sector was to achieve technological progress and improve workforce quality as a milestone for

economic development. In this framework, these plans were also prepared; the National Science and Technology Achievement Spreading Program (1990), the Science and Technology Loan Program (1990), The National Engineering Research Centers Program, The Plan for Joint Development and Engineering Projects between Universities and Industry. In 2000s, Gross Domestic Expenditure on R&D of China also increased year by year, and attained to 1.77% of GDP in 2010.

Moreover, Chinese central authority has attached special attention to incubators. Incubators in China are also classified as follows: general hi-tech incubator centers, specialist hi-tech incubator centers, university science parks, industrial parks for entrepreneurs returning from work or study overseas, international incubator centers, spin-off incubator centers. Different kinds of incubators operate nearly in each province, municipality, autonomous and cities.

Table 6: The Development of Hi-tech Incubator Centers in China

	1997	1998	1999	2000	2001	2002
Number of hi-tech incubators	80	77	110	164	324	436
Number of employees	45.600	68.975	91.600	143.811	283.551	414.995
Cumulative total of graduated enterprises	825	1.316	1.934	2.790	4.281	6.297

Source: Ministry of Science and Technology (7 July 2003), Chen, C. H., Shih, H.T. 2005: 6.

In Table 6, from the period of 1997 and 2002 the number of hi-tech incubator centers increased nearly 445% and number of employees in these hi-tech incubators increased from 45.600 to 414.995 within only 6 years.

Furthermore, since ends of 1970s, a considerable amount of university graduates have traveled to advanced capitalist countries, specifically to US, in order to study on advanced science and technology programs. Since ends of

1990s, China state constituted an appropriate environment for Chinese overseas scholars to turn back to China to work for research laboratories, high-tech firms or science parks and incubators.

This state policy enabled know-how transfer related to modern technology for China's national technologic development in recent decades.

> China's national innovation system is making two transitions – from plan to market as it moves away from a centrally directed innovation system and also from low-income developing country toward Organization for Economic Co-Operation and Development (OECD) industrialized country status as it intensifies its innovation effort and more effectively deploys the ensuing technological gains. (Brandt, Rawski, 2008: 286)

China certainly achieved high growth rate of human capital. For instance, number of university graduated was 45.63 million in 2000 and in 2008 that number attained to 83.67 million. According to forecast reports in 2020 there will be nearly 200 million university graduates in China and this number equals to total number of workforce of United States (China Statistical Abstract 2010: 339). China overcame her biggest disadvantage of great population and created a huge army of science and modern technology. In this transformation, education system has taken the leader role via central authority's top-down policies.

> China is already a major S&T player in terms of inputs to innovation. Since 2000, it has ranked second in the world after the United States and ahead of Japan in number of researchers. R&D spending has increased at a stunning annual rate of almost 19% since 1995 and reached USD 30 billion (at current exchange rates) in 2005, the sixth largest worldwide...The R&D/GDP ratio has more than doubled in a decade and reached 1.42% in 2006 compared to only 0.6% in 1995. (OECD, 2008: 49)

Addition to rapid economic growth of China, developments in science and technology was also attractive by transforming the country with strong innovative capability. China increases its innovation potential continuously and aims to be the world's largest knowledge-based society. By this target, China transformed the disadvantageous position of having a huge population through significant power as creating the largest reserve of S&T human resources,

although People's Republic of China joined to race with capitalist rivals within only last thirty years. As shown in Table 7, China has closed the ratio gap between US (has the highest ratios) from 119.3 in 1981 to 4.3 in 2007 in the scope of "science and technology papers published internationally".

Table 7: Science and Technology Papers Published Internationally, Five Major Powers, Selected Years, 1981-2007

Country	1981	1985	1990	1995	2000	2003	2007
China	0.3	0.5	1.1	1.4	2.2	4.2	7.0
Japan	7.5	8.3	8.1	9.0	9.1	8.6	7.1
Germany	8.0	5.7	6.8	6.5	6.9	6.3	7.4
United Kingdom	9.2	9.1	8.2	7.8	7.8	6.9	8.4
United States	39.4	38.6	40.5	32.7	30.9	30.2	30.5
US/China Gap	**119.3**	**71.6**	**36.1**	**23.0**	**9.5**	**7.2**	**4.3**

Source: World Development Indicators 2006, National Bureau of Statistics of China, "Statistics and Analysis of Chinese Papers in S&T".

Both of number of internationally published papers and also the effectiveness of these scientific studies increase and China improves its academic image in world. According to Social Sciences Citation Index data, Chinese papers were in the nineteenth place in the most cited category in the world between 1992 and 2001, and thirteenth for 1996-2005 periods and tenth for 1998-2008 (Collection of Statistical Data in Science and Technology 2009). Above Table-8 compares the internationally published science and technology papers of countries. According to these statistics, China strives to close the gap with US rapidly in recent years.

Another deterministic point is that there is impressive international cooperation strategy and tendency in academic research and studies. The papers which were co-authored by Chinese and foreign scientists was 20.1% of all papers in 2008. (Science Citation Index); the distribution of foreign scholars nationality was 40.9% US, 12% Japan, 8.6% UK, 7.8% Canada, 7.7% Germany and 7.5% Australia. (China Science and Technology Information Institute, Statistical Data of Chinese S&T Papers, 2009: 8-9). These statistics prove that joint ventures strategy with foreign enterprises occurs in a similar

manner with academic studies. This transformation is the reflection of the open-door strategy of central government after 1980s with the vision of Deng Xiaoping and reformist policies.

Table 8: Research and Development Expenditures, Five Major Powers, Selected Years, 1980-2007

Percent of world total

Country	1980	1985	1990	1995	2000	2004	2007
China	2.1	2.3	1.7	2.5	4.7	7.5	8.1
Japan	9.0	10.0	11.5	11.6	9.4	9.4	10.0
Germany	6.9	6.2	6.0	5.2	5.3	4.5	4.8
United Kingdom	4.8	3.9	3.6	3.3	3.0	2.7	2.4
United States	26.0	27.1	25.1	25.3	26.6	24.3	23.8
US/China Gap	**12.4**	**11.8**	**14.9**	**10.0**	**5.7**	**3.2**	**2.9**

Source: World Bank Development Indicators 2010

Table 8 indicates that research and development expenditures of China have rapidly increased since 1980s. In comparison with US, the gap is rapidly being closed and is only 2.9 according to 2007 statistics.

According to Angang (2011), important points in China's science and technology development period could be grouped under three major headlines. Firstly, the state has defined a long-term development period and comprehensive national strategy. The open-door policies and intense international competition were determined as the major policies for this period. National S&T conferences were deterministic; the first conference was in 1978 and Deng indicated that "science and technology" would be one of four modernizations. The second national conference was in 1985 and focused on open-door policy and integration with other economies and this attempt was a long-term policy. Third, national conference was in 1995 and aimed to invigorate the nation by developing "science and technology". The fourth national "science and technology" conference was in 2006 aimed to formulate a development strategy with new trends in world S&T development, by choosing major fields and projects. The main goal is to enhance China's

national power and international competitiveness. Secondly, state provided a suitable environment for carrying out technical innovations with specific policies and incentives. Thirdly, the state has encouraged funding sources for financial support in R&D activities.

> In 1999, the CCP Central Committee and the State Council issued decisions on strengthening technical innovation and developing high-technology industries. These decisions established a number of policies and incentives, including financial support, tax concessions, the management of scientific and technical personnel, evolution and awards, and the management of intellectual property rights. (Angang, 2011: 116)

Finally, China recently launched a medium and long term plan (Medium- and Long-Term Plan for the Development of Science and Technology (2006-2020)) for scientific and technological development in order to make China "innovation-oriented society" by year 2020. One of the most important objectives of the plan is promoting and supporting (zizhu chuangxin) indigenous, independent and homegrown innovation with Chinese developed standards. For instance, in telecommunication industry global 3G standard of TD-SCDMA could be given as an example for this strategy. Chinese own national standard is one of the three global standards of third-generation network in mobile technologies infrastructure. Chinese telecom equipment manufacturers and research institutes design products on this standard in order to promote this national standard not only in China, also in world mobile market. Some examples from other Chinese standards are also given in below table; TD-SCDMA included. One of common specification of these standards is the state's active role during development periods.

Table 9: Comparison of Chinese Standard Initiatives

Case	Motivation	Major International Competitor	State's role in Standardization
EVD	Avoid royalty fees	Blu-ray, HD DVD, FVD (Taiwan)	State initiated the effort but state's role decreased dramatically when it evolved into commercial activities
AVS	Avoid royalty fees	MPEG4, H.264	Initiated by the state but there are conflicts of interest in the AVS case. For example, CCTV preferred MPEG-4 for IPTV standard
TD-SCDMA	Avoid royalty fees; improve Chinese competitiveness in telecommunication industry	WCDMA, CDMA2000	Strong state support. State established special projects for development of SCDMA technology. Currently state's support lies in decisions about 3G licensing
WAPI	Security	IEEE 802.11	Strong state support
RFID	Establish Chinese competitive status in RFID industry; security	EPC (Gen2)	State initiated, but confusing roles of different state agencies
IGRS	Establish Chinese competitive status in home networking field	DLNA	State initiated but most efforts were from the industry, where differences between IGRS and ITopHome emerge

Source: Thomson, Sigurdson, 2008: 106-7, and modified for this study.

Addition to the role of foreign investments and joint ventures with multinational companies, Lazonick (2011) emphasizes that China's growth is the result of interaction of the "developmental state" and the "innovative enterprise". Lazonick and Li (2012) also indicate that through indigenous innovation China moves into the production of higher value added goods. There is strong dynamic interaction between investments in physical and

human, technology transfer from advanced nations via foreign investments and formation and growth of indigenous companies can improve upon technologies by transferred from abroad or China's S&T infrastructure.

3.5 The Confucian Heritage

Confucius and his philosophy certainly effected and conditioned Chinese social, political and economic life in long periods. This philosophy also strongly affected industrial and technological progress both of during Mao and Deng's periods.

> Confucius looked back to, and was much influenced by, a body of thought proceeding out of the so-called legendary period of China's history; principally concerned with the shared morality which would be necessary for large numbers of people to live together in harmony. Confucius therefore saw himself as the synthesizer of the wisdom of the ancient sages… The best known compilation of his thought is the *Analects*. (Porter, 2011: 75-6)

The politic and economic evolution of China has been strongly affected by Confucius heritage. Specifically socialist revolution of Mao in 1949 and Deng's open-door transformation has effects of Confucius philosophy[21]. Moreover, probably this culture and philosophy was one of the most important factors that differentiate China and its historical evolution from many of other nations, specifically western countries. In order to analyze and study China's transformation and the role of state during the transformation, Confucianism is one of the determinative topics.

Wright (1962) indicates attitudes and behavior patterns sourced from *Analects of Confucius* in Table 10.

[21]The Confucian ideal was based on a return to the perceived virtues of an ancient era. In this, the core unit of society was seen as the family, and the state was seen as a form of superfamily. Power was concentrated in family (or state) headship. Loyalty upwards was exchanged for the downward responsible care of members, and discipline was seen as critical to the maintaining of order… The core of the system was the concept of 'filial piety', the obligation of unquestioning obedience and respect from a son to a father. (Redding, Witt, 2007: 38)

Table 10: Attitudes and Behavior Patterns from Analects of Confucius

Submissiveness to authority
Submissiveness to the mores and norms
Reverence for the past and respect for history
Love of traditional learning
Esteem for the "force" of people
Primacy of broad moral cultivation over specialized competence
Preference for non-violent moral reform in state and society
Prudence, caution, preference for a middle course,
Non-competitiveness
Courage and sense of responsibility for a great tradition
Self-respect in adversity
Exclusiveness and fastidiousness on moral and cultural grounds
Punctiliousness in treatment of others

Source: Wright, 1962.

Confucius and his philosophy certainly emphasize the importance of personal and governmental morality. Strong family loyalty, ancestor worship, respect of elders is the basis of ideal government. Confucius philosophy gives special importance to family unit and the family is a part of Chinese state in micro scale. As mentioned by Redding and Witt, Confucian ideal see the state as a form of superfamily and working for "the state" and obey state rules is a lifestyle for Chinese. For long years, Chinese are disciplined under Confucianism philosophy and therefore "submissiveness to authority and state" becomes one of their lifestyle. One of the most important reasons of the succession state-led policies could be seen as this discipline.

Education also has a special role in Confucius philosophy without any class distinction. According to him, political and social objectives could be met by education and also without formal education, humanity have no basis for wise behavior. According to Confucianism without any discrimination, educating all the people living in the community is an important and strategic

factor for economic development and growth. Skill acquisition, working, being patient, stability encourages social development and growth.

Additionally, Chung-Ying Cheng emphasizes factors which identify economic development in East Asian societies; two of them certainly important and give additional opinions about the effect of Confucius philosophy on Chinese successes.

- The adaptation capability for changing environment provided flexibility and sense of creativity among Chinese intellectuals
- Confucian philosophy highlights that education motives Chinese people to learn and absorb Western knowledge.

3.6 Discussion

Since 1949, there have been significant milestones in China's socio-economic history. The first one is Mao Zedong's socialist revolution and his development model of "Soviet-type" economic development system. Despite setting strong relations with the communist bloc, this new model isolated People's Republic of China from the capitalist world and thus national self-development model was executed until 1978 with protectionist policies. Second milestone is Deng Xiaoping's "market socialism" model. This new model is the open-door economic model with integration into the capitalist world and the capitalist economic system. Deng's reformist model is today's current economic model with minor changes since 1978.

People's Republic of China was founded in 1949 under the leadership of Mao. Until 1978, before the integration into the capitalist world economy (pre-reform), the central government directly managed the economic system as a whole; agriculture- "land reform", heavy industrialization, rural development, Soviet aids etc. were the major topics of that period. This term could be defined as chronologically between 1949 and 1978.

The central command economy transformed China from an agrarian country to that of a heavy industrialized power. That term's strides laid the foundation of today's powerful China. However, because of the closed door, isolated structure, the limited relations with the capitalist economies and the world markets prevented the flow of information and know-how about industrialization with modern technologies and technological progress. Additionally, failure of Great Leap Forward and Cultural Revolution's political and economic instabilities also negatively affected China's development specifically in the scope of industrialization and technological progress. In this term, Mao Zedong's philosophy was mainly based on developmentalism, nationalism and socialism. Mao's protectionist policy of "self-reliance" was ended by Deng's reformist open economy policy.

History of neoliberalism in China followed a different path than the Western World. China was a socialist state; however, "state neoliberalism" emerged certainly after open economy transition with a series of policies after 1978. The open-economy policy was issued in the Third Plenary Session of the Eleventh Central Committee of the Chinese Communist Party (December 18-22, 1978). Deng Xiaoping advocated that Chinese economy was on the brink of bankruptcy and the reform was indispensable. The prominent main headlines were the enhancement of the productivity, searching for export opportunities and foreign investments and gaining scientific knowledge, additionally, delegation of powers. In 1980s, the industrialization strategies were radically changed and production of consumer goods strategies took the place of large scale heavy investments projects. Through this strategy, foreign investments and foreign trade were also encouraged. Thus, integration with the capitalist world created new opportunities for China.

By Deng's reformist policies, China achieved a rapid and sustainable economic development in the recent thirty years. Its GDP has increased by nearly 10 percent for each year since 1978. This success has been attained by the Chinese Communist Party, despite the downfall of the former Soviet Union and the Eastern Europe. In this success story, Deng's open-door strategies and integration with the capitalist world were a milestone. Additionally, leaving heavy industrialization and trend to produce for consumer market were another strategic attack. Besides, this policy included "four modernization"; industry, agriculture, defense and science and technology. These modernization items have drawn the development roadmap of China for the 21st century.

In this perspective, "rural market" has also played a strategic role. First, rural regions have supplied low-cost labor for the world manufacturing operations. Thus, capital accumulation was succeeded and strategic investments of China were funded by these financial sources. Second, rural markets were strategic for the growth of the domestic firms, generally, multinationals were interested in urban markets and most of them neglected the rural markets. For instance, domestic telecom equipment firms of China; ZTE

and Huawei grew in their first years by focusing on rural markets which was also a state-policy; “development strategy of the rural”.

Ta Kung Pao (2004) describes in his speech for China News Net the science and technology development in China within six fields; suitable environment and encouragement of the development of the science and the technology, increasing the capabilities of the technological innovation in agriculture, strengthening the competitiveness of the manufacturing and the service sectors, reducing the digital divide between the regions and succeeding in the balanced economic growth, increasing the technologic innovative capability in the national defense and the public sector and finally aiming to increase the quality of human resources with human capital development approach.

In sum, China’s socialist history, Mao’s doctrine and Confucius philosophy created a strong comprehensive “state culture”. Deng’s economic reform program also aimed to combine “market forces” with “central state planning” in order to satisfy the supporters of the market-type reform and the strong central authority. Although China has integrated its economy and society into the capitalist world, strong effect of “state” has a certain impact on great successes of the recent decades.

During this transformation, one of the most important roles belongs to the Communist Party. Communist Party’s role in both periods (Mao and after Deng’s) significantly contributed to the socialism’s transformation in the world history, too. Additionally, in both of Mao’s and Deng’s periods, one of the shared characteristics was to raise domestic savings by collecting resources from rural sector and to use these resources in order to fund the industrial investments and sustain the national economic growth.

Today’s China has strong and strategic links with the capitalist world, however these relations could not be defined as a similar story of the capitalist nations. Because China Communist Party is still a strong authority and

strategic industries and macro decisions are taken by the central authority as in the communist states. This model was a new model which has its roots from socialism and integrates itself into the capitalist economy, however with a strong and interventionist "state authority". This new model could be named as China-specific state-led development model.

This chapter contributed to the thesis specifically on determining macro historical and political factors which significantly affected and became infrastructure for emergence and evolution of the Chinese high-technology industries. After socialist revolution in 1949, Mao's China had certainly focused on education campaign for all Chinese people in urban and rural. Additionally, "science and technology" was another strategic title for socialist China. Under the conditions of that term, heavy industrialization was popular and socialist China had focused on heavy industry investments via the aid of allied Soviet Union. After Deng's leadership in 1978, China changed its isolated and self-development model and open-door polices began to sovereign. Moreover, integration with the capitalist world and the permission for foreign investments also provided China with a know-how flow from the capitalist markets. However, this transformation was not a result of the neoliberal policies; instead, this new model could be defined as a state capitalism (a market-socialism). Powerful state authority certainly followed interventionist policies as a characteristic of "the state capitalism". This state interventionism could be seen both on the policy perspective and on the direct effect to the industries. For instance, in that period, joint ventures with foreign enterprises were the popular model, and the China state was encouraging domestic firms to form JVs with foreign partners. While these joint ventures provided information about topics of capitalist mode of production such as management, organization of companies, organizational efficiency, market-oriented production etc., the most important effect was related to the "technology" assimilation and know-how transfer for strategic national industries and state-owned enterprises.

After studying historical transformation of China under two major periods of Mao and Deng, it is clear that the emergence and the global-scale success of the high-technology industries of China (one of them is the telecom equipment industry) are the result of these state policies.

To summarize the impact of these macro-scale state policies on the telecom equipment industry in China, the headlines below could be determined.

*Deng's open door and reformist policies were the principal factor for the emergence of the telecom equipment industry.

*Deng's modernization program specified four topics; industry, agriculture, science and technology and national defense. High-tech industries -one of them was the telecom industry- were defined as the subtitles of this modernization program.

*These open door policies have given the legal permission to the foreign enterprises to form joint ventures (JVs) with the state-owned enterprises. After these joint ventures, China's national privately-held firms also began to emerge in the market; Huawei is the biggest firm of the Chinese telecom equipment industry.

* The industry was encouraged and supported by the state-owned enterprises (ZTE, Putian etc.) and the government research institutes such as Datang. Additionally, Huawei is known as a private company in the industry. However, international security and intelligence reports advocate and declare that Huawei has hidden strong relations with the Chinese state and also with the military.

* China's rural region development strategies also affected the telecom industry positively. Central and local governments' rural development strategies created a rural market in which domestic telecom firms operated and sold their products specifically for the first years and provided capital accumulation, because these markets had been neglected by the multinational rivals. This accumulated sales revenue was also used to fund the research and the development activities of the next periods.

*National science and technology programs such as Key Technologies R&D Program, National High-Tech R&D Program ("863" Program), National

Program on Key Basic Research Projects ("973" Program), Torch, Spark provided financial source for research and development activities of the telecom equipment industry by the collaboration with the government research institutes.

* Confucius philosophy is another title which affects the industry in the perspectives of the work ethic, the importance of the education, strong loyalty to the authority and finally the leadership role of "the state authority".

Despite all these positive improvements in the economic performance of China after the reform of 1978, China began to evolve from the socialist to the capitalist system. China focused on economic development and left aside "proletariat dictatorship" by integration into the capitalist system. Thus, labor rights are certainly damaged and labor process is exploited by the capitalist system. This exploitation is executed both by foreign investors and Chinese capitalists with the related major policy changes of the Chinese state and the Communist Party. Mao's "iron rice bowl"- guarantees lifetime employment in state enterprises- was counteracted and labor market was created. As a reflection of those policies, Chinese labor has poorer working conditions and has to pay for basic needs such as health, education, and transportation which were free of charge in Mao's era.

Through the strategy, labor army of China began to serve both for Chinese and foreign enterprises in order to increase their operational profit. Therefore, China is still seen as low-cost manufacturing opportunity for companies of the developed countries. Specifically, these operations are mostly low-value added phases of the manufacturing, however, this is also a strategy of China state in order to learn from foreign companies specifically in strategic industries.

In sum, by this new strategy, China changed the direction from socialism to capitalism with state-led development policies. Thus, Chinese state has chosen national development and attain a developed nation level by leaving the way from hegemony of "the proletariat dictatorship" and socialism. These critics are the other side of medallion in Chinese great transformation and success story.

CHAPTER IV

THE EFFECT OF FOREIGN INVESTMENT ON NATIONAL INDIGENOUS CAPABILITIES

This chapter of thesis aims to discuss the role of foreign investment for latecomers during catch-up period and creating national indigenous capabilities.

Catch-up phenomenon is an attractive topic especially for developing economies and latecomer nations. Interestingly enough, the scholars aim to analyze the case studies and specifically the success stories in order to determine factors and conditions of that period. In these studies, national policies, international relations and their reflections through the national industries are several of major discussion points.

In recent decades, various approaches have existed to explain the process by which developing countries could close the gap and surely catch-up with forerunners. The most common and recent models mainly focus on inevitable role of technology and the reflection of technology-oriented industries on catch-up approaches.

While major economic models discuss the role of technology in economic growth perspective, meanwhile the latecomer nations attempt to catch-up the forerunners mainly on technology oriented policies/strategies. Specifically in recent decades, *foreign investment* has been one of major channels for transferring the latest technologies to latecomers regarding especially high-tech industries. Thus, host nations aim to attract modern technology in order to transfer and absorb the technology through their catch-up strategies around national dynamics.

In sum, this chapter reviews some issues related to foreign investments, technology transfers and its effects on national indigenous capabilities.

The world international economic system has been re-structured with the increasing effect of capitalist system. In recent decades, attracting foreign investment has become one of the major tools for national economic growth in developing countries. The possibility of attaining to modern technologies is the one of the most significant reasons about why countries, especially developing countries, aim to attract foreign investments. Besides, these investments and transferred technologies might spillover to local industries of host countries by supportive national strategies.

Does foreign investment benefit local firms of host country, and which are the major channels for spillover process? Studies show that foreign investment could support or damage the local industries which depend on various effects and criteria. Previous quantitative studies found both positive and also negative effects with different methods and data sets. For positive side, foreign investment could support catch-up via technology transfer and diffusion of technology, thus upgrades the technological infrastructure and innovation potential of host country. On the negative side, foreign investment could impede growth of local industry and invest only because of taking the opportunity of low-cost manufacturing or sales to new markets, not aiming to transfer technology to the host country.

Moreover, foreign investment might have direct or indirect effects on host country economies; foreign capital inflow, modern technology transfer, employment of advanced equipment and increase in employment could be given as the examples of direct effects. By indirect perspective, foreign investments could increase host country productivity by technology spillover processes through local firms of host industries.

Literally, role of foreign investment has attracted many scholars over the years. Several of them indicated that foreign capital invests to a country to increase its own profitability rate, does not have effect on promoting the indigenous capability of host economy. On the contrary, there are also different views; such as Hood and Young (1979) stresses that technology transfer from abroad brings with it the possibility of the dissipation of knowledge and the

encouragement of competition. In the literature, there is clear discussion point related to the role of foreign investment regarding dissemination of knowledge.

Nevertheless, foreign investment could be an opportunity as a channel for diffusion of knowledge and technology through host country firms. By these investments; R&D activities, knowledge, technology etc. could be transferred from multinationals to foreign affiliates and after, indirectly through the indigenous local industry of host country with specific national policies. UNCTC (1987) indicates that effective technology transfer mainly depends on willingness and capabilities of technology supplier and also technology receiver. This environment is influenced by characteristics of home/host country, foreign investment oriented policies of the government, regulations, taxes etc. In sum, the attractiveness of host country (market, resources, education & training, technical and legal infrastructure) and the assimilation and innovation capabilities determine the effectiveness of the technology transfer issues.

Specifically multinational enterprises of advanced countries planned to invest abroad because of various reasons; low-cost manufacturing operations, tax incentives, taking the opportunity of new markets and so on. However, while these enterprises are applying their strategies, these investments could provide opportunities to host county industries with the existence of suitable environment. In fact, host country's dynamics and national strategies also determine the effects of these multinational investments.

Perez (1997) analyses the determinants of multinational enterprises impact on host countries' local firms and defines this development model as an evolutionary model of technological interaction and competition between foreign and local firms.

Blomström and Wang (1992) present a model that indicates the competition between multinational subsidiaries and local firms. If there is strong competition between subsidiaries and local firms, subsidiaries transfer the advanced technology in order to keep the market and this effort increases the spillover effect of these investments. Additionally, Walz (1997) indicates

that foreign direct investments contribute to national economic growth because the existence of MNCs in developing countries provides knowledge spillovers to domestic innovative potential. On the other hand, Glass and Saggi (1998) highlights that "imitation process of local firms" is encouraged by the MNCs investments. Nelson (1993) argues that importation-imitation-absorption-assimilation-original innovation should be the common strategy for latecomers.

Addition to these theoretical approaches, empirical researches obtain various results (significantly positive, not-significant or negative spillover effects of foreign investments) concerning the role of foreign investments in technology transfer activities through local industries or enhancing the productivity of local firms or host country sectors. The major empirical studies will be held in the following parts.

4.1 Spillover Effect of Foreign Direct Investment

Today, most of latecomer countries and specifically their technology-oriented industries have limited know-how about modern technologies. Research activities, radical product/process/service innovation efforts are quite difficult without the relations between advanced economies. Foreign direct investments and especially multinational activities are seen as one of the main actors for generation, application and transfer of modern technology, globally. Thus, latecomer countries encourage the investment of multinational affiliates in order to import the modern and newest technologies.

This part of thesis aims to study the international technology transfer through foreign investments and also interactions between MNC affiliates and host country firms. Additionally, the research aims to examine and discuss the arguments about externalities sourced from activities of MNCs. Besides, the research analyses the effect of MNC affiliates on the technology development potential of host countries' local firms.

Knowledge spillover from foreign enterprises to local firms and acquiring external technology are outcome which are expected by host countries. In fact, foreign investment generally has positive impact on export revenues and employment in host country, additionally, local firms could benefit from multinational investments via imitation, strategic partner investments, employee transfer and so on. Thus, attracting and promoting foreign investment is an important strategy for developing countries with necessary policies and strategies. The effective foreign investment management with required policies is inevitable in order to benefit from these investments in host countries. Knowledge spillover from R&D operations of multinationals are much more strategic than spillovers from manufacturing operations, and it is commonly known that foreign investments are not willing to share core technology with host countries.

The spillover effect could be indicated as one of the major ways through which foreign investments may benefit host economies. Although there is no any certain common method to calculate the magnitude of spillover effect, this effect is a reality between MNC affiliates and host/home country industries.

As a result of technology transfer attempts, the spillover effect might occur and this effect refers to externalities for local firms. Blomström and Kokko (1998) classify the spillover effect in two forms; productivity and market access spillovers. Productivity spillover signs the effect of foreign investment on local firms of host countries. For the market access spillovers, local firms could enter to international markets via the assistance of previously settled international channels of foreign investments. Dunning (1993) argues that literature regarding the determinants of FDI emphasizes that multinational firms generally have firm-specific advantages that might be related to their large endowments of intangible assets, such as superior technologies, patent, trade secrets, brand names, management techniques, and marketing strategies.

FDI also increases the competition in local markets and might benefit through the national economy; especially concerning the awareness of new

technologies, qualified human capital, marketing methodologies and effective management methods. Backward and forward linkages between domestic suppliers and customers also provide benefits. Backward linkages emerge with the relations of MNC affiliates and their suppliers, forward linkages are mostly related to contacts with the customers. (Blomström and Kokko, 1998)

4.2 Determining Factors of Spillover

In general, magnitude and sign of spillovers depend on factors with an undetermined certain effect; for instance, characteristic of foreign investments, sector and domestic firms, economic and social environment of host country, relationship between home and host countries. Thus, impact of dissemination of knowledge/technology of MNEs through domestic firms is strictly dependent on these factors.

According to Cantwell (1996), by transfer of new technology from mother company to its affiliate in a host country, technical change and technological learning appears in host country. This potential could trigger the productivity improvements or changes. By indirect potential, FDI indirectly affects innovation potential by learning spillovers within inter-industry (vertically integrated firms) or intra-industry (as the result of competition). (Weresa, 2004)

According to Peri and Urban (2006), foreign multinational enterprises may benefit to local economies, such as, productive foreign enterprises might support technological catch-up of local firms. This is a kind of spillover effect and is called as “Veblen-Gerschenkron” effect. Findlay (1978) emphasizes that technologically disadvantaged regions much more benefit from spillovers sourced FDI with a stronger productivity growth relative to more advanced regions. Peri and Urban’s study tested this hypothesis with an econometric study with firm-level data for German and Italian manufacturing firms for 1990s.

Kokko (1996) highlights that spillover effect of foreign investments could not be determined only by foreign investments; instead, interactions between foreign and local firms provide much better hints about the spillover effect. Additionally, local environment and conditions are other significant factors in order to determine the scope and the effect of spillover; absorptive capacity of local firms, competitive environment and interaction level between foreign and local firms also contribute to the spillover effect.

Crespo and Fontoura (2006) also studies on determinants of FDI. According to this study, existence, sign and magnitude of FDI spillovers to domestic firms depend on factors related to the characteristics of the MNEs and foreign investments, host countries, sectors and firms. This study determines five categories; absorptive capacity and technological gap, regional effect, domestic firm characteristics, FDI characteristics, and other factors.

In following part, the determinant factors of FDI spillover will be discussed under the topic of technological gap and absorptive capacity, host country environment and local firm characteristics, FDI characteristics, and other factors.

4.2.1 Technological Gap and Absorptive Capacity

Specifically for developing countries, the relationship between inward foreign direct investment and increasing technological capability is an important research field. Foreign investment spillover is one of major factors for industrial and economic catch-up. Moreover, learning effort is another impact factor for latecomers. According to Cohen (1989), absorptive ability and capacity and learning motives are key factors for indigenous firms' technological learning via FDI.

Narula and Marin (2003) define absorptive capacity as "absorptive capacity includes the ability to internalize knowledge created by others and

modifying it to fit their own specific applications, processes, and routines." This definition also highlights the importance of the relationship between the technological gap and absorptive capacity.

Findlay (1978) indicates the importance of "relative backwardness" which defines the development gap between two economies. According to him, the greater distance between economies provides greater pressure to adapt to new technologies presented by MNEs. His model specifies that wider the technological gap could bring greater opportunities to latecomer countries. However, this gap has to be in admissible ranges and host country local firms should attain to required level of technological capability. Cantwell (1989) supports that view; wider technological gap between home and host country industries makes difficult to catch up, because of the possibility of lack of absorptive capability.

Similar to Findlay's view, Wang and Blomström (1992) highlights that increase in technological gap also increases the FDI spillovers; the larger technology gap between foreign and indigenous firms provides opportunities to domestic firms to take higher efficiency by imitation of foreign technologies. On the other hand, higher technological gap could cause to decrease the absorptive capacity of domestic firms, and this situation could be a disadvantage from that point. Additionally, study discusses a theoretical model that integrates Findlay's "relative backwardness hypothesis" into the learning activities of local firms. Besides, this study indicates that imitation and absorption of foreign technologies depends on learning potential of indigenous firms as well. However, this period is not a spontaneous automatic process; technology diffusion could occur if technology recipient could absorb and adapt this technology through its own processes.

On the other hand, Blomström et. al. (1999) contributes to literature from another window and emphasizes that smaller technology gap between foreign and local firms triggers the larger spillover and sufficient technical capacity of domestic firms increases the effect of positive spillover.

In sum, one of most popular determinant factors of FDI spillover is "absorptive capacity" and "technological gap". The absorptive capacity is an

industrial requirement for catch-up discussions. Lack of absorptive capacity could damage the effectiveness of absorbing and dissemination potential of indigenous industries during cooperation with foreign enterprises, for instance with joint venture models or shared projects and so on.

4.2.2 Host Country Policy Environment and Firm Characteristics

Government policies play a significant role in order to attract the foreign investments. Strict policy and regulations of host governments could negatively affect foreign direct investments. On the other hand, laissez-faire attitude of governments might fail to protect national indigenous industries. This interaction and dynamics balance between expectations of foreign investors and national interest is an important research topic for academicians.

> Development of the host countries is a fortuitous side effect at best, which will only come about if the host government maintains enough autonomy and control to guarantee that the benefits of FDI are shared between providers and recipients of foreign capital. (Stallings, 1990: 82)

Wade (1990) explains the role of FDI as; FDI often provides access to capital, technology, access to international markets, management skills, local employment and strengthen local technological base in developing host countries. However, promoting national host industries is not one of major interests of FDI, because the primary point is commercial interests and getting profit.

Blomström et al. (1999) indicates that government policies are also considered as significant determinative factor of FDI spillovers. These policies effects ownership sharing and type of FDI in host country. As a specific subtitle of government policies, intellectual property rights are also important determinative factor. While weak protection of intellectual property rights could cause to low level technology transfer activities of FDIs, however high

protection level also impede imitation strategies of domestic firms. Thus, Markusen (2001) highlights an optimal point for intellectual property protection; requires minimum legal protection which guarantees FDI entry.

Additionally, government strategies and state policies also determine the effects of foreign investments on national industries. While these policies attract foreign investment, also should aim to guarantee the positive effects on local industry. These policies are a strategic topic of case study of Chinese telecom equipment industry.

Competitive business environment also affects the FDI spillover. Blomström and Wang (1992) stresses more competitive business environment encourages the transmission of technology. Kokko (1996) studied on Mexico and founded out that higher the competition in industry encourages larger the spillovers from FDI. On the other hand, this competition might affect the supply of appropriable technology from MNEs in a negative manner. In recent study, according to Barry et. al. (2001), the competition between foreign and local firms causes certain negative spillovers.

The characteristic of FDI is another factor that determines the spillover effect of FDI; nationality, culture, language, level of technology, type of sector etc. Additionally entry mode of foreign investment also important; merger/acquisition has different effects on spillover process. Merger and acquisition also provides great potential for FDI spillover (the equity shares also affect the spillover potential). Takii (2005) achieved an empirical study on Indonesian manufacturing industry and concluded that wholly owned foreign or foreign controlled firms dense environment decrease the magnitude of the spillover. Dimelis and Louri (2002) studied on Greece manufacturing firms with cross-sectional data and concluded that Greece firms benefit from productivity spillovers from multinationals, especially minority-owned foreign multinational enterprises.

The features of domestic firm also affect FDI spillovers; for instance the size of domestic firms could be associated with the capacity of taking

benefits from presence of FDI. For instance, large firms might have more absorptive capacity to imitate foreign technologies in an efficient manner than smaller firms, also larger domestic firms could be more successful than smaller firms in competition with MNEs. (Aitken, Harrison, 1999). Li, Liu and Parker (2001) studied on China and attained to the conclusion of state owned firms benefit from FDI through the competition with privately owned firms, meanwhile the rest of the local firms benefit from the demonstration activities.

4.3 Spillover Channels- Channels of Technological Diffusion

The literature related to FDI spillover is separated in two main groups; horizontal spillover and vertical spillover.

According to Fu et. al. (2010), multinational enterprises (MNEs) create opportunities to transfer or share technology with parent companies or subsidiaries and in medium and long-run, local firms would benefit from MNEs spillovers and linkages. This spillover effect could be categorized as horizontal and vertical spillover effect. Horizontal technology spillovers could be described as the spillover from foreign firms to other firms for instance by transfer of trained labor from foreign to local firms (Fosfuri, Motta, Ronde, 2001). Vertical technology spillover also occurs between foreign and local suppliers and customers within value chain through forward and backward linkages (Javoric, 2004). Another beneficial effect is competition effect of foreign investment which pushes inefficient firms to exit from the market or force local firms to be more competitive.

Same topics are also studied by other scholars too. Lenaerts and Merlevede also indicate that horizontal spillover occurs from MNCs to local firms that operate in same industry. Vertical spillovers occur from MNCs to firms in the industry linked with MNCs through supply chain. Additionally, vertical spillover could be classified as backward and forward spillovers.

Backward spillover occurs from multinationals to its upstream suppliers, forward spillover occurs from multinational to its downstream customers. (Lenaerts, Merlevede, 2011)

Horizontal spillover effects could be positive or negative; depends on how multinationals prevent technology leaking to local competitors. If multinationals transfer basic technologies or protect their technology effectively, spillover might not occur. Many empirical studies could not find positive spillover for horizontal spillover side. On the vertical spillover; backward spillover is expected to be positive that multinationals aim to set effective linkages with their local suppliers. Cooperation with domestic suppliers increases the quality of operation via improving production process, training employees so on. According to Markusen and Venables (1999) forward spillover could be positive when multinationals supply cheaper inputs or higher quality inputs. Forward spillover could be negative if products offered by multinationals are more expensive or too technologically complex for local firms' usage. (Javorcik 2004).

Görg and Greenaway (2004) determine four channels through which spillovers could occur in Table 11;

Table 11: Potential Channels for Spillover from Foreign Direct Investment

Driver	**Sources of Productivity Gain**
Imitation	Adaption of new production methods, adaption of new management practices
Skills Acquisition	Increased productivity of complementary labor. Tacit knowledge
Competition	Reduction in X-inefficiency. Faster adaption of new technology.
Exports	Scale economies. Exposure to technology frontier.

Source: Görg and Greenway, 2004:173

Imitation is a classic transmission tool for products and processes. Domestic firms can acquire technology by imitating multinationals. Technology transfer from developed to developing countries through reverse engineering could be given as an example. *Skills acquisition*; Acquisition of human capital could be seen as a tool for acquisition of new technology. Specifically FDI uses low wage but skilled human capital for its operations with specific training activities; however, the movement of labor from multinationals to other local competitors or new firms could achieve productivity improvements via two ways; direct spillover to complementary workers and through knowledge carried by workers who move to another firm. Haacker (1999) and Fosfuri and others (2001) identifies that knowledge which is transferred by workers is the most important channel for spillovers. *Competition*; competitive environment between multinationals and domestic firms is beneficial and forces domestic firms to become much innovative and efficient. Competition may also increase the speed of adaptation of new technology. *Exports*; FDI operations could benefit local firms via knowledge spillover about foreign market operations and exports. Though collaboration or imitation, domestic firms could learn how to penetrate to export markets. (Görg, Greenway, 2004:174)

Crespo and Fontoura (2006) explain that FDI spillovers could emerge through five main channels: demonstration/imitation, labor mobility, exports, competition, and backward-forward linkages with domestic industries. Blomström (1991) groups the technology spillovers sourced from FDI within two main groups; intra-industry and inter-industry. Intra-industry spillovers are demonstration, competition and labor mobility, inter-industry spillovers are vertical linkages with MNCs and local firms.

One of the most popular spillover channels is demonstration/imitation; introducing a new technology to the market is quite costly and risky operation for local firms of latecomers in a general manner. When the local firms noticed the succession of the current technology, imitation strategy could be applied. Thus, these firms are not damaged by marketing, managerial and technology

uncertainties. US multinational firm Cisco and Chinese Huawei has a similar story. Cisco sued Huawei because of imitating its market leader routers.

> In January 2003, Cisco sued Huawei in a U.S. district court in Marshall, Texas, alleging the Chinese company copied its router code, including bugs in Cisco's code, according to the complaint. Huawei even used the same model numbers, to make it easier for customers to switch to the cheaper Huawei versions, according to the suit. (Huang, 2006 :7)

The second channel is labor mobility means that foreign affiliates train local employees and positioned in-house processes. Then, local firms possibly hire these workers who had previously experienced in foreign firms or the workers could leave the job and behave as entrepreneur and sets-up their own companies by transferring technological know-how which had been previously learnt and absorbed. Well-functioning labor market facilitates knowledge/technology spillover sourced from MNC affiliates. Glass and Saggi (2002) studies labor mobility between multinational companies and host country firms and the research emphasizes the effort of MNCs to keep their human resources and knowledge inside the corporation.

For a recent study, Görg and Strobl (2005) analyze the effect of labor mobility in Ghana regarding the transfer of advanced technology and managerial skills. Sinani and Meyer (2004) emphasize the possible negative effect of this channel, as MNCs might attract qualified employees of local firms by offering higher wages.

The third channel is export. When local firms attain to significant successes in domestic market, then these firms aim to export their products to abroad markets. In general manner latecomers' local firms do not experience in lobbying activities about how to access to international distribution channels. Thus, foreign firms could provide assistance to domestic firms concerning their international operations by previously settled relations. In literature, Kokko, Zejan and Tansini (2001) and Aiken, Hanson and Harrison (1997) have announced the positive impact of MNCs on export capacity of local firms in their empirical studies.

Moreover, existence of foreign affiliates increases the competition in domestic market and this competitive environment forces local firm for in-house development and encourages using existing technology efficiently or adapting to new technologies. The competitive environment which is powered by MNCs is a fourth channel for FDI spillover. This competition encourages both of MNCs and domestic firms for new technologies and innovative efforts. Glass and Saggi (1998), Blomström and Wang (1992), Markusen and Venables (1999) emphasizes "effect of competitive environment" as a spillover mechanism.

Host country's local firms could also benefit from backward and forward linkages as the fifth channel of FDI spillovers. Backward linkages are settled when local firms become the suppliers for MNCs. According to Lall (1980), MNCs provide benefits to local suppliers as creating the awareness of quality of goods, creating of productive infrastructure, guidance in managerial and organizational operations. These linkages are strategically important for local firms because they learn about how foreign affiliates manage in-house operations such as product/process development, quality and managerial activities etc.

The second type of linkage; forward linkages emerge when local firms become the consumers of intermediate products of foreign affiliates. Forward linkages may benefit to local firms about product/process technologies. Markusen and Venables (1999) highlights that this relation mainly appears when foreign firms supply higher quality/lower price inputs to domestic firms which produce consumer goods for domestic market. Besides, Javorcik (2004) stresses the risk of higher quality intermediate goods which might cause to increase the production costs and decrease the competition power of domestic firms.

Furthermore, De Bresson et al. (1991) highlight that strong vertical linkages increase the productivity of local firms, however, indirectly. Blalock and Gertler (2004) studied on Indonesia and attained to the conclusion of downstream suppliers provide positive spillovers through domestic industry.

On the other hand, scholars discuss network externality as another spillover mechanism. Industry-specific knowledge and skills of foreign firms could spread through industry via indirect ways. For instance, the skilled and experienced employees of foreign firms might communicate people in the same industry through social interaction platforms. In the same industry, knowledge sharing between foreign forerunners and local firms is an inevitable reality. AnnaLee Saxenian emphasizes the importance of knowledge sharing via the case study of California's Silicon Valley and Route 128 in her famous book of *Regional Advantage: Culture and Competition in Silicon Valley and Route 128 (1994)*. She highlights the reasons of Silicon Valley's faster technological progress than Route; decentralized structure, high labor mobility and social networks of Silicon Valley and knowledge, skill sharing environment.

As seen above, spillover effect of FDI has a complex environment and includes interdependent factors. Thus, new empirical studies are required in order to analyze the significance levels of all these factors.

4.4 Empirical Evidence

Most of host countries, especially developing countries, liberalized related regulations and policies since late 1970s in order to attract the foreign capital and investments. The main strategy was to acquire modern technology, skills and innovative capability related to popular industries.

According to positive view, foreign direct investments could trigger local industry to introduce new technologies and work harder in a competitive environment. Additionally, MNCs have strong market experience in international markets via previously settled distribution channels and international lobbying activities. Besides, MNCs mostly transfer proprietary technology in order to compete with local firms and other MNCs in competitive markets. These factors enable local industries to be involved into these value-chains. In sum, MNCs could introduce new technologies, break

down monopolies and increase competition, increase R&D effort and technologic awareness of local firms. These are the positive feedbacks of spillover effect. However, these advantages depends on conditional factors; such as, type of industry, MNCs investments, national infrastructure, local industry's absorption capability etc. For instance; local firms mainly use "reverse engineering" or "hiring labor" methods in order to gain access to advanced technologies of MNC or other types of spillovers. Thus, human resource of local industry should have required skills especially for a successful imitation or reverse engineering processes.

In literature, there is no certain consensus on whether there is significant spillover effect of foreign direct investments through indigenous industries. For instance, Caves' (1974) study for Australian local manufacturing sectors was a pioneer study and analyzed the impact of foreign presence per worker (related to value added) through microeconomic perspective and found positive spillover effect. Globerman (1979) studied Canadian manufacturing industries and used cross section data set and found similar results as Caves. Liu et. al. (2000) studied UK manufacturing industries with the panel data belong to 1991-1995 and concluded positive spillover effect. Blomstöm and Sjöholm (1999) used cross section data of Indonesia, Chuang and Lin (1999) studied on Taiwan and used firm level cross section data and found positive spillover effect. Blomström, Kokko and Zejan (1992) studied on Mexican manufacturing industry and this study found out that local competition is positively related to technology import activities of foreign owned affiliates. Blomström and Persson (1983) and Blomström and Wolf (1994) for Mexico and Findlay's (1978) studies are other important studies.

Todo (2006) examines whether R&D activities of foreign enterprises in host country increase knowledge spillover from foreign direct investments with Japanese manufacturing industries with firm level panel data of 1995-2002. The study found positive effects of R&D stocks of foreign firms on the productivity of domestic firms. Motohashi and Yuan (2005) also studies on knowledge spillover from multinationals to local firms in China for automobile

and electronics industries. For the results, study finds that multinationals in assembly industry provides vertical spillovers to domestic parts supply firms and also there is horizontal spillovers between domestic parts suppliers. For electronics industry horizontal spillover effects of multinationals to domestic supplier firms has positive impact.

All these above researches concluded that foreign presence (mainly MNCs affiliates) provides positive spillover effect on local industries.

On the other hand, MNC affiliates could cause to negative effects on local industries; for instance; Haddad and Harrison (1993) observed and empirically tested the Moroccan manufacturing industry and the research detected that FDI decreased the productivity of local firms and created negative spillover effect on Moroccan manufacturing industry. Aitken and Harrison (1999) found negative impact of foreign investment on Venezuelan domestic enterprises by using firm level and panel data. Djankov and Hoekman (2000) – Czech Republic, Hu and Jefferson (2002) and Huang (2004), Hu et al. (2005) are other major scholars who found negative results for spillover effect of foreign enterprises related to different domestic firms. Moreover, Table 12 has a sample of the literature on spillover of foreign investment in domestic firms from different regions of the world.

Table 12: A Sample of the Literature on Spillover of Foreign Investment in Domestic Firms

Reference	Country	Year	Data	Result
Caves (1974)	Australia	1966	CS	+
Globerman (1979)	Canada	1972	CS	+
Blomstrom and Persson (1983)	Mexico	1970	CS	+
Blomstrom (1986)	Mexico	1970/1975	CS	+
Haddad and Harrison (1993)	Morocco	1985-1989	Panel	-
Aitken and Harrison (1999)	Venezuela	1976-1989	Panel	-
Djankov and Hoekman (2000)	Czech Rep.	1993-1996	Panel	-

Source: Sun 2010 and various references.

Table 12 (cont'd)

Kathuria (2000)	India	1976-1989	Panel	-
Liu et al. (2001)	China	1996/1997	CS	+
Liu (2002)	China	1993-1998	CS	-
Li et al. (2001)	China	1995	CS	+
Buckley et al. (2002)	China	1995	CS	+
Liu (2002)	China	1993-1998	Panel	+
Hu and Jefferson (2002)	China	1995-1999	Panel	-
Liu and Wang (2003)	China	1995	CS	+
Chuang and Hsu (2004)	China	1995	CS	+
Huang (2004)	China	1993/1994/1997	Cs	-
Abraham et al. (2006)	China	2002-2004	Panel	Mixed
Liu et al. (2007)	China	1997-2002	Panel	+
Tian (2007)	China	1996-1999	Panel	+
Blomstrom and Sjoholm (1999)	Indonesia	1991	CS	+
Feinberg and Majumdar (2001)	India	1980-1994	Panel	Insignificant
Driffield and Love (2007)	UK	1987-1997	Panel	Mixed
Chung et al. (2003)	US	1979-1991	Panel	+
Buckley et al. (2007)	China	1995		Mixed

For a recent study, Hale and Long (2006) used firm level data from a World Bank survey and analyze the effects of FDI on Chinese domestic firms. The study concludes that FDI has different spillover effects on different firm groups. If Chinese domestic firms have higher absorptive capacity, FDI has positive spillover effect on these firms, on the contrary low initial productivity provides negative spillover effect sourced from FDI. Another output is related to labor mobility which provides a significant channel for FDI spillover activities; movement of managers and engineers from foreign firms to domestic

ones increase the productivity of domestic firms; younger and skilled workers also increase the spillover effect. Thus, study concludes that learning and interaction among workers are certain mechanisms related to network externality.

Although spillover effect of foreign investments is inevitable reality, however, measuring the exact magnitude of this effect is quite difficult. Temenggung (2006) categorizes the empirical studies concerning spillover effect of FDI through host countries. First group includes microeconomic studies which focus on impact of FDI in increasing productivity of local firms via technology spillovers. The next group related to macroeconomic studies which analyze the growth effect of FDI on host country economies. Final model studies the technological spillovers from FDI around industrial case study framework. In some recent industrial case studies have used the final model; Larrain, Lopez-Calva, Rodrigues-Clare (2000), Moran (2001).

One of the main objectives of this chapter is to identify the impact of foreign direct investments (specifically MNCs operations) on in-house technology development activities; and determine the relations between foreign and local firms around telecom equipment manufacturing industry. To examine the emerging and growth process of Chinese telecom equipment manufacturing industry, effect of multinational enterprises is one of three main headlines. Attractive policies for foreign investment inflows to Chinese telecom equipment industry, spillover effect of these investments, Chinese state policies and the network platform between multinational and local firms will be studied in industry chapter.

4.5 Foreign Investment in China

China has achieved significant growth story specifically since 1980s. China is also a latecomer as Japan and South Korea, however China describes an alternative and different type of development model than Asia's other successful examples of Japan and Korea. China's recent effort on catch-up is sourced from the effective combination of foreign investment and indigenous knowledge creation and innovation.

Japanese model had been based on manufacturing-based industrial system. Japanese keiretsu and Korean chaebol could be defined as closed networking systems and these systems do not take into consideration network externality, global procurement and labor mobility approaches comprehensively. However, today's new technologies symbolize to give reaction to the market needs in the possible shortest time. Thus, strategic collaboration between MNCs and local partners is required to response to market needs effectively.

By reform of Deng, China defined national strategies in order to attract foreign investment in strategic industries which had been previously determined by state authorities. Promotion of foreign investment inflow has become one of the most important tools of Chinese economic and political transformation period. Through this perspective, China became the world's largest foreign direct investment recipient around developing countries in early 1990s and thus this strategy caught attention of the scholars in recent decades.

History of FDI in China is literally studied within three periods; before 1949, the term between 1949 and 1979 and since 1979 open policy period (after Deng's refom). Before 1949, especially US, Russia, Britain, Germany and Japan investments had the greatest shares in China as foreign investments which were mostly managed by foreigners and their effects stayed in limited scope.

In 1949, Chinese government referred to Lenin's view of export of capital is the central mechanism of imperialism. In those years, because of Korean War and US trade embargo, China highlighted the international environment in socialist block in order to collaborate about technological know-how. In that term, Soviet Union provided financial support and qualified technical personnel to train Chinese labor force. Additionally, China set up joint ventures with Soviet Union organizations and had control on these collaborative works.

However, the diplomatic crisis between Soviet Union and China was named as Sino-Soviet Union split increased its effect especially in 1960s and this problem left China isolated. Therefore China sought technological support from Western countries and Japan, however this attempt was also blocked by Cultural Revolution of China. By this time, China began to follow the strategy of "self-sufficiency" especially on agriculture and industrial manufacturing industry for a period.

Nevertheless, in the early years of 1970s, China's technological insufficiency was apparent and technological infrastructure was still settled on imported machinery and techniques of 1950s. When Deng Xiaoping took over the political leadership after Mao and opened the economy to international trade by economic reform. The previous strict political regime was related to centrally planned, however the new regime has been a type of market-oriented economic system.

Chinese government's new strategy of "Trading Markets for Technology" (TMFT)" (Shichang Huan Jishu) promoted establishing joint ventures with foreign firms and state owned enterprises since 1978. Through this strategy, foreign company would be allowed access to Chinese domestic market with the requirement of sharing its technology with state-owned companies. Although this strategy was not stated in official government documents, one of the milestones of China's industrial catch-up newly emerging industries. The main logic behind TMFT strategy was import substitution, because after opening Chinese market to the West, China spent significant budgets for importing manufacturing equipment. Feng (2010)

indicates that TMFT could be seen as a national strategy of industrial development. The transition of ideology through market-based economy and its relevant economic reforms also prepared appropriate environment for TMFT in order to change the policy for introducing foreign technologies. TMFT policy played leading role during Chinese industrialization since mid-1980s.

Telecom equipment industry was one of the industries that adapted early to TMFT strategy. Major state owned telecom equipment companies established joint ventures with multinationals specifically since 1980s.

Sun et. al. (2002) analyzes FDI development in China in three stages. First stage started with "law of the People's Republic of China on Joint Ventures Using Chinese and Foreign Investment" in 1979. State foreign investment commission was established for managing the overseas investments which focused on small-sized assembling and processing for exports. Second stage started with state's giving legal rights for wholly owned foreign enterprises in China. Additionally, "Provisions for the Encouragement of Foreign Investment" was prepared to encourage foreign investment, tax incentives for foreign investments so on. More authority was given to local governments related to foreign investments. Chinese government issued in 1990 "Amendments to the Joint Venture Law" and this law started the third stage.

Wu (2003) highlights that China's economic transformation period is mostly related to two parallel lines of action; "decentralization" and "privatization". The first line of action is "bureaucratic decentralization" and aimed to increase the autonomy of firms on product planning, investment, marketing activities as a decision maker, additionally, gave more autonomy to local governments with the topics of administrative, financial and budgetary issues. The second line of action "privatization" loosened the restrictions for township and village enterprises, after also for private initiatives in the mid-1990s opened up new spaces for economic activities. These new policies also include related regulations in order to enable the creation of "Special Economic

Zones" for foreign investments. Xin and Ni (1995) studied on a survey to rank the regions and provinces of China in the scope of investment environment. The variable are occurred such as; market scale (30%), wage level (20%), education level (10%), extent of industrialization (10%), transport facilities (10%), communication facilities (10%), living environment (5%) and the level of scientific research (5%).

Table 13: Actual FDI by Type of Enterprises

Unit: US $100 million/%

		Contractual Joint Venture		Equity Joint Venture		Wholly Foreign Owned Enterp.	
Item	**Total**	**Amount**	**%**	**Amount**	**%**	**Amount**	**%**
1979-1982	11,66	5,32	**45,60%**	0,98	8,40%	0,4	3,40%
1983	6,36	2,27	35,70%	0,74	11,60%	0,43	6,80%
1984	12,58	4,65	37,00%	2,55	20,30%	0,15	1,20%
1985	16,61	5,85	35,20%	5,82	35,00%	0,13	0,80%
1986	18,75	7,94	42,30%	8,05	42,90%	0,16	0,90%
1987	23,14	6,20	26,80%	14,86	**64,20%**	0,25	1,10%
1988	31,94	7,80	24,40%	19,75	**61,80%**	2,26	7,10%
1989	33,92	7,52	22,20%	20,37	**60,10%**	3,71	10,90%
1990	34,87	6,74	19,30%	18,86	54,10%	6,83	19,60%
1991	43,66	7,63	17,50%	22,99	52,70%	11,35	26,00%
1992	110,07	21,22	19,30%	61,15	55,60%	25,2	22,90%
1993	275,15	52,37	19,00%	153,5	55,80%	65,06	23,60%
1994	337,67	71,20	21,10%	179,3	53,10%	80,36	23,80%
1995	375,21	75,36	21,00%	190,8	50,80%	103,2	27,50%
1996	417,26	81,09	19,40%	207,6	49,70%	126,1	30,20%
1997	452,57	89,30	19,70%	195	43,10%	161,9	35,80%
1998	454,63	97,19	21,40%	183,5	40,40%	164,7	36,20%
1999	403,19	82,34	20,40%	158,3	39,30%	155,5	38,60%
2000	407,72	65,01	15,90%	145,9	35,80%	191,4	**46,90%**

Source: China Foreign Economic Statistical Yearbook, China Statistical Yearbook, vaious issues

As seen at Table 13, FDI inflow was mostly in Contractual joint venture format in the first years of open economic reform. After, Equity joint ventures have become popular especially until Asian financial crises. Finally, the number of wholly foreign owned enterprises increased because of more appropriate investment climate. However, there is the fact that, Chinese state

always managed strategic industries under the control of state-owned enterprises. Foreign investments have been accepted with a controlled manner.

For a chronological analysis, Chinese government's national open policy (kaifang zhengce) foresaw that foreign investments would play the main role for transferring the modern technology and know-how by integration with capital system. Thus, China adopted open door policies in order to absorb advanced technology and know-how through foreign trade and investment. Eventually, National People's Congress passed the Equity Joint Venture Law and gave legal permission for foreign investments in 1979.

In this scope, "Regulations for the Implementation of the Law of the People's Republic of China on Joint Ventures using Chinese and Foreign Investment" was prepared in 1983 to create suitable climate for foreign joint ventures. In 1986, Chinese government privileged (additional tax benefits, decrease in local costs) especially export oriented advanced technology focused joint ventures. "The Law of the People Republic of China on Enterprises operated Exclusively with Foreign Capital" required wholly foreign owned enterprises to be export-oriented or to use advanced technologies. In 1995, Chinese authority took the decision to give the priority for foreign investments in high technology industries, telecommunication, energy, transportation, agriculture and basic raw materials.

Specifically during the period from 1975 to 1985, foreign equity joint ventures mainly concentrated in more developed and coastal regions and large cities. Kemp (1987) notes that China created six major types of investment for foreign firms mainly differ around the extent of foreign participation and profit sharing methods. These forms are foreign-owned enterprises, equity joint venture, contractual joint venture, joint exploration, compensation trade, and industrial processing.

> Chinese government policy has discriminated in favour of FDI, including foreign investment in joint ventures. A local company entering into a joint venture will obtain a variety of privileges compared with other indigenous enterprises, including reduced levels of taxation, authority to undertake import and export business by themselves, improved access to capital and so on. (Young, Lan, 1997: 676)

The State council set up four Special Economic Zones – Shenzhen, Shantou, Zhuhai and Xiamen in Guangdong and Fujian provinces in 1980. After eight years, in 1988, open area was expanded through 153 cities in coastal regions. Before China joined to World Trade Organization, annual FDI flow to China reached to $40 billion a year.

Open policy has been a strategic attack to enhance technological and industrial capability of China via the flow of know-how from multinational enterprises. Additionally, behind joint ventures, local firms set also other types of relations such as being supplier or customer of multinational enterprises in a network model.

Since Chinese economic and political reform achieved, three main types of foreign capital inflow have appeared: Foreign loans, foreign direct investment and other types of foreign investment, Table 14 is presented as below.

Table 14: China's Actual Usage of Foreign Capital 1979-1999

Million US dollars/%

	Total	**Foregin Loans**		**Actual FDI**		**Others**	
Year	**A**	**Amount**	**% in (a)**	**Amount**	**% in (a)**	**Amount**	**% in (a)**
1979	2739	2513	91,70%	109	4,00%	117	4,30%
1980	3383	2893	85,50%	195	5,80%	295	8,70%
1985	4647	2688	57,80%	1661	35,70%	298	6,40%
1990	10289	6534	63,50%	3487	33,90%	268	2,60%
1995	48133	10327	21,50%	37521	78,00%	285	0,60%
2000	59356	10000	16,80%	40715	68,60%	8641	14,60%
1979-2000	**506463**	**136649**	**27,00%**	**345471**	**68,20%**	**24343**	**4,80%**

Source: China Foreign Economic Statistical Yearbook, China Statistical Yearbook, various issues

Main types of joint-ventures in China are Wholly foreign owned enterprises, Equity joint ventures and Contractual joint ventures. Contractual joint venture symbolizes a partnership relation between foreign enterprise and

local partner. This model was popular specifically in early years of reform. Equity joint ventures are set up by Chinese and foreign partners in order to share corporate profit and losses and also the risks. This company profile has become the most popular model in China until Asian financial crises. Wholly foreign owned enterprises have been mainly established by multinational corporations as their affiliates, subsidiaries. Specifically in recent years WFOs increased because Chinese large market potential and government supported investment climate attracts MNCs to invest in China[22].

To conclude, in the early years of open policy reform contractual joint ventures was the dominant form in China and this form has brought less risk to foreign participants. In time, business climate was improved and equity joint venture form has become the dominant form in Chinese market. In recent years, numbers of wholly foreign owned enterprises (mainly MNCs affiliates) have also increased by more comfortable investment climate.

Table 15: Share of Foreign Invested Enterprises (FIEs) in Industrial Total, 1995, 2000

Industries	Number of Firms		Industrial Output		Value-Added	
	1995	2000	1995	2000	1995	2000
Textile Industry	16,4%	18,8%	17,9%	21,2%	20,3%	20,7%
Garments and Other Fiber Products	29,8%	43,3%	50,1%	48,5%	50,0%	48,8%
Cultural, Educational and Sports Goods	21,4%	47,0%	50,1%	59,7%	40,6%	59,5%
Petroleum Processing and Coking	5,6%	9,5%	1,4%	5,4%	0,7%	5,7%
Raw Chemical Materials and Chemical Products	9,3%	12,9%	13,2%	20,6%	13,6%	21,5%
Medical and Pharmaceutical Products	16,1%	16,4%	19,6%	22,7%	25,6%	24,6%

Source: China Statistical Yearbook 1996, 2001.
Note: Data for 1995 include all FIEs with independent accounting. Data for 1999 include only firms annual sales of over 5 million yuan

[22]As a result of the active government promotion through various policy measures, FDI in China has grown rapidly since the 1978, especially in the 1990s. From early 1980s to late 1990s, contracted FDI inflow to China has grown from about US$ 1.5 billion a year to more than US$ 40 billion a year in 1999. During the same period, China's actual use of FDI grows from about US$ 0.5 billion to more than US$ 40 billion a year. China has been the world largest FDI recipient among developing countries since early 1990s. In recent years, FDI to China accounts for 1/4 to 1/3 of total FDI inflow to developing countries. Foreign investment has become an important source for China's investment in fixed assets. (Fung et al., 2004)

Table 15 (cont'd)

Transport Equipment Manufacturing	7,2%	12,9%	24,6%	30,3%	23,5%	30,8%
Electric Equipment and Machinery	11,3%	21,2%	24,3%	33,2%	23,1%	34,2%
Electronic and Telecommunications Equipment	**36,3%**	**47,4%**	**60,0%**	**71,6%**	**58,8%**	**65,4%**

The shares of foreign invested enterprises are shown at Table 15. According to statistics, "electronic and telecommunications equipment" industry has the greatest shares in each category; number of firms, industrial output and value-added perspectives about having foreign invested enterprises.

In empirical studies, there are mixed results about the effects of FDIs on Chinese domestic industries. For instance Huang (2004) analyzed the impact of foreign investment on China's productivity by using two empirical models; in first model labor productivity, for the second model total factor productivity (TFP) was used. The models found that foreign investments have negative impacts on China's domestic firms. For another study; Tian (2007) used a set of panel data of 11,324 firms in China from 1996-1999 and the paper found out that there is certain positive spillover regarding technology perspective from FIEs (foreign-invested enterprises) to Chinese domestic firms.

Although many firms began to select China as a manufacturing center because of low-cost labor, land, raw materials, huge market, Chinese government has prioritized mainly high-tech sectors as strategic and invested through state sources; such as aircraft and avionics, computer technologies, telecom equipment and chemicals and so on.

In sum, this open economy policy mainly aimed to transform the old-fashioned technological infrastructure and know-how of China, especially on strategic fields. However, this authorization does not sign a fully liberalized system; instead of, this is also a kind of state controlled and state-planned system achieved by the Chinese government. While that system aims to absorb and disseminate the MNCs' know-how related to strategically defined

technology fields, also aims to control the power of FDI in national borders because of national economic and political strategies. This characteristic will be deeply analyzed in following chapters.

Table 16: Investment Projects by Type of Foreign Direct Investment; 1979-92

	Equity joint venture	Contract joint venture	100% foreign owned	Total
1979-82	83 (9)*	793 (87)	33 (4)	909
1984	741 (40)	1,089 (59)	26 (1)	1,856
1986	892 (60)	582 (39)	18 (1)	1,492
1988	3,909 (66)	1,621 (27)	410 (7)	5,94
1990	4,093 (56)	1,317 (18)	1,861 (26)	7, 271
1992	34,225 (71)	5,542 (11)	8,789 (18)	48,556
1979-92	**58,875 (65)**	16,831 (19)	14, 970 (17)	90,676

Note: * Numbers in bracets are percentages

Source: Calculated according to Mıtsubishi Research Institute, 1993, p.33

Table 16 describes the distribution of investment projects according to type of foreign investments in China. As seen, equity joint venture is the main source of investment projects with 58.875 projects and % 65 share in overall.

Liu and Buck (2007) studies on international technology spillover and impact on innovation potential of Chinese high technology industries. The study emphasizes the importance of "learning by exporting strategy" to promote innovation in Chinese indigenous firms. Besides, both of indigenous efforts, absorptive capacity and international technology spillover is counted as the major indicators of Chinese high-tech catch-up. In that scope, Chinese firms strategically aimed to learn from foreign rivals, also with imitative innovation strategy.

4.6 Discussion

Globalization has a significant effect on the world economy especially since the late nineteenth century. FDI is also an important tool and driving force of the global economies. Foreign enterprises mainly invest in the entire world in order to access different markets, low-cost manufacturing opportunities, technology, and qualified work force and so on. On the other hand, host countries also seek the opportunities of employment, increasing export, and transfer of the modern technologies via those foreign investments. Foreign investment could contribute to the host industries and also economies with related political infrastructure which serve for national interests of host countries.

In general, foreign investments are seen as a part of the neoliberal policies in free market, however, specifically in state-led economic development models, foreign investments could also be managed by the state authority and the related policy tools based on the national interests. As a recent example, by the decision of the market-based economic reform, China's significant economic growth over the last three decades has become an important success for the developed and developing nations. In the similar period, China attained the largest FDI inflow in the world. Two main factors significantly affected the FDI investments; one is the low-cost manufacturing opportunities and the other is the attractiveness of the Chinese market. Specifically after the period of reforms, Chinese state applied a new political strategy in order to attract foreign investment into the industries defined as strategic previously under the policy of "Trading Markets for Technology" (TMFT)" (Shichang Huan Jishu). Through the strategy, foreign enterprises were invited by using the attractiveness of the Chinese market with the pre-requisite of forming joint ventures with the state-owned enterprises. This policy increased the possibility of technology spillover from foreign enterprises into the local industry with various spillover channels. In sum, China used a

different model in which foreign investments were attracted by profitable operations in China and China state also provided benefit from these investments via related state policies.

Scholars have also studied the relations between FDI and economic growth specifically on China case. In addition to the empirical studies mentioned in this chapter, as a recent study, Tang et. al. (2012) focused on FDI and its overall impact in China for post economic reform period of 1978 to 2005. The study used a stationary multi-equation system of time series models with statistical data between 1978 and 2005. The results of the study indicate that FDI had a crucial role during Chinese successful economic growth. FDI inflow to China was $4.65 US billion between 1987 and 1992 and attained $60.33 US billion in 2005 (World Investment Report 1999 and 2005). Tang et. al. (2012) also emphasizes the determinants of the US and other western country FDIs in China. The most important ones are huge domestic market, cheap, abundant and poorly protected labor, tax incentives and quality of the local infrastructure. The results of the empirical analysis and the major findings of the study are mentioned as below;

* Labor cost is the primary and the most important factor which attracts FDI to invest in China.

* FDI has played a significant role in China's economic growth and development through spillover effects, transferring know-how and diffusing technology and raising productivity.

* FDI also facilitated China's transition into a market based economic system and triggered the reforms of the industrial structure to be more efficient and competitive.

In addition to the positive effects, the study shows that FDI also has negative effects for China:

* Low-cost manufacturing operations of the MNEs cause pollution and damage natural environment in China. This problem could also negatively affect China's economic and social development in the following decades.

* This new market based economic system negatively affected Chinese social welfare system.

* FDI increased income inequality in China because of the uneven distribution in regions and the impact on the regional economic development.

Additionally, Tsai (1995) studied the relationship between FDI and income inequality for 33 less-developed countries. The study showed that FDI causes more unequal income distribution in less developed countries. Fu (2004) also studied with panel data between 1990 and 1999 with a log-linear dynamic panel model. The study proves that FDI increases income inequality between inland and coastal regions in China.

As an extension of this chapter, the effect of the foreign investment on the Chinese telecom equipment industry after the reform of 1978 and the open economy model will be discussed in the Chinese telecom equipment industry chapter. The contribution of the foreign investment to the development of the Chinese national industries will also be discussed with related national policies by using the case study of the Chinese telecom equipment industry.

CHAPTER V

CHINESE TELECOM EQUIPMENT INDUSTRY

This chapter studies on historical transformation of Chinese telecom equipment industry since 1978, open-economy reform of Deng Xiaoping. This evolution period will be studied under four main sub-titles beginning with switching technology through mobile technologies. Additionally, major players (equipment manufacturers, telecom operators, government research institutions) in industry and their development and major projects will be studied. Effect of government policies and strategies on telecom equipment industry and role of "national programs for science and technology" on industry will also have part in the chapter. In sum, the chapter will study the impressive transformation period of telecommunication equipment industry from sales operations of imported fixed phone switches through creating one of the three approved global 3G standards.

Before Deng's reform, Chinese telecom industry was dominated by state owned enterprises. These enterprises had mainly focused on fixed phone handset and manufacturing activities of related components. After mid of 1980s due to open economic policies, foreign enterprises entered to Chinese market with digital phone switches and wireless technologies. Then wholly owned foreign affiliates of multinationals and joint ventures became dominant players in Chinese telecom equipment industry.

Sun (2002a) claims that in early years of transition through open economy, government promoted the technology transfer from multinational companies in order to improve the technological capability of domestic companies, however, according to recent studies, in-house research measured

by patents, is the primary source of new product development of Chinese domestic companies rather than imported foreign technologies.

> In China, the government has targeted opportunities to skip some stages of innovation and lay down the foundation for new generations of technology to narrow the gap to the world frontier as soon as possible. Science and technology programmes are integrated and have a prominent role in the five year plans. The most important motives have been to break down the technological dominance of MNCs. (Xielin, Dalum, 2009: 453)

Xie and White, (2006: 230) divide technological learning process of China within four historical periods 1949-1960, 1960-1978, 1978-1991, and 1992-2000. In all these periods China aimed to catch-up Western technologies. These four periods are grouped as "imitation paradigm", the next period of 2001-onward is called as "creation paradigm" and specified as global competitiveness, knowledge management and Chinese firms describe themselves as a significant source of learning.

There exist a rapid development period in global telecom equipment industry from fixed telephone switches to today's 3G mobile technology. During this rapid transformation period, China's huge market potential has always attracted major telecom equipment manufacturers. Specifically since 1980s, these global companies began to invest in China with different investment forms in order to take benefits of Chinese attractive market. Hereby, Chinese telecom equipment industry's catch-up story also started.

Catch-up of Chinese telecom equipment industry occurred within three main stages; digital switches for fixed phones, wireless communication technologies (1G-2G) later third generation - 3G and China's innovative effort of TD-SCDMA (one of three global standard of 3G). In that transformation period, main strategy has been drawn around know-how and technology transfer from advanced countries, knowledge assimilation of indigenous industry and achieving in-house R&D and increasing innovative capability of Chinese indigenous telecom equipment industry.

> There are two different catching-up patterns in China's telecom-equipment industry. One is the "path-following" pattern driven by using new technology in a low-end market. For example, even Huawei takes part in the GSM area much later than the foreign multinationals; the company has attained astonishing success in the value-added part of GSM.....The other pattern is "stage-skipping" catching-up which tries to leapfrog some stages to the next-generation technology. This finding is substantiated by two examples. The first example is concerned with the development of China's own 3G standard (TD-SCDMA) byDatang. (Shan, Jolly, 2011: 167).

5.1 History of Chinese Telecom Equipment Industry

The emergence of Chinese telecom equipment industry is not a coincidence case. The industry has some specific features than other domestic industries of China; a high-tech industry and indigenous enterprises attained to significant success stories in only two decades. This period is studied within three phases; development of digital switches for fixed telephones, wireless communication technologies (1G-2G) and third generation wireless communication (3G) - TD-SCDMA. During this transformation period, main strategy was settled on improvement of innovation capability of telecom equipment industry.

Between 1949 and 1978, China was quite close, isolated and under the management of central planning system. Except the relationship between SSCB, there was limited contact with rest of the world in global perspective. Thus, there was limited know-how exchange with western R&D lobbies and foreign markets. In that framework, Chinese telecom infrastructure was inefficient and had poor and insufficient user penetration. Therefore, China state took a strategic political decision and determined communication as a national priority and defined one of the most strategic industries.

Thus, by open-economy reform of 1978, China changed political priority and focused on national construction and rapid economic development. Transition from central planning to market-dominated economy has commenced and foreign investments were allowed under state control. The

attractiveness of Chinese market was also used as an instrument for foreign investments by the state.

Major multinational telecom equipment manufacturers were strictly attracted by China's market size, mostly for sales opportunities and production operations by using the advantageous of low-cost labor. Meanwhile, foreign enterprises were not confronted by domestic competition between local suppliers, because of significant gap of technology level. Thus, foreign suppliers directly imported their products and attained to significant sales revenues in market.

Meanwhile, state authority also determined strategies in order to provide appropriate environment to enable know-how transfer from these foreign investments through local industry. The form of joint ventures (JVs) between SOEs and multinational enterprises were one of the most common models in industry.

> While technology gap was clearly recognized, one of China's agenda of opening its market to multinational corporations was to acquire technologies for domestic manufacturers in order to upgrade China's technology capability. In the early 1980s, multinational corporations were actively pursued through negotiating Joint Ventures (JV) and linking JV to equipment procurement contracts, termed as the strategy of "combining technology transfer with trade". (Tan, A. 2003:8)

Addition to joint ventures, forcing multinationals to set-up local R&D centers in China, technology licensing, localized manufacturing operations became other channels which enabled know-how transfer through local industry. These forms and technology transfer activities expanded indigenous industrial capabilities and triggered national R&D activities for telecom equipment industry.

In 1980s, central office switch suppliers, optic fiber and wireless communication equipment manufacturers launched joint ventures in China. Alcatel, Siemens, Nortel, NEC, Ericsson, Lucent could be exemplified. In late 1990s, Motorola, Siemens, Nortel and Lucent also launched joint R&D

facilities. These joint ventures aimed to deploy their existing technologies to Chinese market; however, these investments also directly and indirectly assisted to increase Chinese national technology production capacity. Besides, FDI sourced knowledge spillovers procured an important source for indigenous industrial capabilities.

> Realizing the attractiveness of its market size and the resulting bargaining power, the Chinese government actively approached multinational suppliers for technology transfer and joint venture negotiations. (Mu, Lee, 2005: 763)
> In general, after a new technology from the global market is imported and deployed in the Chinese market, it is gradually turned into local production by joint ventures, local subsidiaries of multinational corporations and indigenous manufacturers. (Tan, 2004: 82)

Although Chinese telecom equipment industry's growth story mainly started at end of 1980s, Chinese telecom market attained to rapid development at the beginning of 1990s. Meanwhile Chinese national equipment manufacturers began to emerge and increase their market share annually. Domestic firms enhanced their own technology production capacity specifically by reverse engineering, labor turnovers, imitation and international and domestic R&D activities.

> Qingdao-Lucent ever lost almost half of its testing team since these engineers got better offer from Huawei (Chinese telecom equipment firm) to participate in product development, and got better pay. (Feng, 2010: 216)

Evolution of telecom equipment industry mainly followed those technological trajectories; central office switches, optic fiber transmission systems, wireless mobile base stations and mobile handsets.

> From the end of the 1980s to the present day, the growth trajectory of CMTFs' (Chinese Telecom Manufacturing Firms) technological capability has experienced three main stages-technological acquisition/monitoring capability supporting appropriate technology import, incremental process innovation capability supporting gradual process innovation, and incremental indigenous technological innovation capability that integrates external knowledge with internal knowledge. (Wei et al., 2005: 360)

5.1.1 First Phase: Digital Switches for Fixed Phone Networks

China state selected signaling system No. 7, which is telephone signaling protocol for digital program controlled switches. By this open signaling system, various kinds of switches could access the same phone network. Main aim of selection this open system was to enable the entrance of many foreign companies with different kinds of products through the infrastructure and also encourage latecomer domestic firms in order to develop their own technologies. This was a state policy.

As another part of this approach, China's FDI policy after 1978 reform had effects on switch industry. Before 1978, China's telecom service providers had to buy telecom equipments from domestic suppliers with out-of-dated technologies and low quality. Before 1981, there was no Stored-Program-Controlled (SPC) central office switch in China. Firstly, by open-door policy direct import of up-to-date switching and transmission equipments were allowed.

> Direct imports from these multinational corporations continue to support most of China's high-end market. However, local subsidiaries and joint ventures of multinational telecom manufacturers currently supply a large percentage of the medium-end of Chinese market. Meanwhile, indigenous producers have recently emerged to dominate the low-end market and to aggressively compete in the medium-end market. (Tan, A. 2003:4)

Although domestic firms were able to manufacture only fixed telephone sets and several components, imported technology was the sole strategy in this period in order to meet the Chinese telecom equipment market needs. The first digital programmed control switch, F-150, was imported from Japan and established in Fujian Province of China.

Then, these import strategies were changed to support establishment of joint ventures with MNCs in order to upgrade technological capability of domestic manufacturers. Then, China state changed JV strategy from "accepting whatever is available" to "selective promoting and accepting" in 1987. Through this selective strategy Chinese government chose the best

partners and limited the number of JVs. As a conclusion of this policy, JVs were established with Alcatel (Shanghai Bell) and Siemens. (Tan, 2002: 21)

First foreign joint venture was Shanghai Bell Telephone Equipment Manufacturing Co. – Shanghai Bell was established in 1983. "System-12" was its brand and technology transfer agreement involved Belgian and Chinese governments, the Ministry of Posts and Telecommunications (MPT), Bell Telephone Manufacturing Company (BTM), International Telephone and Telegram Corporation (ITT) and the Posts and Telecommunications Industrial Corporation (PTIC) (Mu, 2003). Shanghai Bell's shareholders were, PTIC of MPT had 60%, Bell Telephone Manufacturing Company (BTM) had 32% and the remaining 8% belonged to the Belgian government. PTIC was responsible for providing land, buildings, facilities for plant and domestic marketing operations, BTM obtained the technology and Belgian government provided capital. Through this agreement, Shanghai Bell took nearly half of switch market in China via the assistance and support of Chinese government. (He, Mu, 2012). The main product was S-1240 and Shanghai Bell has become a major player in Chinese telecom equipment industry and in 1990s it was the largest producer of telecom equipment in China.

Another joint venture was established in 1988 with three Chinese partners and German Siemens; Beijing International Switching Company (BISC). Its main product was digital programmed control switch (EWSD) developed by Siemens. Additionally, Lucent established joint venture as Qingdao Lucent and began to produce the product of 5ESS-2000. Shanghai Bell, Huawei and BISC were the top three switch suppliers in 2000.

Table 17 shows main joint ventures in digital phone switch market in China. Most of equity share by Chinese partner is above 50%.

Table 17: Main Joint Ventures in the Digital Phone Switch Market

Product Type	Company	Multinationals	Equity share by Chinese Partner	Start Year of Production	Sales Volume (10000 lines) 1997
S-1240	Shanghai Bell	Alcatel Belgian	60%	1986	500
EWSD	Beijing International Switching Communication	Siemens Germany	60%	1992	300
AXE10	Nangjing Ericsson	Ericsson Sweden	43%	1993	80
NEAX-61E/61	Tienjing NEC	NEC Japan	60%	1994	70
5ESS	Qingdao Lucent	Lucent USA	49%	1995	150
DMS-100	Guangdong Nortel	Nortel Canada	60%	1995	100
F-150	Jiangsu Fujitsu	Fujitsu Japan	35%	1995	100

Source: "Key Industry Innovation" Project Team Report of Ministry of Science and Technology, 1997

> As the huge size of domestic market provided the government with strong bargaining power in dealing with multinational corporations (MNCs), the Chinese government could require three conditions to be satisfied when a foreign firm enters China to establish a joint venture in the telecommunication business. The first condition was that the Chinese side must hold a majority share of more than 50%, the second was that the foreign side must transfer important technology to the Chinese side, and the third was that the custom large scale integrated (LSI) chips used in telecommunication equipment must be produced within China (Zhu, 2000).

Although Chinese market was strongly dominated by foreign products because of joint venture operations, there was mismatch between the existing products and potential market needs specifically for rural regions. Joint venture products were mostly designed according to their home country market needs and these products' prices were also higher for towns and rural regions of China. Thus, the products were widespread mainly urban provinces of China; rural markets were neglected by foreign enterprises.

As a fact, innovation potential is also closely related with marketing operations; interactive relation between producer and user is inevitable fact for innovation process. Additionally, Xielin and Dalum claim that a gap or

mismatch between existing foreign products and actual market needs provides a key opportunity for domestic enterprises of developing countries. By moving this approach, Chinese domestic enterprises have grabbed at the opportunity and determined neglected markets and targeted to produce in order to meet rural market needs. This was the start-up point of newly emerging domestic telecom equipment firms; Huawei and ZTE would be Chinese biggest multinationals in telecom equipment industry after 2000s.

5.1.2 Second Phase: Learning about Digital Switch Technologies

In first years, the market was dominated by foreign companies. Domestic companies, universities and government research institutes were lacked of sufficient know-how about digital switch technology. Thus, knowledge flow from multinationals was vital to emergence of domestic equipment manufacturers.

> In 1983, while negotiating with foreigners in setting up a telecommunications equipment JV, a State Councilor Jinfu Zhang made it clear to Chinese industry that the goal was to acquire technology. As Zhang out it: "[The] strategy is to trade the market for technologies. We should import, assimilate and absorb high technologies from foreign partners" (quoted in Feng 2010, 74). (Lazonick, Li, 2012: 9)

Spillover from joint ventures through Chinese domestic enterprises was an important source in order to absorb and assimilate necessary know-how related to switch technologies. As a state policy and supported by related ministries, this strategy became beneficial about creating technology transfer channels[23].

[23]The Chinese industrial ministries intentionally organized engineers from other parts of the domestic industry to get training or job rotations at the JV firms. In cases like Shanghai-Bell in telecommunications equipment, this training was the JV returning the favors granted by the Ministry of Posts and Telecommunications (Mu and Lee 2005). In other industries like automobiles and semiconductors, the nation's elite engineers were mobilized to facilitate

According to Shan, Jolly (2011: 159-60), in earlier phases domestic firms, universities, research organizations did not have sufficient knowledge about digital switch technology. Knowledge diffusion from joint ventures to latecomers was critical (Mu and Lee, 2005). Meanwhile, joint ventures with foreign partners (for instance Shanghai Bell) gave opportunity to experience about core technological areas and operating and manufacturing about related technologies.

> Ministry of Post and Telecommunication (MPT) would sometimes use the advantage of that to ask Shanghai Bell to have R&D consortium with domestic firms. For instance, in the process of adapting the system-12 to the Chinese environment, Shanghai Bell cooperated with local universities and research institutes. This process brought about the diffusion of related knowledge and skills and later on conducted the success of indigenous switch, HJD-04 (Shan and Jolly, 2011: 160).

Mu, Lee (2005) studied on the growth of technological capability in telecom equipment industry of China. The study explicitly found determinative factors about catch-up; strategy of "trading market for technology", knowledge diffusion from Shanghai Bell (first JV) to research consortium and to Huawei, and industrial promotion by Chinese government.

> Labor turnover is an important mechanism for knowledge transfer. The MNCs usually recruited a lot of talented experts from Chinese companies. From interview with the CTO for Beijing Capital Telecommunication - an affiliate of China Putien (also the parent company of a joint venture with Nokia in Beijing) - we learned that Capital Telecommunication was the first Chinese company in mobile phone industry. The employees acquired a lot of knowledge through the joint venture with Nokia. But as a state owned enterprise it did apparently lack incentives to further innovation. The result was that a lot of engineers went to Huawei, ZTE and other Chinese companies. It meant that most of the earlier SOEs with advanced knowledge

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technology transfer (Feng 2010; Li 2011). In both cases, the JV firms became industry-specific "schools" for the domestic engineers. After gaining experience at the JV, many of these engineers moved on to higher salaries and even more challenging positions at emerging indigenous companies (Mu and Lee 2005). (Lazonick, Li, 2012: 10)

became large training schools for private companies[24]. (Xielin and Dalum, 2009: 461)

5.1.3 Third Phase: Awareness and Attempt to National Digital Switch

In 1986, the first national digital switch DS-2000 was developed by a government research institute under the Ministry of Posts and Telecommunications (MPT), however not succeeded in commercial side. Post and Telecommunication Industrial Corporation (PTIC) settled a new strategy in order to develop large scale digital switches; signed a contract with Zhengzhou Institute of Information Engineering of the People's Liberation Army. Luoyang Telephone Equipment Factory of MPT as the producer of crossbar switches and joint venture Shanghai Bell were also included to research consortia. The project team had experienced on Fujitsu F-150 system and this technical team developed a new type of digital switch which had superiorities of Fujitsu F-150 and Shanghai Bell's S1240 model and recent novelties on telecom technologies. (Gao, 2004)

After two years, in 1991, this research consortium developed a new switch HJD-04[25] which adapted a multi-processor distributed control system for the new switch. (Gao, 2004)

[24] Based an interview with Mr. Lai, former CTO of Beijing Capital Telecommunication, in 2006

[25] The first indigenous digital switches (HJD-04) in China were developed by a R&D consortium constituted of three organizations in 1991, including the Center for Information Technology (CIT) under the Zhengzhou Institute of Information Engineering of the People's Liberation Army, the Posts and Telecommunications Industrial Corporation (PTIC), and the Luoyang Telephone Equipment Factory (LTEF) of MPT. The CIT was the research arm of the Army and served as the initiator of the project; the PTIC was originally the procurement unit of the MPT and played the role of the general project manager and financial sponsor, and the LTEF was formally a producer of crossbar switches and later emerged as the initial producer of the HJD-04 (Mu & Lee, 2005). To produce the HJD-04 in a large scale, the consortium cooperated with the joint initiatives by the MPT and MET (Ministry of Electronics Industry) to establish a manufacturing company called Great Dragon (Julong). By 1994, the market share of HJD-04 had grown from zero to 16 percent. (He, Mu, 2012: 277)

> The research team of the HJD-04 started with conducting research on Shanghai Bell's system-12, using publicly available documents. Some of the other engineers participating in the development of HJD-04 were recruited from those who had participated in Shanghai Bell's system-12 project. Moreover, the Luoyang Telephone Equipment Factory (LTEF), the main manufacturer of the HJD-04 even sought direct technical help from the Shanghai Bell. As a result, the new product integrated the advantage of Fujitsu's F-150 (centralized control system), Shanghai Bell's S1240 (distributed control system) and computer design (Gao, 2004). Encouraged by government as well as its cost advantage, HJD-04 became a game winner in the market. To summarize, without the diffusion of the technology related to digital automatic switches embodies in the system-12 and other projects in the Shanghai Bell, the indigenous technological development of HJD-04 might not have been possible (Shan and Jolly, 2011: 160).

HJD-04 was not a large scale switch and designed for lower levels of network, on the opposite market position of dominant multinationals (MNCs) and JVs' switches which had targeted only high-end city markets. After research and development activities, HJD-04 was firstly commercially marketed by the company of Great Dragon which was established as an affiliate of Luyang Telephone Equipment Factory in collaboration with other Chinese SOEs. Great Dragon attained to a significant market share with national switch of HJD-04, product entered the market with a marginal price (nearly half price of similar products of JVs) and became the best seller in China by focusing on rural market which had been previously neglected by MNCs.

> In short, the success of HJD-04 stimulated the institutional, organizational and strategic changes to overcome the barriers among different technological disciplines and industrial systems as response to the emerging technological and industrial challenge. All these made HJD-04 a milestone in the history of China's telecom-equipment sector, and changed the technical trajectory and organizational pattern of Chinese domestic firms. (Feng, 2010: 207)

Under the leadership of MPT, technological know-how diffusion of HJD-04 was enabled through national telecom equipment industry. HJD-04 development team provided consultancy services for domestic telecom equipment firms of Huawei and ZTE.

> After the development of HJD-04 in 1991, knowledge diffusion was further amplified through the inter-flowing of engineers or related persons, which finally led to successive development of four types of digital automatic switches (EIM- 601, ZXJ-10, SP-30 and C&C08) by other indigenous firms. The later development of other types of digital switches by Jinpeng, ZTE (Zhongxing), Datang, and finally Huawei benefited from knowledge diffusion via inter-firm mobility of skilled engineers. (He and Mu, 2012:278)

Table 18: Breakdown of Market Share in Central Office Switches Market

	1982	1987	1992	1997	2000
Direct Import	100%	89%	54%	5%	0%
Joint Venture	0%	11%	36%	63%	57%
Indigenous Suppliers	0%	0%	10%	32%	43%

Source: Tan, 2004

Transformation of market from directly imported products to indigenous suppliers' equipment could be seen as in Table 18. In early 1980s, the market fully relied on direct imported equipment. In late 1980s and early 1990s, the new strategy was "attract foreign investment and absorb the technology" which increased the dominance of joint ventures in the market. The third stage aimed to "promote the indigenous equipment suppliers" via diffusion of technology with technology transfer and local R&D efforts of domestic firms. Thus, in 2000 indigenous suppliers attained to 43% percent, this segment did not have any market share in ends of 1980s. Starting from 10% market share in 1992 four domestic manufacturers- Great Dragon, DaTang (Datang), ZhongXing (ZTE) and HuaWei (Huawei) held 43% of the market. (Tan, 2002)

> Nations gain competitive advantage in industries or industry segments where the home demand gives local firms a clearer or earlier picture of buyer needs than foreign rivals can have. Nations also gain advantage if home buyers pressure local firms to innovate faster and achieve more sophisticated competitive advantages compared to foreign rivals. (Porter, 1990: 86)

Domestic telecom equipment firms Datang, ZTE and Huawei entered the digital switch market as latecomers, both of them focused on market segment of small-scale public switch for rural regions with their indigenously developed equipment. In that perspective, these domestic firms previously focused on Public Digital Switch Systems (PDSS) –C&C08, ZXJ2000 SP-30 etc. and this was a milestone for early growth of these firms. Satisfying low-end market needs and taking significant sales revenue provided considerable financial support for following innovative efforts of domestic enterprises; specifically for next generation technologies (wireless, mobile technologies etc.). In sum, China strategically localized the development and manufacturing of SPC switches with the evolution period of direct import, joint ventures and indigenous suppliers within nearly 20 years. Table 19 shows main switches designed and produced by indigenous firms.

Table 19: Main Switches Designed and Produced by Indigenous Firms

Products	Makers	R&D Institution	Sales Volume in 1996 (1000 lines)	Appraisal Date
DS- 30 Central office exchange	Shanghai Telephone Equipment Factory	MPT 1th Research Institute, MPT 10th Research Institute		1991
HJD-04 central office exchange	China Great Dragon (Julong) Telecommunication Group co. Ltd	MPT's PTIC (Posts & Telecommunications Industry Corp.), PLA's Zhengzhou Information Engineering Institute (college)	2300	1991
EIM-601	JinPeng Telecommunication Group Co. Ltd	MEI 54th Research Institute, Huazhong Univ. Of Science & Technology, Guangzhou Science and Technology Commission, MEI's Shijiazhuang Telecom Equipment Factory, Anshan City Electronic Bureau	100	1995

Source: Remade according to Pyramin (1996), He, Mu, 2012: 278

Table 19 (cont'd)

SP30 Central Office Exchange	MPT 10th Research Institute, Shanghai Telephone Equipment Factory	Datang corp., U.S. Start-up ITTI	600	1995
C&C08 Central Office Exchange	Huawei Technology Co. Ltd	Huawei Technology Co. Ltd	1800	1995
ZXJ10 Central Office Exchange	Zhongxing Telecom of Shenzhen	Zhongxing Telecom of Shenzhen	600	1995

During development own national digital switches, technology imitation and reverse engineering were major strategies for indigenous suppliers. For instance, Stored Program Controlled (SPC) central office switches were developed by MNCs (including Nortel, Alcatel, Lucent, Siemens) in more than ten years and significant R&D budgets. However, Chinese indigenous manufacturers (Great Dragon, Huawei, ZTE) developed their own switches within a few years by technology imitation and reverse engineering methods.

> The growth of the telecom equipment manufacturing and home appliances industries showed that multinational corporations transferred technology through the flowing path: transnational corporation, joint venture, Chinese joint venture partners, other enterprises. For example, the technology transfer of program-controlled switches was: transnational corporation (Bell), joint venture (Shanghai Bell), state-owned enterprises (Great Dragon Group), private Enterprise (Huawei, etc.). (He and Mu, 2012: 285)

For digital telephone switches (SPC switches), market share of local firms' (inc. sino-foreign joint ventures) products was less than 50% in 1980s, however, increased to more than 90% in 1996. In 1982 first foreign SPC switch was imported, but after only ten years China developed its own national digital switch with own intellectual property rights. 98 percent of newly added SPC

switches in China were made by local national firms; as Great Dragon, Huawei and ZTE (He, Mu, 2012).

> In 1996 and 1997, the former Ministry of Posts and Telecommunications hosted coordination meeting for indigenous switch customers. At two coordination meetings, the telecommunications sector signed a total of 22 million lines of intention contracts with manufacturers; the final actual implementation was 25 million lines. More than 60 percent of all new switch equipment orders in the 1998 were from indigenous manufacturing firms (Mu & Lee, 2005). (He and Mu, 2012: 285)

As emphasized in Hu et al. (2005) "R&D and Technology Transfer: Firm-Level Evidence from Chinese Industry" successful technology development is the consequence of joint contribution by government support, foreign investments, technology transfer opportunities and R&D effort of indigenous enterprises. Development of indigenous digital switch in China is the result of this kind of approaches.

5.1.4 Fourth Phase: Mobile Technologies

History of mobile technologies in China began with the deployment of wireless 1G phone system in 1987, a variant of 900 MHz TACS. MNCs Motorola and Ericsson were the major equipment providers. Only after 7 years, TACS system was replaced by Chinese government with new generation 2G technology GSM (European digital 2G technology). 2G market and infrastructure was also opened to foreign equipment suppliers and controlled by MNCs as in 1G. Major MNCs Ericsson, Motorola, Nokia, Siemens, Lucent and Northern Telecom dominated Chinese domestic 2G market for both of infrastructure and terminals. Table 20 summarizes profile of major telecommunication equipment manufacturers in China. All of these firms opened their first offices in 1980s and 1990s.

Table 20: Profile of Major Telecommunication Equipment Manufacturers in China

Vendors	First Office	Product Portfolio
Motorola China	1987	Mobile network equipment for GSM/GPRS and CDMA
Nokia China	NA	Mobile systems and handsets
Nortel	1994	Mobile networks, 3G, transmission and switching systems
Lucent	1984	Mobile network systems and optical transmissions
Ericsson	1985	Mobile Network Systems
Cisco	1994	High-End Networking Equipment
Huawei	1988	Fixed, mobile, optical networks, switching and next generation network
ZTE	1985	Switching, transmission, access and mobile communications

Source: ChinaNex.com and company information

In mobile market competition Chinese telecom equipment manufacturers attempted to search opportunity as in digital switch market, however, GSM technologies have much more strict patent protection than digital switch product group. Thus, Chinese domestic telecom equipment firms chose to enter the industry with an alternative technology to GSM in mid 1990s; CDMA which had been developed by Qualcomm-US. CDMA technology is 2.5G and provides higher voice transmission quality and less radiation. This could be an alternative for dominant and monopoly position of GSM in China. Chinese forerunner telecom firms Huawei and ZTE focused on the development on CDMA technology. Qualcomm licensed CDMA to Huawei, ZTE and Datang in fields of switches, base stations, handsets etc. because of Chinese government pressure and attractiveness of Chinese market. Meanwhile a state-owned corporation China Unicom decided to invest in CDMA technology, too.

As emphasized in above example, Chinese domestic forerunner enterprises entered to mobile market with manufacturing switches, base stations, handsets etc. with the license agreement of Qualcomm's CDMA

technology. This strategy brought significant sales revenue for Chinese domestic firms in both of domestic and international markets. Besides financial achievement, this attempt brought high-segment know-how related to mobile technologies and next generation technologies-3G, 4G.

On the other hand, Huawei and ZTE used alliance strategies with foreign forerunners in order to transfer advanced technologies. Huawei established a joint digital signal processing laboratory with Texas Instruments. This joint laboratory aimed to develop DSP (Digital Signal Processing) products; for instance chipsets for mobile terminals. Additionally, Huawei also set joint labs with Motorola, SUN and Lucent and established partnership with 3Com and Nortel. Besides, US, Russia, India, Sweden, Turkey were some of abroad R&D centers. Huawei established R&D center- Chip R&D institute- in Silicon Valley in 1993, also Telecommunication R&D Institute was established in Dallas in 1999 and another important R&D center was also established in Stockholm, Sweden in 2001. These three centers mainly focused on chip, telecommunication and CDMA technology.

After 1G and 2G technologies, the third generation mobile communication infrastructure created a new opportunity to Chinese telecom equipment manufacturer firms via their previous experiences which come from digital switches, 1G and 2G markets. This attack could be defined as a leapfrogging catch-up, because by this attack China succeeded development of one of three internationally approved 3G standards; TD-SCDMA. This is a national state-supported strategic decision in order to leapfrog into the next generation technology.

China 3G market had been dominated by these two technology standards of US and EU. Chinese infrastructure had to pay significant amount for patent holders with license agreements. Thus, state research institutes and universities began to research on alternative technologies for 3G standards of W-CDMA (European) and CDMA2000 (US) by encouragement of MPT (Ministry of Posts and Telecommunications) and Ministry of Science and

Technology. This kind of interventionist strategy was also seen by EU in 1980s. In Europe, development of GSM standard was encouraged initially by state-owned telecom operators and also European Commission in 1980s.

5.1.5 Fifth Phase: Chinese Standard of 3G; TD-SCDMA

Datang- is a former state research institute under Ministry of Post and Telecommunication- is the most important actor during TD-SCDMA development project which is the most innovative effort of Chinese telecom equipment industry. Through this project, China mobile technology industry became patent holder by state supported innovation project.

Datang was structurally transformed into a SOE (state owned enterprise). In time, Datang had significant experiences about digital switches for fixed lines, additionally, focused on 1G and 2G-GSM network technologies via government encouragement.

TD-SCDMA development period could be summarized as follows. Researcher Chen Wei (from Motorola –US) and Xu Guanhan (University of Texas) focused on development of a new wireless network technology to bypass Qualcomm's CDMA. After one year, these researchers contacted with Research Academy of Post and Telecommunication. They established a start-up company of CWILL (means China Wireless Access) in US. The company developed "uplink synchronous technology" which is core technology and the new system was designed on that technology named as SCDMA (synchronous CDMA- SCDMA originally obtained wireless accession between fixed networks and fixed terminals.) Then, joint venture "Xin Wei" was set up by Research Academy of Ministry of Post and Telecom and CWILL. The main focal points of the company were smart antennas and synchronous uplink SCDMA wireless access to core system.

At last, after a successive development period, new alternative system was developed; TD-SCDMA (Time Division – Synchronous Code Division

Multiple Access). One of the foremost advantages of this technology is higher frequency spectrum utilization and TD-SCDMA (uses 1.6MHZ bandwidth) system capacity is several times bigger than other two 3G standards (WCDMA and CDMA2000). In 2000, this new technology was approved by International Telecommunication Union (ITU) as one of three 3G mobile communication standards; development of this system has been the most important innovative success for Chinese telecom equipment industry.

Although business and development operations need long term and costly operations (chips, terminals, operational platform, network management and optimization systems, operation support and business support systems etc.) Chinese government put pressure to support the industrialization of TD-SCDMA. Thus, a joint group was set up by The State Development and Reform Committee, Ministry of Science and Technology and Ministry of Information Industry; TD-SCDMA Alliance was settled.

On the other hand, multinational telecom companies and Chinese domestic firms contributed to development and industrialization projects of TD-SCDMA. Datang signed a cooperation agreement with Siemens which is now a part of Nokia-Siemens Networks in the scope of a development project in two subfields; base stations and terminals. In this agreement, Siemens almost completed base station developments however the project of terminal development was cancelled because of Siemens' wireless communication problems and delay of the launch of TD-SCDMA.

The leader Chinese telecom equipment manufacturing companies (Datang, Huawei, Potevio) have also joined to TD-SCDMA alliance by establishing joint ventures with foreign companies in order to develop and commercialize TD-SCDMA. Huawei established joint venture with Siemens in 2004 focuses on research and development of TD-SCDMA and also manufacturing, sales and service activities. (Siemens holds 51% share, Huawei 49%) (People's Daily, 2004), Potevio established joint venture with Nortel in 2005 focuses on TD-SCDMA development; (Potevio holds 49%, Nortel 51% share) (Beijing Evening Daily, 2005), Potevio also established joint venture

with Nokia in 2006 in order to construct TD-SCDMA base stations; Potevio has 51%, Nokia has 49% share (China Economy Network, 2006). Additionally, Alcatel and Datang, Ericsson and ZTE, NEC and Torch also established joint ventures related to TD-SCDMA technology and development opportunities.

The responsibility matrix of partners for TD-SCDMA development operation is illustrated as in Table 21;

Table 21: Partners of TD-SCDMA

TD-SCDMA	**Companies**		
System Equipment	**Datang**	Nortel	UTStarcom
Network Equipment	Siemens	**Huawei**	**ZTE**
Base Band Chipset	TI	T3G (Datang, Philips, Samsung)	STMicroelectronics
Commercial Handset	Samsung	LG	Soutec, Legend
Testing Equipment	Agilent	Tektronix	Rhode and Schwartz

Source: Fan 2006a, Chinanex 2005

Share of granted patents of MNCs and Chinese domestic enterprises for TDD and SCDMA technologies are listed in Table 22. As shown patents are shared by each company which are the part of this development consortium.

Table 22: The share of granted patents in TDD and SCDMA in TD-SCDMA

	Siemens	**Datang**	**Huawei**	**ZTE**	**Nokia**	**Motorola**	**Qualcomm**	**Others**
Share in TDD %	21,6	12,2	10,1	7,4	4,1	2,7	6,1	35,8
Share in SCDMA %	21,2	15,2	12,1	24,2				27,3

Source: IPR in TD-SCDMA

Chinese government postponed the launch of 3G schedule several times because of delays during development of TD-SCDMA. Essentially, government could have launched 3G with imported standards as in many

countries; with WCDMA (EU) and CDMA2000 (US). However, government planned to support TD-SCDMA and give an opportunity to get share in national market and thus prove its potential. TD-SCDMA is a state-supported innovation project in which most of R&D budget of TD-SCDMA project came from Chinese state-owned bank loans[26].

After the launch of third generation wireless communication by Chinese government, 3G standard selection was conditioned under the impact of state, mobile operators and equipment manufacturers. In fact, if Chinese operators selected W-CDMA or CDMA2000 technologies for 3G network, would invest smaller budget because of operating in same standard family (for instance; previous standard is Qualcomm's (US) 2G CDMA), however, China Mobile (state owned operator), which is world's biggest operator in the scope of number of subscribers, chose to change the infrastructure radically and move through the national technology standard; TD-SCDMA. China Telecom selected CDMA2000 and W-CDMA became 3G standard for merger of China Unicom and China Netcom.

Chinese authorities consider TD-SCDMA as a national hero. China mainly aimed to change the monopoly of foreign standards (CDMA2000 and WCDMA) by nationally developed core technology and decrease the domestic companies' patent fees which are paid to foreign corporations (Shen, Jolly, 2011). Although Chinese multinationals Huawei and ZTE spend significant resources (both of financial and R&D staff) on development of TD-SCDMA,

[26]MII (Ministry of Information Industry) gives vigorous support to TD-SCDMA development, arranging special funds as part of mobile projects and electronic development funds. MII and MST (Ministry of Science and Technology) and other government departments have invested 1 billion RMB ($120 million) since the late 1990s, involving nearly 3,000 scientists and engineers across the country. A team of 10 thousand technicians and researchers have been involved in the research, development and market promotion in 3G mobile services. In 2002, MII established the TD-SCDMA industry alliance with other ministries. They also support theoretical research in TD-SCDMA, including design and R&D in crucial chips, system, antenna, terminal, network plan, testing and construction. MII invites more and more Chinese and foreign manufacturers to join the alliance. At present, more than 50 manufacturers are engaged in the development of TD-SCDMA.. - Liu Jin (2005) Summarization of MII's Promotion of TD-SCDMA Development, China Electronics. (Yan, 2007: 7)

they pay heavy license costs for W-CDMA and CDMA2000 in order to develop their solutions for international markets.

> **China Wants TD-SCDMA to Take 20% of 3G Market by 2020**: The Chinese government wants the Chinese 3G technology, TD-SCDMA, to gain a 20 percent share of the overseas 3G market by user number by 2020, according to a long-term development plan for mobile communication drafted by the Ministry of Industry and Information Technology (MIIT), an industry expert told Interfax on June 2,2009. (http://www.cn-c114.net/583/a418611.html)

Xiaojie defines this relationship in the study of "TD: the MII's daughter is difficult to get marry". MII is the King, TD-SCDMA is the daughter of the King and mobile operators are the quasi-sons-in-law, defines the relationship as a marriage story. Although mobile operators are more close to other beauties (WCDMA and CDMA2000) because TD-SCDMA is not as beautiful as the rivals and pressure from other "fathers in law", the King puts its pressure to marry with his daughter.

> After China submitted its 3G file to the ITU, manufacturers from Europe, America and Japan unanimously opposed to it immediately. MII gave a tough stand right away: "Even foreign forces tried to block the Chinese standards to be adopted, the Chinese market has sufficient space to support their own standards, we are fully capable to develop and operate TD-SCDMA in China!". Taking into account the importance of the Chinese market and unwillingness to offend the Chinese government, the large telecommunications manufacturers did not take more radical opposition this time. (Yan, 2007. 6-7)

In sum, TD-SCDMA is an important attempt of indigenous innovation in Chinese telecom industry. The project includes a value chain which covers core system, chips, terminals, software systems, test environments, TD-SCDMA mobile phone, data cards etc. Thus, there is network of production around TD-SCDMA and this value chain will also bring great value for national economy.

To increase effectiveness of the collaborative environment, TD-SCDMA Forum was established in December 2000 by Chinese government support. Co-founders were China Mobile, China Telecom, China Unicom,

Datang, Huawei, Motorola, Nortel and Siemens. That form was renamed as TD Forum in 2009, January.

> China Mobile, the largest wireless carrier in the country, and also the largest in the world based on the number of subscribers, is expected to reach a number of over 100 million 3G subscribers by 2011. During the 2009 Sino-Japan TD-SCDMA Collaboration Conference, Yang Hua, secretary general of the TD-SCDMA Industry Alliance, said that this was the 3G-subscriber base the carrier should reach within the following two years. (http://news.softpedia.com/news/China-Mobile-to-See-100-Million-3G-Subscribers-by-2011-127008.shtml)

International telecom operators, research institutions, member of the forum organize China TD-SCDMA International Summit yearly to discuss several main topics related to TD-SCDMA and sub technologies, globally. Board members are three telecom operators of China; China Mobile, China Unicom, China Telecom, Chinese domestic and multinational telecom equipment firms; Nokia, Alcatel-Lucent, NSN (Nokia Siemens Networks), Motorola, Ericsson, Qualcomm, InterDigital, Huawei, Datang Telecom, Potevio, TCL.

5.2 Chinese Major Telecom Equipment Manufacturers

In this part, Chinese major telecom equipment manufacturers will be studied; Great Dragon, Huawei, ZTE, Datang Telecom Technology Corporation. All these firms have been established after 1978 Chinese transition from closed system to open market economy, are encouraged and have close relations with state research institutes and all of them spend approximately more than 10% of revenue for R&D operations annually.

5.2.1 GREAT DRAGON

One of the first attempts of Chinese state to take market share from joint ventures companies was the establishment of Great Dragon which began in 1989 as a research endeavor at military university of Zhengzhou College of

Information Engineering in order to develop indigenous national switch. The main project was to develop an advanced indigenous switch and start to work with only seventeen people. (Harwit, 2008)

Its core product model was launched in 1991; first indigenous large-scale PDSS in China- HJD-04. In 1991, research consortia; army research institute PLA (People Liberation Army) Information Colleague and Potevio Group developed Chinese self-developed switch HJD-04 in 1991. HJD-04 was not a large scale switch and designed for lower levels of network.

The succession of Great Dragon was a milestone for national capabilities of Chinese telecom equipment industry, Great Dragon took 14% market share in 1998 (Mi and Yi, 2005).

> By 1994, switch sales from these factories totaled some 2 million ports, nearly all of the solely Chinese-owned production, and about 10 percent of the nation's market that year. The cost of the switch was some 450-500 yuan per port or about $55, at a time when imported and joint venture switches, such as those made by Shanghai Bell, cost $100 or more per port. (Harwit, 2008: 123)

Great Dragon was the first success in Chinese market by self-developed low price/good quality switch of HJD-04. However in time Dragon did not introduce any new successive products and lost its place to Huawei and ZTE in market.

5.2.2 ZTE (Shenzhen Zhongxin Technology Corporation)

ZTE was founded in 1985 by a group of engineers affiliated to Ministry of Aerospace Industry. The aerospace industry in China has a quasi-military characteristic. In fact, there are limited information about ZTE's history and shareholders. ZTE's state-owned position and China state's strict protection strategies could be counted as the reason of insufficient information about the company.

ZTE is a government initiative to support Chinese national capability in telecommunication equipment industry.

Table 23: ZTE Shareholders

Name of Shareholders (Shareholdings of top ten shareholders)	Nature of Shareholders	Percentage of shareholdings (%)
Zhongxingxin	State owned Shareholders	32.45%
HKSCC Nominees Limited	Foreign Shareholders	18.27%
China Life Insurance Company Limited — Dividend — Individual Dividend — 005L — FH002 Shen	Others	1.28%
Guangfa Jufeng Stock Fund	Others	1.18%
China Post Core Growth Stock Securities Investment Fund	Others	1.12%
Hunan Nantian (Group) Co., Ltd	Others	1.09%
China Life Insurance Company Limited — Traditional — General Insurance Products — 005L — CT001 She	Others	0.83%
Industrial Global View Securities Investment Fund	Others	0.75%
E Fund Selected Value Stock Securities Investment Fund	Others	0.73%
E Fund SZSE 100 ETF	Others	0.68

Source: ZTE Annual Report, 2011.

As shown in Table 23, ZTE is a state-owned company. The biggest shareholder of ZTE Zhongxingxin (32.45%) also has its shareholders. Zhongxingxin's shareholders are also listed in below table.

Table 24: Zhongxingxin Shareholders

The controlling shareholder of the Company: Zhongxingxin was jointly formed	Shares
Xi'an Microelectronics	34%
Shenzhen Aerospace Guangyu Industrial (Group) Company Limited ("Aerospace Guangyu")	17%
Zhongxing WXT	49%

Source: ZTE Annual Report, 2011.

Table 24 shows the shareholders of Zhongxingxin. Xi'an Microelectronics (established in 1965), a subsidiary of China Aerospace Electronics Technology Research Institute, is a large state-owned research institute. The second authority Aerospace Guangyu is a subsidiary of CASIC Shenzhen (Group) Company, is a wholly state-owned enterprise, established in 1984. The business scope includes aerospace technology products, mechanical products, electrical appliance products, apparatuses and instruments; electronic products, plastic products, chemical products, hosting and transportation products, hardware and furniture, construction materials, magnetic materials, powder metallurgy, Chinese-manufactured automobiles, raw materials for textile, raw materials for chemical fiber, apparel, textile and warehousing. Third authority, Zhongxing WXT is a private high-technology enterprise incorporated in 1992. Business scope includes development and production of telecommunication and transmission equipment, ancillary equipment, computer and peripheral equipment. (ZTE Annual Report, 2010)

Yan (2011) has also comments about history of ZTE and strongly emphasizes the role of state in the stage of ZTE's establishment.

> ZTE was established by Hou Weigui, who was sent to Shenzhen from a state owned company to explore cooperation opportunity with Hong Kong company. In the very beginning, they also tried electronics production for Hong Kong companies, and then they realized that it was very impossible to import technology from Hong Kong, and they did not want to forever work as OEM production. Then they decided to do their own research. (Yan, 2011: 18)

ZTE also a R&D focus company as Huawei; there is nearly 32.8% of human resources responsible for R&D operation of ZTE. The second rank also belongs to manufacturing related sources; nearly 27% of human resources are responsible for manufacturing operations, as shown in Table 25.

Table 25: ZTE Human Resources

Employee Specialization	Number of Employees	Approximate percentage of total number of employees (%)
R&D	27,941	**32.8%**
Marketing and Sales	12,987	15.2%
Customer Service	12,99	15.3%
Manufacturing	22,855	**26.8%**
Administration	8,459	9.9%
Total	85,232	100%

Source: ZTE Annual Report 2011, 46

ZTE's operating revenue attained to RMB 84.22 billion in 2012; includes domestic and international market revenues; amounted to RMB39.56 billion and RMB44.66 billion, respectively. (ZTE Annual Report 2012: 14). ZTE also attained to significant sales revenue as a GSM vendor[27].

In first years, ZTE was a small-scaled company to produce household electronic appliances. In time the company decided to enter telecom equipment industry with telephone technology and PBX. Feng (2010) tells this story as;

> ZTE decided to enter the telecom-equipment sector. Its members had experience regarding the electronics and semiconductors technical development when working in the No. 691 factory. ZTE turned to the Post and Telecom-equipment Plant of Shaanxi Province (SPTE) to look for support related to the traditional telephony technology. SPTE had already developed a prototype of a PBX, which was based on analogue crossbar technologies, only with the capacity at 32line/unit. Their cooperation started from 1986, ZTE

[27] ZTE Joins World's Top Three GSM Vendors; 10 February 2010, ZTE Corporation is a leading global provider of telecommunications equipment and networking has announced at the GSMA World Mobile Congress Barcelona 2010 that its global GSM sales continued to grow fast in 2009, with a shipment of over 750,000 carrier frequencies in the past year. As its share in the global newly added market rose to almost 20%, ZTE is now one of the top 3 equipment vendors in the industry...From 2004 to 2009, ZTE's GSM product sales already maintained a growth of over 100% each year, obtaining the fastest growth in the industry. ZTE's GSM markets are mainly distributed in over 70 countries.
(http://wwwen.zte.com.cn/en/press_center/news/201002/t20100210_180305.html)

> invested most of money it had earned to industrialize this model, namely the ZXJ60. (Feng, 2010: 208)

In time, MPT (Ministry of Posts and Telecommunications) focused on the differences between telecom infrastructure of urban and rural regions of China, because MNCs neglected to sell products for peripheral markets in first years. Thus, MPT decided to encourage indigenous firms to develop PBX and small PDSS for peripheral markets. ZTE was one of the firms which have been included in official recommended list for telecom operators in rural areas. (Feng, 2010)

As the conclusion of this strategy, ZTE began to cooperate with government research institutes- such as, No.10 Research Institute, Nanjing College of Posts and Telecoms- and developed its own switch ZXJ2000 and attained to significant market share in rural market. This was a significant success story and the revenue of this operation funded the next time researches and product development projects of ZTE.

In time, emergence of mobile technologies also created a new opportunity for Chinese telecom equipment industry and also ZTE. Technology licensing and manufacturing under these technologies were popular strategy for ZTE. Through this strategy, ZTE signed license agreement with Qualcomm; Qualcomm has granted ZTE a license under Qualcomm's CDMA patent portfolio to develop, manufacture and sell cdmaOne and third-generation (3G) CDMA2000 1x/1xEV network equipment.

Addition to technology licensing, ZTE also focuses on R&D operations in order to increase value-add in telecom equipment market as Huawei. In a general manner, R&D in telecommunication industry could be grouped within three layers; physical layer of research (basic algorithm research), software development and technology application development. Specifically, second and third layers require certain amount of R&D personnel. Chinese telecom industry has great amount of human research (low-cost and well educated

engineers) which provides comparative advantage against other foreign competitors of US and EU. Huawei and ZTE use this source mostly in R&D activities in order to take advantageous against competitors, specifically for second and third layers of development activities in telecom industry.

The most common technology development method of forerunner firms, Huawei and ZTE, was import of foreign technology or product and assigning large amount of knowledge-intensive employees in order to imitate and modify and upgrade the imported technology. Additionally, Yan, H.'s interview indicates that Huawei improves R&D level annually and has started to core technology development, mostly uses Chinese universities' academic resources via joint resource projects.

Furthermore, ZTE has also significant amount of qualified employees and mostly focus on application development- third stage. Mobile terminals (design and production), PHS and access networks are the main product groups. ZTE also plays an incubator role for Chinese telecom equipment industry. ZTE incubates both of mobile phone design and production companies and major terminal design companies. There are many companies which spin off from ZTE and these companies also play significant role for research and innovation potential of the sector, because these firms provide significant infrastructure for key innovative activities.

5.2.3 HUAWEI (Huawei Technology Corporation)

How has Huawei transformed from a telecom equipment importer through a global giant with own technology and products in only two decades?

Today, Huawei Technologies Corporation (Huawei) is a multinational enterprise in telecom equipment industry and the largest telecom-equipment provider in China. Huawei is one of the leader suppliers of next-generation telecommunication network solutions in all world. Until 2006, 31 of world's

top 50 telecom operators (Vodafone, BT, Telefonica, FT/Orange and China Mobile) selected Huawei as corporate partner (Shan, Jolly, 2011: 159). Huawei has been spending up to 10% of its total revenue for research and development activities for years. Huawei deployed its products or services over 140 countries and have been serving for 45 of the world's top 50 telecom operators.

According to 2012 Annual Report, Huawei achieved CNY220.2 billion (US$35.35 billion) in sales revenue and CNY15.38 billion (US$2.47 billion) in net profit in fiscal year 2012. Huawei announces itself as industry leader in mobile broadband, optical transmission, optical access, and core networks.

Table 26: Five-Year Financial Highlight

CNY Million	2012 (USD Million)	2012	2011	2010	2009	2008
Revenue	35,353	220,198	203,929	182,548	146,607	123,08
Operating Profit	3,204	19,957	18,582	30,676	22,241	17,076
Operating Margin	9.1%	9.1%	9.1%	16.8%	15.2%	13.9%
Net Profit	2,469	15,38	11,647	24,716	19,001	7,891

Source: Huawei Annual Reports of 2008-2012

As shown in Table 26, Huawei is a multinational telecom equipment corporation with nearly $36 billion revenue of 2012 and with 9.1% operating margin.

5.2.3.1 Huawei's Birth and Growth

Huawei was set up in Shenzen economic zone as a privately owned enterprise in 1988 with registered capital of RMB 20.000. Ren Zhengfei is the co-founder and CEO of Huawei.

> As the founder, Ren only holds 1.42% while the rest 98.58% are owned by 65% internal employees through two unions, which endows organizational members the sense of participation and the foundation for being mobilized and integrated. During our investigation, some Huawei engineers said, ―*our boss has only very small share of this firm – Huawei is not his private property.*

However, he can work so hard, day and night for the collective. Certainly we shall also do like this![28] (Feng, 2010: 251)

Huawei's first operation was reselling imported small-scale telephony switches and fire alarms. Addition to sales operations, Huawei became the distributor of HAX switch of Hong Kong company, thus, Huawei accumulated capital by transit trade. After several years of imported equipment sales operation, Huawei management team decided to develop independent design Huawei branded telephone switches. By the advisory of Huazhong Science and Technology University professors, Huawei began to develop small scale switch systems with reverse engineering imported switching devices and network equipment. During this time, many attempts were failed; however, in 1990 analog private SPC switch HJD48 with 512 lines and in 1992 the rural terminal switch JK1000 was developed. This small-scale switch system became popular in China's countryside markets.

After this succession, Huawei began to invest in R&D for large capacity central office SPC switches. Huawei R&D team firstly developed the central office SPC exchange CC08-A with 2000 lines in 1993, and then developed CC08-C with 10.000 lines in 1995 (He, Mu, 2012). During these R&D projects, Huawei team also worked with uncommon tradition of work. He and Mu (2012) gives an impressive example in order to show the effort and willingness of employees. This could be defined as China specific work culture in which engineers work, eat and sleep in their offices[29].

[28] It is according to the interview with LIU ChunQiang (2003,2005) and CHE HaiPing (2003).

[29]In the process of researching SPC switches, Huawei formed a special corporate culture, including the well know ''mattress culture'' and ''eating culture''. ''Mattress culture'' held that in order to finish new product R&D as soon as possible, Huawei's founders worked, ate and slept in their office. They just covered a mattress and put it under their desks. From then on, newcomers were given a mattress and an area of carpet when they joined Huawei. Even now, the president and many whitecollar employees have mattress under their desks. ''Mattress culture'' has embedded the firm with the spirit of collectivist effort and survival. ''Eating culture'' was formed by R&D division engineers. Since they usually worked facing computer screens day and night, they had no time to meet and communicate with each other. So they adopted a way of ''talking while eating'' while having dinner or lunch together at restaurants around Huawei. Following the growth of Huawei, they moved their office many times, accordingly restaurants nearby their offices grew prosperous on account of their ''eating

After this effort, Chinese first large-scale digital program control switch was launched. Huawei had transformed the certain amount of budget for R&D activities of C&C08 switch which would be the flagship of Huawei product group and provide the infrastructure for Huawei's today leading position (Milestones of Huawei). Meanwhile not only Huawei, other Chinese telecom giants, ZTE, Great Dragon Telecommunications (GDT) and Datang also developed own large scale switch systems.

When Huawei entered the market, Chinese telecom equipment market had been dominated by multinational foreign enterprises and there were certain competition in the market. Huawei focused on the rural market, which had been neglected by foreign enterprises.

After C&C08 switch was launched to market successfully, Huawei's R&D resources were transferred to synchronous digital hierarchy (SDH) of the optical fiber networks. Then SDH products were presented to market and next step became data network equipment. In early 1990s, Huawei focused on wireless field and 1G technologies. Since late 1990s, Huawei began to diversify the product group as; access equipment, optical transmission, data and wireless network product fields by accumulated know-how sourced from R&D activities of large scale digital switch technology. The sudden enlargement of Huawei organization caused to inefficiency in management. Thus, Huawei decided to enlarge within an institutional framework and therefore worked with international consulting companies to get advice related to managerial systems, human resource management, quality control etc.

Huawei settled a new collaboration with one of forerunner MNC, IBM, in order to respond to market needs faster by using IBM's system of integrated product development (IPD) and integrated supply chains (ISC). IPD (Integrated Product Development) was implemented to improve the efficiency of Huawei's R&D activities in 1998. R&D activities mainly focused on functional results and generally ignored quality and service topics in earlier

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culture'' (Cheng, 1999). ''Eating culture'' has prompted engineers' communication and cooperation on technology innovation. (He, Mu, 2012: 279)

periods. Although this strategy provided rapid response to customer needs and problems, product quality was mainly ignored specifically at development stage. ISC (Integrated Supply Chains) was also an important tool in order to decrease Huawei's operating cost.

Moreover, collaboration with IBM assisted to Huawei's transformation period through being a global giant, especially in the late 1990s. Huawei transferred and assimilated advanced management systems via IBM's assistance role in order to reform the enterprise culture through international standards. Huawei also cooperated with leading management consulting companies such as PricewaterhouseCoopers, Hay Group (US) and Fraunhofer-Gesellschaft (Germany) in order to take consulting services specifically about quality control, human resources management and finance. As seen, not only technology, management methodologies were also transferred from multinational corporations.

After mobile technologies emerged, Huawei has focused on mobile systems development and manufacturing operations by 59% as illustrated in Table 27. Today most of revenue comes from mobile technology products and services.

Table 27: Huawei R&D Investment by Product Line, 2004

Product Lines	**Percentage**
Mobile Networks	59%
Software	15%
Data Communication	13%
Optical Transmission	10%
Fixed Networks	3%

Source: Market Avenue Report

In order to get the benefit of mobile technologies market, Huawei signed license agreement with Qualcomm, pioneer and world leader of Code

Division Multiple Access (CDMA) digital wireless technology. [30] Huawei successfully combined technology license and its R&D and manufacturing capabilities and began to increase market share of mobile technologies in both of China and world markets.

In order to analyze Huawei's innovation capability;

> As at 31 December 2010, Huawei had accumulatively filed 49,040 patent applications i.e. 31,869 patent applications in China, 8,892 international patent applications under the Patent Cooperation Treaty, and 8,279 overseas patent applications. Of the 17,765 authorized patents granted, 3,060 were overseas patents. In addition, Huawei holds a leading position in terms of essential LTE patent applications. (Annual Report, 2010: 18)

Huawei is domestic leader for patent applications in China since 2002 and became the fourth largest global patent applicant in 2007.

> In 2006, Huawei has been rising from a 3G technology leader to a market leader with its strong competitive abilities and leading advantages in the new-generation UMTS/HSPA Node B. According to its Annual Report (2006), Huawei won 32.9 percent of market share in the new UMTS/HSPA markets. The new-generation UMTS/HSPA Note B has been widely deployed around the world, with a 44 percent of global unit shipment market share by the end of 2006.... The success of Huawei's catching-up relies on its rapid and precise reaction and more important, its self-developed technology. (Shan, Jolly, 2011: 163).

2012 annual R&D expenses were CNY 30,09 million, as of 13.7% of sales revenue. Huawei has over 70,000 product and solution R&D employees, comprising more than 45% of our total workforce worldwide. Huawei has set up 16 R&D centers in countries that include Germany, Sweden, the US, France, Italy, Russia, India, and China (Annual Report, 2012). Huawei also has

[30]Qualcomm announced that it has signed a commercial license with Huawei Technologies, one of the largest domestic infrastructure providers in China. Under the terms of the royalty-bearing license agreement, Qualcomm has granted Huawei a license under Qualcomm's CDMA patent portfolio to develop, manufacture and sell cdmaOne and third-generation (3G) CDMA2000 1X/1xEV network equipment. The license grants Huawei the right to use QUALCOMM's patented technology and chipsets to make and sell cdmaOne and CDMA2000 1X equipment in China and worldwide. (Business Wire, 2001)

20 joint innovation centers with leading telecom operators in order to transform the advanced technologies through business successes.

5.2.3.2 Internationalization Period

Success on domestic market encouraged international operations of Huawei. There were several main reasons for international investments; although Chinese domestic telecom market supported growth and expansion of Huawei, fierce competition with multinational rivals was also a strong problem mostly for urban markets. Additionally, rapid innovative characteristic of telecom industry requires investing on R&D activities in order to enhance the competitiveness and maintain sustainable development. Thus, internationalization approach aimed to increase the cooperation opportunities with leading foreign parties.

According to Cheng (2006); some researchers claim that Ren's internationalization strategy was also influenced by Mao Zedong whose "guerilla war strategy" guided Huawei during the partial battles with multinational telecom rivals specifically in early terms of internationalization period. Chen adds that customer-centric strategy of Huawei is another important characteristic of this success story.

Good reputation and international brand images are quite significant for international operations. However, Huawei had unfamiliar brand name and product reliability problems in previous years. Overseas customers did not aware about Chinese telecom equipment industry and perception of low quality standards of Chinese products was common belief. Against Huawei, rival MNCs have been already operating in international markets for years and have brand awareness and large number of loyal customers in many countries. Huawei management team indicated that problem as an obstacle for their internationalization attempt; thus, spend $1 billion for brand internationalization operations. Addition to financial side, Huawei ordered

tours for overseas customers. In ends of 1990s, Huawei aimed to overcome the world's understanding of "China produces low-cost and low-quality products". Thus, worldwide potential customers were invited to Huawei plant in Shenzen in order to demonstrate the effects of Chinese economic reform and also Huawei's products quality and effectiveness in 1990s.

Huawei's major internationalization strategies were technology oriented R&D, price competitiveness and offering value added products. Huawei's internationalization activities started within Hong Kong and continued with Russia, Asian and African countries, and Europe and North America. The time plan for entrance to these markets was prepared according to the difficulty and competition levels of these markets. In 1996, Huawei got an agreement with Hutchison Telecom (one of largest telecom service providers) of Hong Kong in order to provide fixed line network products. Huawei's price advantage was an important factor about this agreement; on the other hand, higher standard requirements of Hutchison increased Huawei's capability and prepared for differentiated global market needs.

Operations and investments in Russia, South America and Africa become important references of Huawei for international operations. Huawei began to explore the Russian market in 1996. Huawei entered Africa and Latin American markets with the price of about 30% lower prices than of EU and US similar product ranges. One of the foremost reasons of this price advantage is low cost R&D oriented technical staff, rather than low cost manufacturing operations. In 1999, Huawei signed first international contracts in Yemen and Laos. Additionally, Huawei entered Saudi Arabia, United Arab Emirates, South Africa, Egypt, Thailand, Singapore, Malaysia markets.

Huawei's operations entered to the European market with deployment of Synchronous Digital Hierarchy (SDH) system in Berlin in 2001. European Headquarters were set up in United Kingdom and it was the largest investment by Chinese enterprises in UK in 2004. Next year, British Telecom selected Huawei as the supplier of 21st Century Network concerning Multiple-Service Access Node and optical transmission. Addition to UK operations, Huawei was

chosen to build radio access part of UMTS/HSDPA network of Vodafone Spain. Both of UK and Spain projects provided a good reference point for other European countries; setting up branch offices and joint ventures, product reselling etc.

Additionally, entrance to France market was an important milestone for Huawei's international operations. The second largest fixed network operator of France, NEUF, decided to set up a backbone optical network. In fact, NEUF was not voluntary to take offer from Huawei, however a French local agent, which has strong relationship with NEUF, persuaded NEUF to include Huawei in competition. Trial networks were set up in short time and performance was tested and satisfied NEUF. Thus, NEUF decided to sign contract with Huawei.

According to Mathews (2006), MNCs of developing countries prefer alliance or overseas cooperation to overcome the existing disadvantages. One of these alliances is R&D alliance and Huawei used that strategy effectively as a "learning" process in technology advantage improvement. These R&D alliances were beneficial for both of the parties; Huawei has the advantage of low cost R&D and some of leading technologies, on the other hand, partners increased R&D management capabilities and R&D resources and environment.

Addition to R&D alliances, Huawei also settled market alliances specifically for European and U.S markets. For instance, Huawei established joint ventures with Siemens and 3Com in order to sell its products in European and U.S markets. These joint ventures were beneficial for Huawei in order to overcome the branding problem via reputation advantages of telecom giants. Also these market oriented joint ventures provided an infrastructure for overcome the trade and technology barriers and risk of entrance to EU and US markets.

Strategically, Huawei invest in developed countries[31] in order to acquire advanced technology and penetrate to large markets. In this scope, Huawei

[31] Chinese government plays one of major role in Huawei's internationalization period. Cai (1999) indicates that Chinese government encourages Chinese large enterprises for direct investment in overseas.

settled international R&D cooperation operations; India, Silicon Valley, Dallas, Stockholm, Sweden, Moscow. These places were selected because the advantages of high-tech talents, proper R&D infrastructure. Additionally, R&D labs were established with Texas Instruments, Motorola, IBM, Intel, Agere Systems, Sun Microsystems, Altera, Qualcomm, Infineon and Microsoft (Milestones of Huawei). Technology support and training centers were also set up in developing countries in Asia, Africa and Latin America markets.

Table 28: Joint Ventures formed by Huawei and Major MNCs

Partner	Date	JV Name/ Location	Capital	Controlling Share	JV focus and interest of Huawei
NEC	April 2002	COSMOBIC Technology Co. Ltd./Shanghai	US $8 million	NEC 47%, MCI 47% and Huawei 6%	3G mobile handset business
3COM	March 2003	Huawei-3Com Co. Ltd. (Huawei-3Com)/Hangzhou	UC $160 million (from 3Com)	3Com 49% and Huawei 51%	Ethernet switches and internet protocol routers designed for the enterprise market Huawei's interest: to access North America market
Siemens	August 2003	TD Tech Ltd./Beijing	US $100 million	Siemens 51% and Huawei 49%	R&D on TDSCDMA Huawei's interest: access to European market for its data network products
Nortel	February 2006	N.A.	N.A.	N.A.	To develop gigabyte ultra-broadband access products Huawei's interest: access to North America's broadband market

Note: After four months of the announcement, Nortel and Huawei ceased the JV in June 2006.
Source: Fan, 2010

The cooperative activities of Huawei with leader multinational firms aimed to improve the innovation capability and access to international markets, shown in Table 28. Specifically the JVs with 3Com and Nortel targeted the US market.

Although low-cost strategy takes an important role in Huawei's internationalization period, intense R&D activities is another advantageous point. Because of development of Chinese economy, RMB appreciation and increase of Chinese people income, China loses its low-cost advantageous to other developing countries; Indonesia, Vietnam, Thailand etc. Low-cost advantageous is important competitive factor in order to penetrate the international market, however, higher value added activities are requirement for being one of major actors in those competitive international markets.

On the other hand, Huawei's another specific characteristic is being customer-oriented and producing customized solutions. While Western telecom enterprises usually offer fixed solutions, however, Huawei could design its solutions according to customer expectations.

> In Huawei, over 14,300 engineers were appointed to provide services for customers directly, while ZTE had 9,200 (data from 2007). Xinwei was still in its infancy with only 2,500 employees in total in 2006; but even its leading engineers also served customers directly. In other words, Xinwei had its forward customer service teams, home base project teams and specialised R&D departments overlapped, which imitated the strategies of Huawei and ZTE in inceptive stages. (Feng, 2010: 228)

For instance; Telfort (Dutch supplier of mobile telecommunications services and internet) selected Huawei to develop customer care and billing system.

> "After a successful deployment of Huawei's Customer Care and Billing System outside Europe, we are pleased that Telfort is the first European operator to choose our Customer Care and Billing System, which is fully equipped to support Telfort's strategy and market needs. Huawei is committed to leveraging its proven expertise and extensive global application experiences to provide tailored services to operators worldwide." said Dr. Haiping Che, Chief Technology Officer, Huawei Software. (www.huawei.com)

> Their technology is very good. I visited its headquarter in China several times. Their product line is the best in the world. More important, they react very quickly, no matter what request we make, they always respond in shortest time. I am surprised by their fast reaction speed," Michel Paulin CEO of NEUF (People's Posts and Telecommunications, 2005)

In recent years, Huawei's internationalization attempts were through developed countries market. Huawei prefers the strategy of setting joint ventures with local partners in order to take lower-cost and decrease risks. On the other hand, Huawei attempts to acquire world-class telecom giants in order to set a good brand image and enhance its strategic position in the world competition. The competitors also try to obsolete these attempts even with political interventions. For instance; after Cisco case (Cisco Systems claimed that Huawei Technologies infringed several of Cisco System's technology patents in 2003), Huawei aimed to enter to US market with well-established sales channel and established joint venture with 3COM with the name of H3C in 2003. In 2006, the shares of H3C were wholly transferred to 3COM, however, in 2007 Huawei and Bain Capital (US) attempted to proposal for acquisition of 3COM. Committee on Foreign Investment rejected this proposal because of national security concerns. (New York Times, 2008)

5.2.4 DATANG TELECOM

Datang Telecom was founded in 1998 in new technology development region of Haidian District in Beijing. Datang's share held by The CATT (China Academy Telecommunication Technology) and was listed in Shanghai Stock Exchange. Today, Datang is still called as "China Academy of Telecom Tech" (CATT). Datang mainly focuses on microelectronics, software, access, terminals, communication application and services etc. Datang is also owned by the SASAC as a state owned firm. The policy behind Datang is "One Institute two mandates". This policy means that in research institutes two different rules coexist; one is academic and other is commercial (Gu, Lundvall, 2006: 302)

Datang is relatively smaller enterprise than Huawei and ZTE and much more works on research and development activities as a state owned research laboratory. Datang is supported financially by government funds instead of

sales revenues; Chinese central government budget is the main source of Datang's activities.

> In June 2007, Datang Telecom signed a cooperation agreement with China Development Bank to receive a CNY 30 billion (3.89 US billion) loan for Datang to develop its TD-SCDMA service. Earlier, China Development Bank also granted a CNY4.6 billion loan to Datang Telecom for Olympics and post-TD-SCDMA commercial network construction. "the article of "Datang Telecom Receives another RMB20 Billion Line Of Credit", 20 July 2007" (http://www.chinatechnews.com/2007/07/20/5660-datang telecom-receives-another-rmb20-billion-line-of-credit)

Datang established manufacturing facilities in Beijing, Chengdu, Xi'an, Tianjin, Shanghai and Shenzhen, market network and also service centers in all around China. Addition to Chinese market success, Datang entered to Europe, US, Mid-Asia and Southeast Asian markets too. Datang has projects mainly related to data communication, third generation and fourth generation mobile communication, optical transmission and integrated access systems in the scope of High-Tech R&D Program (863 Program). In 2000, Datang was listed as one of the first 16 in "863 National High-Tech R&D Program Achievement Industrialization Bases" announced by the Ministry of Science and Technology in China. (www.datang.com)

China Internet Weekly ranked Datang 10th in "Top 100 Telecommunications Suppliers in 2005 in China".

> In 2006, it was elected as one of the Technology Center which can take the Preferential Policy of China, sponsored by National Development and Reform Commission, Ministry of Science and Technology of People's Republic of China, The Ministry of Finance of People's Republic of China, China Customs and State Administration of Taxation.(www.datang.com, http://www.datang.com/en/aboutus.asp?classid=L2611)

Chinese telecom equipment industry's most innovative project TD-SCDMA was developed under Datang's leadership. Datang developed Chinese own third generation (3G) mobile communication standard TD-SCDMA (Time Division-Synchronous Code Division Multiple Access). Datang also got

certain share in 3G bids. In April 2007, Datang took 36.6% share of China Mobile's first large-scale TD-SCDMA network construction contracts.

Datang gained net profit of about CNY 169 million in 2012, rising 29.93% from that in the same period of 2011[32]. (Datang Annual Business Report; Shanghai Stock Exchange)

In sum, Table 29 categorizes telecom equipment major companies of China. One of the most important shared characteristics of these companies is that companies have relations with China state in different models.

Table 29: Comprehensive Evolution of Companies

Firms	Aspiration Level	Management Capacity	Description
Huawei	Wolf	High and centralized	Military style, high survival pressure, accurate eyesight, high efficiency
ZTE	Bull	High and decentralized	State owned background, but learnt to be pragmatic in the South business environment
Datang	Half academic, half business	Middle, more like a research institute	Financed by the government to do R&D for a long while
Great Dragon	Firework	Low, fatal problem of its collapse	Originally with high aspiration level, but cannot follow further constrained by system problem

Source: Yan, 2011.

Furthermore, state policies and strategies have strongly effected the development period of Chinese telecom equipment industry in each phases.

[32] The company invested much more money in the R&D of products in critical fields, such as the design of integrated circuit (IC), software and application, the design of terminals, etc. The investment hit CNY 69,800 in the year, increasing 33.07% year on year. As the investment rose, the orders the company received were spurred to increase to some extent and thus guaranteed a growth in the operating revenue.
(http://www.tmcnet.com/usubmit/2013/04/08/7045740.htm)

Nee and Opper (2007) discusses that although China has been in transitioning period from planned to market economy, the state insisted on involving in business at firm level as in planned economy. The state strived for shaping the future of strategically important large enterprises. Main attempt of the state could be summarized as financial support, institutional relations and protectionist market policies.

All before, state's strategy was to attract the foreign enterprises to invest in China by setting joint ventures with domestic firms. Several MNCs set up joint ventures in order to take the advantageous of attractive Chinese huge market. In early 1990s, telecom market in China was dominated by foreign enterprises; additionally there were several emerging domestic firms. Meanwhile, Ministry of Information Industry, which is the major government institution, introduced new policies and strategies to enhance the competency of domestic telecom enterprises and protect and control domestic market, before issuing WTO agreement of China.

> Going abroad and entering the international market could not have been done without the help of the Chinese government. In addition to ample financial support from the government through low-interest loans the Chinese government has also supplied financial aid to several developing countries in order to help Huawei gain more contracts. This was especially the case in the African market. We must not forget, however, that in developing countries where cost is a larger issue than in Europe and North America, Huawei has found success through its cost advantage over European and American vendors. (Market Avenue Report, 2006: 20)

Government also assisted to domestic manufacturers concerning research and development expenditures to be able to compete with global rivals. Domestic enterprises generally followed an aggressive investment-driven strategy. Addition to sales and marketing operations, Chinese government encouraged Huawei for R&D cooperation and strategic alliances with multinational telecom giants; Motorola, Siemens etc. On the other hand, Chinese government launched "Go Global" policy (1999) which encourage and support Chinese enterprises to invest abroad in order to increase their competitiveness.

China's entry to WTO has had significant impact on China government strategies. Open the market for foreign competition was a requirement and contrary to prior protection strategies. WTO rules had significant effects on intellectual property, import licensing, subsidies, standards, investments etc. Before entry to WTO, China's regulatory environment was settled to develop indigenous sector and enterprises. Specifically for major tenders, restrictive strategies were applied towards foreign manufacturers, meanwhile domestic firms as Huawei and ZTE took the advantages of this strategy.

> China Telecom completed its first CDMA network equipment tender and is upgrading its network capacity in 342 cities. After the new deployment, China Telecom will have 133,000 Base Transceiver Stations (BTS) installed nationwide. ZTE has the largest overall CDMA base transceiver station market share with 28 percent of the market, followed by Huawei with close to 24.5 percent. (İsuppli Applied Market Intelligence, 2008)

On the other hand, US official reports also mention about barriers to trade for telecom equipment industry in China with protectionist state policies. One of them is the report of "Office of Industries U.S. International Trade Commission, 1998".

> Although China has taken steps to eliminate market access barriers to telecommunications products and other goods, certain obstacles continue to restrict the presence of these goods in the Chinese market... Investment restrictions limit U.S. company opportunities in the Chinese market and compel companies to transfer technology to domestic producers. While technology transfer is not formally required, China strongly "encourages" foreign companies to form joint ventures in the telecommunications equipment sector in order to localize production and acquire technology. (Office of Industries U.S. International Trade Commission, 1998: 97)

China state intervened to relation between domestic market and domestic telecom-equipment producers. Namely, government encouraged domestic service providers (mostly operators) in order to purchase the equipment from domestic manufacturers. Government authority (MII) encouraged the operators China Telecom and China Mobile in order to

purchase the telecommunication equipment and services from domestic national enterprises (as Huawei, ZTE, Datang). For instance, Table 30 shows 3G equipment market shares in China according to 2009 statistics. Three major Chinese firms (ZTE, Huawei and Datang) have approximately 63.8% of 3G equipment market share in 2009.

Table 30: China 3G Equipment Market Share, 2009

Vendors	**Percentage %**
ZTE	29.3
Huawei	21.9
Datang	12.6
Ericsson	10.9
Nokia-Siemens	6.8
Alcatel-Lucent	6.8
Motorola	2.7
Nortel	2.3
Others	6.7

Source: DBS Vickers, 2010: 28

Addition to state-oriented policies and strategies, government directly prepared legal infrastructure in order to control foreign investments and also encourage and enhance domestic telecom equipment capabilities. Through this strategy, "**Law on Sino-Foreign Equity Joint Ventures"** was prepared with below conditions.

Chinese government settled "joint venture" formations mainly on that law.
Adopted 1 July 1979 at the 2nd Session of the 5th National People's Congress. Amended 4 April 1990 at the 3rd Session of the 7th National People's Congress in accordance with the Decision to Revise the Law of the People's Republic of China on Sine- foreign Equity Joint Ventures. Amended 15 March 2001 at the 4th Session of the 9th National People's Congress in accordance with the Decision to Revise the Law of the People's Republic of China on Sine- foreign Equity Joint Ventures.

Article 1

In order to expand international economic co-operation and technological exchange the People's Republic of China shall permit foreign companies, enterprises and other economic entities or individuals (hereinafter referred to as foreign partners) to establish, within the territory of the People's Republic of China, equity joint ventures with Chinese companies, enterprises or other economic entities (hereinafter referred to as ~ partners), in accordance with the principles of equality and mutual benefit that are subjected to the approval by the Chinese government.

Article 4

Equity joint venture partners shall share profits and bear risks and losses in proportion to their contribution to the registered capital of an equity joint venture.

Article 5

Each party to an equity joint venture may contribute cash, capital goods, industrial property rights, etc.. as its investment in the enterprise.

.....

Technology and equipment contributed as investment by a foreign partner must genuinely be an advanced technology and equipment appropriate to China's needs. If losses occur due to deception resulting from the intentional supply of outdated technology or equipment, compensation shall be paid.

5.3 National Programs for Science and Technology and the Effects on Telecom Equipment Industry

China formed several programs to support R&D activities in order to increase the competitive position of China specifically on high-tech fields. These programs are embedded in environment in which high-level government

agencies, state-run research institute, public R&D funds, related industries and enterprises are included.

> Over the past five years, China has spent approximately 1.5 percent of its total GDP ($141 billion) on R&D (compared to 2.8 percent in the US and 3.4 percent in Japan), and is expected to outspend Japan by mid-2010.8 Government initiatives make up nearly 70 percent of R&D spending in China, which accounts for approximately 4 percent of total public spending. In 2008, the combined budget for the 863 and 973 (Key Technologies) R&D Programs was approximately $585 million.
> Most observers agree that the 863 Program has played a key role in China's recent technological and industrial development, although it is difficult to quantify the direct return on high-tech R&D spending in terms of increased productive capacity. (National High-tech R&D Program (863 Program), Impact Investing a Framework for Policy Design and Analysis, 2011: 5)

National science and technology programmes such as National High-tech R&D Program (863 Program), National Basic Research Program of China (973 Program), Spark and Torch Program encouraged domestic firms to invest according government priorities. Chinese domestic telecom equipment firms Huawei, ZTE and Datang had projects related to data communication, third generation mobile communication (3G), optical transmission and integrated access systems in the scope of High-tech R&D Program (863 Program).

The government mainly targeted firms to have strong innovation capabilities and potential for R&D activities of next generation technologies. Thus, government has provided financial incentives for those companies in order to achieve self-developed technologies. The Ministry of Science and Technology (MOST) has an effective role in defining national science and technology strategies and coordination with other government authorities. The Chinese Academy of Sciences (CAS) is the authority which manages academic institutions and research organizations, state-run research institutes. The Natural Science Foundation Committee allocates research funds to related projects. The Academy of Engineering (CAE) is responsible for international collaboration in industrial and academic perspectives.

5.3.1 National High-Tech R&D Program (863 Program)

This program was launched in 1986 to support and accelerate China's high-tech development by promoting innovation through public investment in research and development activities of high-technology industries. 863 Program[33] was perceived as a response to US' Strategic Defense Initiative, European EURICA and Japan's high-tech programs. The program aims to close the gap between China and developed countries and attaining to rapid development in high technologies by investing and funding strategic research and development through state sponsored research institutes in strategically important fields of nation's economic and social development.

> Over 15 years' operating, "863" Program has altogether invested 5.7 billion yuan and generated new additional output value of 56 billion yuan on a cumulative basis, with an input-output ratio up to 1 to 10. The implementation of "863" program has opened up new high-tech industrial growth points while providing technical support for the transformation of traditional industries, producing indirect economic benefits as much as over 200 billion yuan. A total of more than 40,000 researchers in 200-odd research institutes and more than 100 universities have been involved in the projects of 863 Program. (http://www.chinaembassy.org.nz/eng/kj/t39433.htm)

This program is one of economic reforms which qualified Chinese transition through open-market economy and encouraged achieving rapid economic growth and technological innovation. China is still a state-planned economy and the program follows the strategy of determining list of priorities and focusing on pre-defined core projects.

> The 863 Program is part of China's gradual re-orientation toward international trade and openness to foreign investment following the accession to power of Deng Xiaoping in 1978. Before 1985, research and development had been centralized in state-controlled public research institutes (PRIs), not

[33] At its core, the 863 Program channels government investment capital to high-tech research and technology development through a system of research grants and contracts. Public research institutes account for 37 percent of expenditures under the program, universities for 43 percent, and private enterprise for 12 percent. (National High-tech R&D Program (863 Program, Impact Investing A Framework for Policy Design and Analysis, 2011. 4-5)

universities or private sector firms, and China viewed technology as a free public good.

According to program, telecommunication is one of four focal fields under information technologies. Telecommunication field has subtitles of network and switching technology, optic fiber transmission technology, personal communication network, multimedia communication technology and integrated broadband digital network technologies. In this scope; university, industry and military researchers could propose projects and strategically important ones are selected and funded by the program.

> Entering the 1990's, China realized that it must pay attention to the information revolution, especially to catch up of world's pace by taking the opportunity of "digitalization" of telecommunication technology, so that, "telecommunication", as a special area called "Tele-863", had been added into 863 program with emphasis on digital mobile communication and high speed optical communication. Reviewing to the 15 years of "Tele-863" program, in term of mobile communication, it could be divided into two phases. In the first 10 years, the program could be considered as "3G"-oriented one, while in recent years which has become "B3G" (beyond 3G) - oriented. (Gong, Wang, 2007: 1)

5.3.2 National Basic Research Program of China (973 Program)

This program aims to strengthen basic research under coordination with national strategic targets and implement key projects to meet national strategic demand. The National Basic Research Program (also called 973 Program[34]) is approved by government in 1997 and is organized by the Ministry of Science and Technology.

The main objectives of 973 Program are to address and support science and technology issues in order to improve China's innovative potential for

[34]Over years of evaluation of the research projects, we've already put 133 projects under the authorized program by the end of 2002, including 17 projects in the agricultural sector, 15 in the energy, 18 in the information, 24 in the resource and environment, 21 in the population and health, 19 in the material, and 19 in the synthesis and frontier science. We've appointed 175 chief scientists for the projects, and made financial investment of 2.5 billion RMB in the Ninth Five -Year Plan. (http://www.973.gov.cn/English/Index.aspx)

country's national economic and social development. The program mainly focuses on multidisciplinary research fields.

> This program has four main tasks. The first is to conduct multidisciplinary comprehensive research and provide theoretic and scientific foundations for the settlement of the important scientific issues regarding the development of the national economy and society as well as the science itself in the fields of agriculture, energy, information, resource and environment, population and health, materials, and etc. The second is to deploy relevant, important and explorative forefront basic researches. The third is to nurture a number of outstanding personnel with high scientific qualification and creative capability, whom could be to meet the requirements of development in the 21st century. The fourth is to build a group of high-level scientific and technological assignments of the country, thus constituting some interdisciplinary scientific research centers.
> (http://www.973.gov.cn/English/Index.aspx)

Researches are intensified on major scientific issues in the scope of agriculture, energy, information, resources and environment, population and health, materials, and related areas in order to achieve national economic and social targets of China through this program.

5.3.3 Key Technologies R&D Program

Key Technologies R&D Program, that is the first national science and technology program of China, was launched in 1982 and is coordinated by State Development and Planning Commission with other government agencies. This program was implemented through Five-Year Plans. Program aims to support national economic and social construction (sustainable development of society and enhancing living standards with new technologies) of China in previously defined strategic fields; such as agriculture, energy, materials, electronic information, transportation, medical, healthcare and other fields.

Program has enabled the upgrading of traditional industries and also forming next generation new industries in order to enhance the national science and technology capability and innovation capacity.

> The program concentrates on the R&D of key and common technologies that drive technical upgrading and restructuring of industries that promote sustainable social development. The program provides advanced and applicable new technologies, materials, techniques, and equipment to industrial and agricultural production, while facilitating the application and industrialization of high-tech achievements to enhance the international competitiveness of key industries and human welfare.
> (http://www.most.gov.cn/eng/programmes1/200610/t20061009_36224.htm)

5.3.4 The Spark and Torch Program

The Spark Program was initiated in 1986. The main aim of the program is to support rural economy and social development by scientific and technological researches and findings. Since 1986, there have been more than 100,000 scientific and technological demonstration projects in 85 percent of rural regions of China.

Torch Program was initiated in 1988 in order to encourage the carrying out projects/products in high-tech industries by providing good economic benefits for both of domestic and foreign markets. Additionally, organizing high-tech industrial development zones in China is another goal of that program.

This program is mainly responsible for the technology dense fields of biotechnology, electronic information, communication and material.

All these above programs created a suitable environment for state in order to support telecommunication industry as a sub-field of information and communication technologies. Specifically domestic firms and their strategically important projects could have been financed by these programs.

5.4 Special Economic Zones and Telecom Equipment Industry

Chinese state organized to establish high-tech parks in late 1980s to attract multinational high-tech companies and create incubation environment and encourage domestic innovative firms. Geographic concentration of high-tech production and also know-how spillover has been major benefits for high-tech industries. Zongguancun High-tech park (referred to as "China's Silicon Valley) in Beijing, Zhangjiang High-Tech Park in Shanghai and Shenzhen High-tech Park are major ones.

By China's transition from planned to open market economy, special economic zones were established. The state provided special policies for enterprises in order to invest in these zones. The first special economic zone is Shenzen in which Huawei was established. These policies and environment obtained opportunities for Huawei specifically in domestic market and that background encouraged privately owned firm in order to enter to the international markets as a competitive telecom enterprise.

In 1990s multinationals established R&D centers in these locations; for instance Nortel launched a joint R&D center with Beijing University of Post and Telecommunications. Lucent, Motorola, NEC, Ericsson, Siemens also established own R&D centers. Table 31 shows R&D centers of telecom equipment firms in China.

> These R&D centers hire Chinese researchers and engineers. They have fostered the dissemination of information and knowledge in China, which either directly or indirectly helped China's technology capacity upgrade... Nevertheless, the appearance of multinational corporations in Chinese market has helped to disseminate information and to train local engineers. Some of these engineers left the multinational corporations later on. They either start their own business or join indigenous firms, which contribute to overall technology development in China. (Tan, 2003: 17)

Table 31: R&D Centers of Telecom Equipment Firms in China

Company Type	Company Name	Locations
MNC	Motorola	Beijing, Shanghai, Nanjing, Suzhou, Chendou, Hong Kong
MNC	Lucent	Beijing, Shanghai, Nanjing, Shenzhen, Qingdao
MNC	Ericsson	Beijing, Shanghai, Shenzhen, Chendou, Zhuhai
MNC	NEC	Beijing, Shanghai
MNC	Nortel	Beijing, Guangzhou
MNC	Siemens	Beijing
Domestic Company	Huawei	Beijing, Shanghai, Shenzhen, Nanjing, Chendou, Xi'an, Hangzhou
Domestic Company	ZTE	Beijing, Shanghai, Shenzhen, Nanjing, Chendou, Xi'an, Chongqing
Domestic Company	Datang Telecom	Beijing, Shanghai, Xi'an

Source: Company Websites

Beijing is the most popular location, because it is the capital of China and therefore there is high concentration of financial and qualified human sources for R&D activities. According to China Statistical Yearbook 2008, Beijing's total R&D expenditure amounted to RMB 52.7 billion in 2007. Shanghai is the largest manufacturing base of country. While Beijing mostly focuses on electronics and information technologies, Shanghai mostly related with industrial technologies.

Fan emphasizes in his study of Comparative Analysis of Beijing and Shanghai's High-Tech Parks (2006c) that national R&D institutes are the major source for R&D activities in Beijing, on the other hand, large-medium size enterprises play important role for R&D activities. For a statistical analysis, 64% of R&D resources dedicated to Beijing were used by national R&D institutes and higher education institutions. However, in Shanghai share of large-medium size enterprises in R&D expenditure is 57%.

As R&D center, Shenzen's transformation has a different story. Shenzen was a small fishing village and transformed rapidly through an industrial city (labor-intensive, industry based economy) in 1980s. The

transformation continued and Shenzen became an innovative city focused on high-tech industries.

In sum, these three locations have unique characteristics. The main advantages of these locations could be grouped as proximity to telecom equipment industry and market, rival firms and universities and also qualified and skilled labor, research institutes. While specifically Beijing and Shanghai are mainly preferred by both of MNCs and domestic firms because of its R&D researches and developed manufacturing capabilities, Shenzhen is mainly dense with domestic innovative high-tech companies. Additionally, these regions trigger the spread of accumulated know-how via labor turnovers, spin-offs, new firms, joint projects etc.

5.5 China Telecom Market: Service Operators

Specifically mobile operators are main customers of telecom equipment industry for both of domestic and foreign vendors. Table 32 classifies mobile operators of China according to technology, number of subscribers and ownership.

Table 32: Mobile Operators of China

Operator	**Technology**	**Subscribers (million)**	**Ownership**
China Telecom	PHS, CDMA, CDMA2000, EVDO	168.1 - April 2013	State-owned
China Mobile	GSM, GPRS, EDGE, TD-SCDMA, TD-HSDPA TD-LTE	726.3 - April 2013	State-owned
China Unicom *	GSM, GPRS, EDGE, PHS, W-CDMA (UMTS), HSDPA HSDPA HSPA+	250.7 - April 2013	State-owned, Telefonica 9.7%

* On June 2 2008, China Netcom announced its intention to merge with China Unicom, after the latter sold its CDMA network to China Telecom.
Source: Company documents,
http://www.reuters.com/article/2013/04/26/china-mobilesubscribers-idUSL3N0CC0WK20130426

China Telecommunication Corporation (China Telecom) was established as a government monopoly that had control of all telecommunication services until 1993. In time, China Telecom monopoly position was broken by spinning off China Unicom in 1994, spinning off mobile services to form China Mobile in 2000.

China Mobile Communication is the largest mobile phone operator in the world with over 720 million subscribers- April, 2013. China Unicom is a government owned company and founded by Ministry of Electronics, Electric Power and Railways in 1993. China Unicom is the second largest mobile operator in China. China Netcom Group Corporation (CNC) is a government controlled company and Government of Shanghai, the China Academy of Sciences, the State Administration of Radio, Film and TV, The Ministry of Railways have been in founding members. CNC was formed in 2002 on the basis of the former China Telecom Group Corporation and its affiliated telecom companies. China Netcom Group Corporation (Hong Kong) was incorporated into China Unicom in 2008.

> **MNOs spent RMB 1.16 trillion constructing 325,000 3G base stations:** China's three telecom operators invested RMB 1.16 trillion in the 3G network to construct a total of 325,000 3G base stations in 2009: 108,000 TD-SCDMA base stations covering 238 cities for China Mobile; 117,000 3G base stations covering 342 cities for China Telecom; and 100,000 3G base stations covering 335 cities for China Unicom, 163.com reports quoting data released by China's Ministry of Industry and Information Technology (MIIT) (Annual Telecom Industry Press Conference on January 27, 2009).

Table 33: China Operators: Capital Expenditure Spending

Operator	2003 (billion $)	2002 (billion $)
China Telecom	7.36	7.40
Netcom	4.95	3.26
Unicom	4.83	5.31
China Mobile	7.24	7.85
Railcom	0.68	1.19
ChinaSat	n/a	1.08
Total	25.06	26.09

Source: ChinaNex.com

As seen in Table 33, Chinese operators have significant investment budgets for telecom infrastructure because of China's geographic and crowded population characteristics. In that market, competition between rival service providers also create environment which enables great pressure on domestic telecom equipment providers to innovate and satisfy challenging market demands.

Ministry of Industry and Information Technology of China issued third-generation mobile telephone licenses with China Mobile, China Telecom and China Unicom. China's three major mobile carriers were achieved their first phase of 3G wireless network deployments in 2009. China Telecom received CDMA2000 (US developed), China Unicom got the license to set 3G network on WCDMA technology and China Mobile obtained approval to operate the nation's self-developed TD-SCDMA technology. It is clear that China is a member of WTO and a hybrid network which includes three standards in China is the most probable solution.

China Unicom's 3G tender in 2009 was shared as; Huawei 30.6% (cooperation with Motorola which outsourced manufacturing parts to Huawei), Ericsson and its partners (New Postcom and FiberHome) 25.6%, ZTE 21.5%, Nokia Siemens Networks took 11.1% and Alcatel-Lucent took 10.2%.

> Based on this analysis, iSuppli ranked the vendors of wireless equipment in the 3G market before the second quarter of 2009. ZTE gained the largest share in the domestic 3G market, with 610,000 transceivers deployed in all three 3G wireless technologies nationwide. Huawei ranked second nationwide, with 520,000 transceivers. ZTE took the No-1 position in both TD-SCDMA and CDMA2000. iSuppli projects that ZTE will continue to take leadership in TD-SCDMA because of its leading technology and on-time delivery. (http://www.isuppli.com/China-Electronics-Supply-Chain/MarketWatch/Pages/Chinas-3G-Network-Deployment-Update.aspx)

China granted TD-SCDMA 3G license to China Mobile in January, 2009. China Mobile is the world's largest mobile phone operator with over 720 million subscribers, in April 2013.

> Chinese vendors Huawei, ZTE and Datang are reported to be the biggest winners once again in China Mobile's TD-SCDMA network tender. The three companies have won as much as 70% of the value of the contracts in China Mobile's fourth-round TD-SCDMA tenders. It said that in an effort to win market share, Huawei had bid low for the contract, which provides for the deployment of 102,000 base stations in 101 cities. After the issue of 3G licenses in early 2009, China Mobile started to launch a nationwide TD-SCDMA network construction. It has accumulatively poured about CNY 80 billion into the TD-SCDMA construction. By the end of 2009, its third-phase TD-SCDMA network had been finished, and its nationwide TD-SCDMA network had covered above 70% of the country's cities. Huawei won 29% of the total, ZTE 22%, Datang Mobile 18%, NSN 6%, Ericsson 6%, Fiberhome 6%, Potevio 6%, Postcom 6%.
> (http://www.telecomasia.net/content/chinese-vendors-take-70-td-tender-report)

China Mobile's first large scale tender for TD-SCDMA network equipment's total value was 26.7 billion Yuan (3.53 billion USD). ZTE and Datang had nearly 75% share (ZTE 46.3%, Datang 28.6%), TD 14.8%, 2.4% Potevio, 0.9% Ericsson, 7% others. Ericsson is the loser of the tender, other MNCs Motorola, Samsung and Lucent could not offer the tender because of lack of infrastructure to offer TD-SCDMA. Other Chinese huge company Huawei settled joint venture with Siemens and got only less than 15% market share. (ZTE Technologies, WIMAX-A New Highlight for IMS (2007).

China Mobile's second tender covered 23.000 wireless base stations in 28 Chinese cities. Datang Mobile, FiberHome and Postcom, which use equipment of Datang Mobile, gained 40% share, ZTE had 25% to 28% share, Huawei 17% to 18%, Nokia Siemens Networks 8%, Potevio 6% and Ericsson 4.5%.

China Mobile's third-phase tender of TD-SCDMA network covered 200 cities. Chinese equipment vendors got 72% share; ZTE gained 34%, Huawei 22% and Datang 16%. Remaining companies (New Postcom, FiberHome, Nokia Siemens Networks, Ericsson, and Potevio) gained nearly 6%. (http://wirelessfederation.com/news/17178-china-mobile-announces-results-for-third-phase-of-td-scdma-tender/)

China Mobile announced that Huawei, ZTE and Datang have become the biggest winners in China Mobile's fourth 3G network (TD-SCDMA) tender. Chinese vendors took 70% of China Mobile's TD-SCDMA tender.

5.6 Discussion

Economic and political transition of 1978 changed the destiny of China. The hybrid model of open market economy and state-planned socialist development model brought significant growth rates which have not been replicated yet.

After open market decision, China became low-value added manufacturing operations center of the world in early years. In time, China strived to increase the value-adding operations via Chinese state strategies. Chinese authorities defined national priorities and roles in strategic industries with top-down decision making approach. In that respect, one of the major goals was to catch-up advanced countries in the scope of high-tech industries. By accurate strategies, China transformed its manufacturing advantages into value-added operations via direct and effective role of the domestic enterprises. Finally, transformation from mass manufacturing into more value added operations in strategic industries has created Chinese own multinational enterprises via state-led policy and strategies.

One of the recently emerged and remarkable high-tech industries is the telecom equipment industry. The success story began in the early years of 1980s by selling imported products, today, industry created its own MNCs such as Huawei, ZTE, etc. and developed own national standard for the third generation mobile technology (TD-SCDMA).

Table 34: High-Technology Industry Expenditure on R&D and As a Percentage of Value Added

Industries	R&D Expenditure (100 Million Yuan)	As a Percentage of Value Added
Aircraft and Spacecraft	33.3	13.82
Computers and Office Equipment	72.9	3.45
Electronic and Telecommunication Equipment	276.9	**5.41**
Medical Equipment and Meters	20.7	2.67
Pharmaceuticals	52.6	2.91

Source: China Science & Technology Statistics Data Book, 2007

As seen in the Table 34, according to the criteria of "high-technology industry expenditure on R&D and as a percentage of the value added", electronic and telecommunication equipment industry is in the first place with "R&D expenditure" and rank as second with 5.41% value added, after aircraft and spacecraft.

In sum, the emergence and the rapid development of the Chinese telecom equipment industry is the joint achievement of four major actors; foreign multinational enterprises, domestic telecom firms, government institutions and related state policies and attractive domestic market (mainland operators).

Although foreign investments and joint ventures create awareness about the telecom equipment industry in China, first success of the national industry was Chinese domestic companies' attempt to create its own digital telephone switches in 1980s via know-how dissemination from multinational operations in China. In fact, foreign products had significant market shares in city centers; however, these products could not meet the rural market needs; because of technical and pricing matters. Thus, Chinese domestic firms developed their own switches and marketed with lower prices in the rural regions. The mismatch between MNCs' existing products and the Chinese market needs could be defined as the beginning point of this catch-up period. These domestic companies had the capability to better understand the home market needs and this position created a local advantage for Chinese telecom firms against MNCs.

This was a success story for technical and marketing perspectives. Knowledge dissemination from MNCs and joint venture operations were quite strategic for domestic manufacturers. Behind, Chinese state encouraged and stimulated the development of the innovative capability of the domestic telecom equipment firms actively. The state has provided financial incentives in order to encourage self-developed technologies by national S&T programs, state bank loans, building high-tech parks and geographic concentration of manufacturing operations. Specifically related S&T programs support specific

and strategic projects of the industry in order to be much more competitive in foreign markets.

Following digital switch operations, wireless mobile technologies began to emerge with 1G and 2G infrastructures. Meanwhile, Chinese domestic firms (which had previous experience in digital switches) focused on the mobile technologies and equipment market. License agreements were the beginning point and the following steps were the low-cost manufacturing capabilities and the R&D operations which open worldwide market opportunity for Chinese national MNCs, specifically for Huawei and ZTE. Today, these vendors are two of the major MNCs which develop, manufacture and market telecommunication equipment and services worldwide.

In this catch-up case, key factors could be counted as the state role, the know-how dissemination from foreign investments, the technology transfer with learning activities, the innovation-oriented firm strategies of the indigenous industry and the domestic market effect. As emphasized in that case study, openness to the world and encouragement of alliance with foreign companies bring more opportunities to the latecomer countries to attain current know-how and recent technologies. Specifically, in high-tech and R&D intensive industries, foreign investment is an important factor in order to transfer the technology and create the awareness in host country industries.

Foreign investments also played a major role in this catch-up case. MNCs assisted to disseminate know-how through domestic industry, trained Chinese workforce, transferred recent technologies and increased local manufacturing capabilities. These investments also provided awareness about the related technology and the diffusion of know-how through joint venture business models. Joint ventures between MNCs and the Chinese local firms for the digital switch technology, direct investments of Motorola, Qualcomm, Nokia and Ericsson for GSM technologies and collaboration with Siemens for TD-SCDMA development project could be given as examples.

In fact, foreign investments and joint venture strategy do not provide opportunity to take the core technology for local partners directly, however,

they provide infrastructure for innovative high-tech industries; increase technology awareness, train human resources, and increase management capabilities of the local firms and so on.

After intense collaboration with foreign investments during two decades, China telecom equipment industry attained a radical innovation level via TD-SCDMA. Under Datang's (government research institute) leadership, one of the world's three recognized 3G standards was developed by a consortium. This attempt brought the effort of the path-following experiences to a leapfrogging stage; TD-SCDMA[35].

This standard is an output of previously accumulated know-how which comes from digital switch technology to today's 3G wireless technologies. Although TD-SCDMA has been developed by a consortium and the contributions of the foreign partners, TD-SCDMA is seen as a national hero and a success story. For a market example, China Mobile selected TD-SCDMA as a 3G infrastructure standard and Chinese domestic firms Huawei, ZTE and Datang got the biggest share in equipment and service tenders. All these are directly or indirectly supported by Chinese state policy and strategies.

In short, Chinese telecom equipment industry's catch-up strategy is mainly constituted by the open economy policy of China, the size of the national market and the national strategy to prioritize the high-technology industries. The state, the strategic alliances with foreign capital (mostly MNCs), the collaboration with the national and the international research institutes and universities have assumed the strategic roles in this case. Openness to the world and strategic alliances with the foreign companies and the research institutes provide latecomers with the opportunity to access the

[35]The Chinese effort in promoting TD-SCDMA is one of the most important strategies to implement the national policy of "indigenous innovation", and assumed to take the historical mission to make the breakthrough. Through this process the country is aimed to develop into an "innovation based" economy, which could largely reduce patent fee dependence on the developed countries and enhance the position of the Chinese enterprises in global production value chain. (Yan, 2007: 19)

latest know-how and technology. Additionally, state support is the inevitable factor for a latecomer country, especially in high-tech industries' catch-up cases.

The following chapter is "the case study" chapter, in which the research question will be answered by testing hypotheses. Additionally, the importance of the state's role, the effect of the foreign investment and the importance of the national industry and capital will be discussed with related documents, reports and interview results.

CHAPTER VI

CASE STUDY

During research period, visit to China and interview with major Chinese telecom equipment vendors Huawei and ZTE management teams around research questions was not available. Several attempts and effort to set relations with these companies' headquarters and top management in order to get answers for research questions was failed. In sum, there was a reluctant approach for research topic of thesis from Chinese relevant parties. This is the limitation of the case study chapter.

Thus, official state reports, national strategy documents, intelligence agency reports, company strategy and annual reports, newspaper and journal articles, which related to Chinese telecom equipment industry and its development period since 1980s, are used as research tools in order to answer the research questions and test the hypothesis of thesis.

The information gathering for this stage was also difficult, because outstanding company of Chinese telecom equipment industry Huawei is not publicly listed company and, thus, there exists limited public information about company's history, financial position, strategies and so on. Additionally, the other foremost company ZTE is a state-owned company and limited information structure is also a fact for ZTE related topics, too. Moreover, Chinese state also shares limited information via their official sources about telecom equipment industry. Despite these limitations and difficulties to gather information, research questions are answered in a comprehensive manner in this chapter.

The importance of state-led policies and interventionist state against neoliberal development models for catch-up of latecomers in high-tech

industries will be the main point to which the thesis seeks to understand. Then, the sub-titles (effect of state policies on industry, knowledge dissemination from foreign investments, importance of domestic market and state-led financing) will be analyzed in the scope of case study of Chinese telecom equipment industry. Finally, by moving from these sub-parts, state-led catch-up policies will be tested as an important instrument for a latecomer- China- in telecom equipment industry, against hegemon neoliberal catch-up policies.

Research Question

Which policies succeeded Chinese telecom equipment industry catch-up in past thirty years?

Hypothesis

Chinese telecom industry's catch-up is the succession of state guidance and state-led development policies.

Sub-hypothesis

1. Telecom equipment industry is a strategic industry for China and the state defined specific policies in order to develop the industry.

2. Foreign investments and Joint-ventures had played one of the most important roles during emergence and catch-up of Chinese telecom equipment industry.

3. Chinese potential domestic market financed emerging and growth stages of national telecom equipment industry.

4. "State-led financing by state-owned banks" policy funded national industry for both of domestic and export operations.

During research, the most recent official report has been published by U.S. House of Representatives Permanent Select Committee (8th October, 2012). This report has strong evidences specifically about Chinese telecom equipment major vendors Huawei and ZTE and their emergence, relations with Chinese state and other official authorities. Thus, this report is also included to this chapter in order to provide evidences for each hypothesis.

6.1 U.S. House of Representatives Permanent Select Committee on Intelligence Report

"Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE" (2012)

The recent official report has been publicly announced by US House of Representatives Permanent Select Committee on 8th October, 2012. This report is final output of an investigation period about Chinese major telecom equipment companies, Huawei and ZTE.

The House of Permanent Select Committee on Intelligence had initiated the investigation in November 2011. The formal investigation focused on top telecom equipment manufacturers Huawei and ZTE with the mission to better understand the relations with Chinese state and these companies and level of risk on national security of United States. The investigation was mainly based on two parts; one was included review of open source documents, reports, company histories, operations and ties to Chinese state and Chinese Communist Party. The second part was related to review of classified information.[36]

The committee also summarizes the goal of investigation as;

> The Committee's goals in this investigation were to inquire into the potential security risk posed by the top two Chinese telecommunications companies and review whether our government is properly positioned to understand and respond to that threat. An additional aim of this process has been to determine what information could be provided in an unclassified form to shed light on the key questions of whether the existence of these firms in our market would pose a national-security risk through the potential loss of control of U.S. critical infrastructure. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012: 7)

[36] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a:v

Thus, the Committee focused on Huawei and ZTE's ties to Chinese state, support mechanism from Chinese government and state-owned banks, connections to Communist Party, Chinese military and intelligence services.[37]

> The investigation sought to answer several key questions about the companies that would, including: What are the companies' histories and management structures, including any initial ties to the Chinese government, military, or Communist party? How and to what extent does the Chinese government or the Chinese Communist Party exert control or influence over the decisions, operations, and strategy of Huawei and ZTE? Are Huawei and ZTE treated as national champions or otherwise given unfair or special advantages or financial incentives by the Chinese government? (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 11-12)

The investigative process included dense and extensive interviews with company and government officials, document analysis, open hearing with officials from both of Chinese firms. Committee staff and members were in meetings and interviews with officials from Huawei and ZTE. Committee also visited the facilities and factories of Huawei and ZTE. Committee staff was in interview with corporate executives of Huawei in China in February 23, 2012, and a similar interview was held with ZTE in April 12, 2012. These interviews and meetings included tours of corporate headquarters and factories of firms. Officials are from Huawei Ken Hu, Huawei's Deputy Chairman of the Board and Acting CEO; Evan Bai, Vice President of the Treasury Management Office; Charlie Chen, Senior Vice President in charge of Huawei (USA); Jiang Xisheng, Secretary of the Board; John Suffolk, Global Security Officer; and Rose Hao, Export Regulator. Additionally, from ZTE Zhu Jinyun, ZTE's Senior Vice President, U.S. and North America Market; Fan Qingfeng, Executive Vice President of Global Marketing and Sales; Guo Jianjun, Legal Director; Timothy Steinert, Independent Director of the Board; Ma Xuexing, Legal Director; Cao Wei, Security and Investor Relations with the Information Disclosure Office; Qian Yu, Security and Investor Relations with the

[37] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 11

Information Disclosure Office; and John Merrigan, attorney with DLA Piper.[38]

After those meetings, the Committee prepared a document which includes written questions and document requests from companies. Some of the questions could be exemplified as; Huawei's interactions and relationships with following Chinese entities; Ministries of Industry and Information Technology, Commerce, Finance, National Defense, State Security and The Central Military Commission, The People's Bank of China, The China Investment Corporation, The China Export Import Bank and The Chinese Communist Party. Huawei's employee-owned structure and Employee Stock Ownership Program (ESOP), Chinese Communist Party Committee structure within these firms, Chinese state funding mechanism for Huawei and ZTE's R&D and innovative technology investments, Huawei's CEO of Mr. Ren Zhengfei and his relations with Chinese military, Huawei's interactions with banks and export-import credits, abroad training centers worldwide, Huawei's cyber-security assurance system and finally management consulting firms that have worked with or for Huawei as IBM, Accenture, PWC etc. became the major research topics of this part for Huawei.[39] Additionally, Committee also sent a document which includes written questions and also document requests to ZTE's Chairman Weigui Hu. ZTE's interactions and relationships with following Chinese entities; Ministries of Industry and Information Technology, Commerce, Finance, National Defense and State Security, The People's Bank of China, The China Investment Corporation, The China Export Import Bank and The Chinese Communist Party. For instance, China Development Bank's credit to ZTE in 2009 was also questioned; the Bank gave $15 billion credit to ZTE in 2009 while having only $8.4 billion annual revenue. Furthermore, Chinese government funding mechanism for ZTE's research and development of indigenous and innovative technologies, ZTE's cyber security assurance system, ZTE's funding and its source for start-up capital, founders of ZTE and

[38] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 8-9

[39] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012b

their relationship with Chinese Communist Party, whether ZTE produces any specific technology for Chinese military/government, investments and relations with Iran government and the effects of this relationship concerning the security threat to U.S. could be counted as major research fields for ZTE part.

> Unfortunately, neither company was completely or fully responsive to the Committee's document requests. Indeed, neither Huawei nor ZTE provided internal documents in response to the Committee's letter. To attempt, again, to answer the remaining questions, the Committee called each company to an open hearing. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 9)

After these interviews, with document analysis, review of open-source information, hearing with witnesses from Huawei and ZTE the report was issued. In a general conclusion, the committee was unsatisfied about the cooperation level of companies, for instance about explaining their relationship with the Chinese government and Chinese Communist Party.

> Neither company was willing to provide sufficient evidence to ameliorate the Committee's concerns... Neither company provided specific details about the precise role of each company's Chinese Communist Party Committee... Huawei, in particular, failed to provide thorough information about its corporate structure, history, ownership, operations, financial arrangements, or management... The investigation concludes that the risks associated with Huawei's and ZTE's provision of equipment to U.S. critical infrastructure could undermine core U.S. national-security interests. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: vi)

In summary of conclusion part, the report claims that these telecommunication companies are supported by Chinese state and provide comprehensive opportunity for Chinese government to involve US telecommunications supply chain.

> That said, understanding the level and means of state influence and control of economic entities in China remains difficult. As Chinese analysts explain, state control or influence of purportedly private-sector entities in China is neither clear nor disclosed. The Chinese government and the Chinese Communist Party, experts explain, can exert influence over the corporate boards and management of private sector companies, either formally through personnel choices, or in more subtle ways. As ZTE's submission to the Committee states,

> "the degree of possible government influence must vary across a spectrum." (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 11)

In report, Huawei and ZTE's growing market shares and the position of becoming dominant players in telecommunication market are also emphasized. The importance of telecommunication infrastructure and market dominance is defined as a national concern because of the risks of spying and other malicious purposes from foreign manufacturers. Thus, Huawei and ZTE's growing market shares are determined as a risky position for US national security. Australia's similar concerns and Great Britain's limitation of Huawei's access to infrastructure and evaluation process of all Huawei's equipment and system before entrance to the system are also exemplified.

As a final word, the Committee concludes the report with the recommendations as;

> **Recommendation-1:** The United States should view with suspicion the continued penetration of the U.S. telecommunications market by Chinese telecommunications companies...The Committee on Foreign Investment in the United States (CFIUS) must block acquisitions, takeovers, or mergers involving Huawei and ZTE given the threat to U.S. national security interests...U.S. government systems, particularly sensitive systems, should not include Huawei or ZTE equipment, including component parts. Similarly, government contractors should exclude ZTE or Huawei equipment in their systems.
> **Recommendation 2:** Private-sector entities in the United States are strongly encouraged to consider the long-term security risks associated with doing business with either ZTE or Huawei for equipment or services…Based on available classified and unclassified information, Huawei and ZTE cannot be trusted to be free of foreign state influence and thus pose a security threat to the United States and to our systems. (ibid, vi-vii)

6.2 Answers of Huawei and ZTE to the Report of U.S. House of Representatives Permanent Select Committee

Huawei and ZTE officially responded to the report of U.S. House of Permanent Select Committee on Intelligence's investigation about Huawei and ZTE.

According to Huawei, the report was incomplete and there was no clear information and evidence related to the legitimacy of the Committee's concerns. Despite best effort of Huawei, the Committee prepared a predetermined report. Huawei also responded to accusations of the Committee by an official declaration as a press release:

> The United States is a country ruled by law, where all charges and allegations should be based on solid evidence and facts. The report conducted by the House Permanent Select Committee on Intelligence (the Committee), which took 11 months to complete, failed to provide clear information or evidence to substantiate the legitimacy of the Committee's concerns. (http://www.huawei.com/en/about-huawei/newsroom/press-release/hw-194454-hpsci.htm)

Grant Gross in his article of "Huawei: Critical House Report Motivated by Politics" on 9th October, 2012, noted the explanation of William Plummer Huawei's Vice President for External Affairs; "the report is a political distraction and is rapidly being recognized as such. Huawei is the same globally trusted and respected company today as we were last week. Nothing has changed, politically inspired China-bashing aside. Huawei is Huawei, Huawei is not China."

On the other hand, after the publishing the Committee report, Chinese Foreign Ministry spokesperson Hong Lei urged U.S. government "respect the facts and abandon prejudices" and "the Chinese telecom companies are international activities based on market principles, their investments in the U.S. are of mutually beneficial nature". [40] Additionally, Shen Danyang, spokesperson for the Chinese Commerce Ministry, told about US report "is merely based on subject conjecture and untrue foundations" and consists of "groundless accusations against China."[41]

[40] http://articles.software.informer.com/huawei_and_zte_consider_u_s_charges_to_be_protect.html

[41] https://www.law.upenn.edu/blogs/regblog/2012/10/24-takahashi-chinese-telecom.html

The other company ZTE also published a statement on its official website after the Committee's report. In brief, ZTE officials emphasized safety and trusted characteristics of ZTE equipment and services.

> ZTE has set an unprecedented standard for cooperation by any Chinese company with a US congressional inquiry. ZTE has presented the Committee with ample facts that demonstrate ZTE is China's most transparent, independent, globally focused, publicly traded telecom company. ZTE is listed on the Hong Kong and Shenzhen Stock Exchanges. The company already is recognized as a Trusted Delivery Partner by 140 governments and 500 network carriers.
> (http://www.zteusa.com/news/press/news/201210/t20121009_13230.html)

Additionally, ZTE's director of global public affairs, David Dai Shu claimed an interesting speech in the declaration:

> "It is noteworthy that, after a year-long investigation, the Committee rests its conclusions on a finding that ZTE may not be 'free of state influence.' This finding would apply to any company operating in China. The Committee has not challenged ZTE's fitness to serve the US market based on any pattern of unethical or illegal behavior."
> (http://www.zteusa.com/news/press/news/201210/t20121009_13230.html)

ZTE was disappointed that Committee chose to investigate only two Chinese firms and excluded Western telecom vendors and their Chinese joint venture partners. Thus, ZTE also criticizes the scope of this investigation.

Against Huawei and ZTE's press releases, however, some members of the U.S. Committee also praised the report by emphasizing critically important outcome of the relationship between the Chinese government and these companies.

> "At a time when Chinese collection intelligence efforts against the United States are significant, and Chinese theft of American trade secrets is rampant, handing critical telecommunications infrastructure to Huawei and ZTE poses too great a threat to our security and economy," Representative Adam Schiff, a California Democrat, said in a statement. The Chinese government can access the two companies' telecom equipment at any time under Chinese law, Schiff said. "The coercive power of the Chinese government is simply too great," he added. (Gross, 2012)

Democrat representative Jim Langevin committee member also added:

> "The committee gave these companies every opportunity to demonstrate their good intentions," he said in a statement. "They did not do so, and instead provided incomplete and evasive answers to the committee's questions." (Gross, 2012)

For a final word, thesis does not involve through the discussions between US and Chinese governments about intelligence and national security. Instead, the report will only be a beneficial source in order to provide evidences for research questions of the thesis.

6.3 Research Question, Hypothesis and Sub-Hypothesis

As hegemonic ideology, neoliberal policies are modeled and suggested to latecomers by the assistance of the ruling authorities; as World Bank and IMF under the name of Washington Consensus. In this model, Washington Consensus proposes market-based economic development model by minimizing the state intervention to the economy for latecomers.

Thus, ruling neoliberal policies are presented as the sole way for catch-up attempts of latecomers. These policies are certainly market oriented and state has passive, regulative, limited role as legislation, taxing, auditing etc. Therefore, laissez-faire and free market are arranged in order to provide the sustainability of this hegemon system; neo-liberalism.

However, in fact neoliberal policies that are imposed by ruling organizations had not been applied by today's advanced countries during their development and growth phases. State intervention and state-led financing had important roles for their economic development periods since 1800s. State intervention- guidance of state, role of financial subsiding- could be evaluated as an effective policy for those periods' development economies.

In time, state-led development models have become popular within different forms; for instance socialist economic models assigned main role to the central state authority, on the other hand, East Asian countries used developmental state with a different approach via state-led macroeconomic planning in late twentieth century. Furthermore, there are also different theoretical approaches which assign central role to the state in capitalist economy against neoliberal policies. For instance, Fernandes and Cardoso's "dependent development" model presents the alliance between the multinationals, state and the local industrial bourgeoisie in order to attain to dependent capitalist development for latecomers. Peter Evans in his popular book of *Dependent Development- The Alliance of Multinational, State, and Local Capital in Brazil* underlines "dependent development" and defines around three actors; national government, national capital and multinational firms.

Dependent development approach emphasizes the important central role of state in order to foster the accumulation. Additionally, state has a sponsorship role as a source of financing (state-led financing) in strategically defined industrial investments. State has also a strategic role in order to attract foreign investments and to balance the necessities of local accumulation and know-how transfer. According to approach, national capitalist development could be possible with technological knowledge spillover from foreign investments through national industries.

Moreover, Friedrich List and his recent followers mainly criticize neo-liberal discourse and assign a central role to the state for industrial development. Alexander Gerschenkron is another scholar who has significant contribution to state-led catch-up literature. Gerschenkron focuses on banking and financial side of development of "backwardness"; as claiming that state as an investment banker. These theories are also discussed in theoretical framework chapter, comprehensively.

In thesis case; China had different forms of state-led development model during its socialist development between 1949 and 1979 and after

reform of 1979. Since the end of the Cold War, neoliberal policies around market competition have become hegemon economic model in world. While popularity of free market policies increased worldwide in the ends of 1970s, China began to change the close-door socialist economy policy through a kind of state-capitalism. Although Chinese model is indicated as a kind of capitalist development model, on the background China has still strong central authority and macro-scale policies are defined by Communist Party and related national official committees.

> The rise of Chinese military might and the dawn of a potential new economic paradigm, as the Beijing model of state-led and sponsored growth challenges the "Washington consensus," add further issues to this dynamic relationship. (Daly, 2012: 1)

After 1979 reform and its conclusion of new economic model, strategic industries have been determined by central authority and in these industries foreign investments were invited by using the attractiveness of Chinese market. Meanwhile, state-owned enterprises which operate in these strategic industries were not privatized; however, these enterprises were modernized and reorganized. Additionally, the legal regulations are also prepared with "The Law of the People's Republic of China on Sino- foreign Equity Joint Ventures". Thus, while joint ventures were founded between foreign firms and state-owned enterprises; local firms have also been emerged in these industries. One of these strategic industries is telecommunication industry and a subdivision "Chinese telecom equipment industry" is also the case study of thesis.

In this framework, four main titles are discussed around research questions in order to test thesis hypothesis; "role of state policies", "effect of foreign investments and joint ventures", "power of domestic market" and "state-led financing model", during the catch up of telecom equipment industry. These topics will be studied through major companies, telecom operators, financial institutions and related state organizations.

Sub-Hypothesis-1

Telecom equipment industry has been defined as a strategic industry by Chinese state that actively managed all phases during development of industry.

The Speech between Huawei CEO Ren Zhengfei and China's Communist Party Secretary General Jiang Zemin:

> In Ren's words: "I said that switching equipment technology was related to national security, and that a nation that did not have its own switching equipment was like one that lacked its own military. Secretary Jiang replied: Well said." As noted above, in 1996, the government ended special import policies for telecommunications equipment, likely in reaction to national security concerns. (Harwit, 2008: 127-8)

U.S.-China Economic and Security Review Commission "Hearing: China's State-Owned and State-Controlled Enterprises" (2012) report indicates that China's capitalism is strongly state-dominated and main goal of the government is to sustain Communist Party rules and policies through all industries. According to US State Department Reports, state-owned sector has 40% of China's GDP[42]. In China, ten largest multinationals are managed under state-control[43]. Thus, China aims to increase its control over previously defined strategic sectors as energy, telecommunications, defense and financial services. (Fagan, 2008)

"State-Owned Assets Supervision and Administration Commission" (SASAC) controls most of the largest SOEs, their budgets, sales, investments and strategies. The SASAC aims to expand overseas SOEs in China and transform the biggest SOEs through globally competitive national champions; China Mobile, PetroChina, ZTE, Lenovo, China Aluminum and so on. This model has similarities with South Korean chaebols and Japan's keiretsu, however, in China's model role of state and control is much more effective.

[42] http://www.state.gov/r/pa/ei/bgn/18902.htm.

[43] OECD, 2008: 2

China state and China Communist Party's effective roles on these enterprises are clearly indicated in WTO and countries' official security reports.

According to 2011 Report to Congress on China's WTO Compliance, in 2010 the Central Committee of the Communist Party and the State Council prepared and issued the Opinions on Further Promoting the Implementation of the "Three-Major One-Large" Decision-making System. Through this system, state-owned enterprises would found a new decision making system in which Chinese Communist Party plays an important role concerning major business decisions, assigning management team and project arrangements (called as "three major"). This system also manages financial transactions as; movement of large amount of funds (called as "one large") are decided by a selected special group which includes member from Chinese Communist Party.[44]

> In addition, publicly listed firms have a parallel structure to their board — the firm's Party Committee, chaired by the Party Secretary, who reports to the Communist Party of China's Organizational Department. According to one study, the CEOs of the 53 largest SOEs in China are appointed directly by the Communist Party of China's Organizational Department.[45] Local governments or the Communist Party also can exercise control by informally influencing the composition of corporate boards and the corporation's management team.[46] (Fagan, 2008: 19)

According to USTR Report to Congress on China's WTO Compliance (2008), in first years of China's accession to WTO there were not many complaints from US companies. However, after the establishment of SASAC in 2003, China intended to intervene to commercial decision, strategies, management and investment decisions, appointing or removing CEOs of SOEs (United State Trade Representative, 2011: 60). In 2008, Congress of China passed the Law on State-owned Assets of Enterprises which aims to develop

[44] United States Trade Representative, 2011: 61

[45] Graham, Marchick, 2006: 107

[46] Morck, Yeung, Zhao, 2007:6

state-owned enterprises and their dominant role in national economy, specifically in key sectors, and encourage and support the development of socialist market economy through the country.

As a specific policy, 12th Five-Year Plan defined primarily seven "strategic and emerging industries" for state support. Chinese government aims to be the leader country in each of those seven industries; new-generation information technology, high-end equipment manufacturing, advanced materials, alternative-fuel cars, energy conservation and environmental protection, alternative energy, and biotechnology. In order to attain to this goal, China plans to invest $1.5 trillion in these seven industries over the next five years (Twelfth Five-Year Plan). While China strives for dissemination of information technology within China, also allocating significant amount for country's telecommunication infrastructure investments (over $300 billion)[47].

> The decree then specifically identifies seven "strategic" industries, where state capital must play a leading role in every enterprise. These industries include civil aviation, coal, defense, electric power and grid, oil and petrochemicals, shipping and telecommunications. The decree also provides that key enterprises in "pillar" industries must remain under state control. (United State Trade Representative, 2011: 61)

One of these seven strategic industries, where state capital must play a leading role in every enterprise, is "telecommunications"- the others are armaments, power generation and distribution, oil and petrochemicals, coal, civil aviation, shipping- and Chinese government aims to maintain "absolute control" (over 50 percent ownership).

Chinese telecom industry has powerful state-owned enterprises. Operators (China Mobile, China Telecom, China Unicom) are state-owned enterprises which dominate telecom equipment market. Additionally, there are major multinational telecom equipment vendors; ZTE is known as a state-

[47] People's Republic of China, Twelfth Five-Year Plan for National Economic and Social Development (March 14, 2011), Chapter Thirteen, "China Telecom to Build World's Largest Fiber Optic Network"

owned enterprise, Huawei also describes itself as a private company; however, there are significant suspicions about Huawei and ZTE's relations with Chinese state and People's Liberation Army (PLA).

According to report of "Background Material for US-China Economic and Security Review Commission" (2012), China's top telecommunication equipment firms, Huawei and ZTE, strongly benefited from aggressive government support. Chinese government protected and promoted Huawei and ZTE via increasing domestic telecommunications infrastructure and providing enormous financial and political advantages for these national firms.[48]

According to report of US-China Economic and Security Review Commission Hearing- "China's State-Owned and State-Controlled Enterprises", Huawei's close relationship with the PRC (People's Republic of China) and PLA (People's Liberation Army) is documented by many official sources. U.S. Department of Defense's most recent report of "Military and Security Developments Involving the People's Republic of China 2011" emphasizes the Huawei's, Datang and ZTE's close ties with PLA.

> Both Huawei's chairwoman, Sun Yafang, and its founder and CEO, Ren Zhengfei, have had previous careers working as high level officials within the PRC and the PLA. Additionally, it has been reported that many of Huawei's employees have direct ties to the PLA...The PRC has a history in developing and implementing cyber warfare, and given Huawei's close ties to the PLA, it is a significant risk to allow them to distribute sophisticated telecommunications equipment in the United States that could potentially compromise our government infrastructure, military, law enforcement or private citizens. It is simply bad policy to overlook our concerns and leave our country vulnerable to Chinese espionage. (U.S.-China Economic and Security Review Commission, 2012: 2)

[48]The government is the owner, operator, and regulator of the telecommunications sector in China, and decisions regarding the procurement of telecommunications equipment are made accordingly.... The Telecommunications Industry Association reports that, in some procurement by the big three (China Mobile, China Telecom and China Unicom), "companies are ignoring published criteria for bid evaluation, resulting in the selection of 'national' champions." An investment advisory on China's telecom market states that MIIT "has encouraged Chinese operators to purchase telecommunications equipment from Chinese manufacturers, including leading suppliers such as Huawei, ZTE, Datang and Great Dragon."... In 2010, for example, ZTE and Huawei received massive equipment purchases from China Mobile for the rollout of its first Package Transport Network, with each company getting a 35% share of the revenue.[48]" (McCarthy, 2012: 5-8)

The House of Representatives Permanent Select Committee on Intelligence report "Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE" is published in October 8, 2012. In this recent report, Huawei's founder of Mr. Ren Zhengfei and its ties to military was one of the research topics for the Committee. According to interviews with Huawei officials; Mr. Ren was a member of Chinese military's engineering corps as a soldier, then was promoted as a director. Mr. Ren was retired from the army in 1983, then started to work for a state-owned enterprise. Because of low salary, then he left SOE and founded Huawei. However, Huawei officials did not explain details about Mr. Ren's leaving his employment in this SOE.

> Huawei officials denied that Mr. Ren was a senior member of the military. The Committee's requests for more information about Mr. Ren's military and professional background were unanswered. Huawei refused to describe Mr. Ren's full military background. Huawei refused to state to whom he reported when he was in the military. Huawei refused to answer questions about how he was invited to join the 12th National Congress, what duties he performed for the Party, and whether he has been asked to similar state-party matters. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 24)

Moreover, report claims that Huawei officials did not give information about the role and status of Mr. Ren Zhengfei in Chinese Communist Party.

> In his official biography, Mr. Ren admits that he was asked to be a member of the 12th National Congress of the Communist Party of China[49] in 1982. The National Congress is the once-in-a-decade forum through which the next leaders of the Chinese state are chosen. The Party members asked to play a role in China's leadership transition are considered key players in the state apparatus. Mr. Ren proudly admits that he was invited to that Congress, but he will not describe his duties. Shortly after being given such a prestigious role, Mr. Ren successfully founded Huawei, though he asserts he did so without any government or Party assistance. Huawei likewise refuses to answer whether Mr. Ren has been invited to subsequent National Congresses or has

[49] 12th National Congress of the Chinese Communist Party was convened on 1 September 1982. This congress has also a strategic meaning which was the first Congress of the Party after Deng's reform of 1979 and before this congress, strategic industries for China had already been defined and one of them was telecommunications.

> played any role in Party functions since that time. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 23)

According to report, the Committee received no information about the role of Chinese Communist Party in Huawei and also Huawei's formal interaction channel with Chinese government. Huawei specifically denied having any links to Chinese government.

However, report underlines the doubts as follows;

> Many industry analysts, however, have suggested otherwise; many believe, for example, that the founder of Huawei, Ren Zhengfei, was a director of the People's Liberation Army (PLA) Information Engineering Academy, an organization that they believe is associated with PLA, China's signals intelligence division, and that his connections to the military continue.... many analysts believe that Huawei is not actually controlled by its common shareholders, but actually controlled by an elite subset of its management. The Committee thus requested further information on the structure of the company's ownership. For example, the Committee requested that Huawei list the ten largest shareholders of the company. Huawei refused to answer. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 13-14)

The report also emphasizes role of Chinese Communist Party in Huawei management team. According to report, Huawei admits that Chinese Communist Party maintains a Party Committee in the company, however, Huawei failed to explain the role of this Party Committee and who are attendees of the committee. Huawei also advocates this position as; "party committee is an obligation in all companies in China according to Chinese laws." These committees also influence, pressure and monitor of corporate activities according to experts of Chinese political economy.[50]

> In essence, these Committees provide a shadow source of power and influence directing, even in subtle ways, the direction and movement of economic resources in China. It is therefore suspicious that Huawei refuses to discuss or describe that Party Committee's membership. Huawei similarly refuses to explain what decisions of the company are reviewed by the Party Committee,

[50] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 22-23

> and how individuals are chosen to serve on the Party Committee. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 23)

Huawei's R&D programs and its relation with Chinese military and intelligence services is another topic for the report. Huawei officials refused to provide details about R&D operations; however, Huawei officials admit that Huawei provides products to Chinese military as 1% of its total sales.[51] The report also mentions some documents related to Huawei's relations with PLA.

> The Committee also received internal Huawei documentation from former Huawei employees showing that Huawei provides special network services to an entity the employee believes to be an elite cyber-warfare unit within the PLA. The documents appear authentic and official Huawei material, and the former employee stated that he received the material as a Huawei employee.... The Committee finds that Huawei's statements about its sales to the Chinese military are inherently contradictory. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 34)

On 4th -10th August 2012, title of The Economist was "Who's Afraid of Huawei? Security Threats and China's New World-Beater". The paper reports that Westerners say Huawei has close ties with People's Liberation Army and Huawei's networks are eavesdropped by Chinese military. They also see Huawei as a potential weapon of China for cyber war. For instance, Australian government blocked Huawei's participation to national broadband network tender in the country because of the probability of Huawei's relations with Chinese state and army.[52]

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[51] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 34

[52]However, the United States is not alone in questioning the companies' links to the Chinese government. Sir Malcolm Rifkind, chair of British Parliament's Intelligence and Security Committee, revealed that the ISC will investigate Huawei's relationship with British Telecom, which uses Huawei's equipment for large infrastructure projects such as fiber-optic, broadband, or 4G networks. Canada invoked its "national security exception" in the bidding process for a new secure communications network, a move that some have suggested is linked to the U.S. report. Australia had previously kept Huawei from supplying the country's new fiber network.
(https://www.law.upenn.edu/blogs/regblog/2012/10/24-takahashi-chinese-telecom.html)

Thus, Australian national broadband network (NBN) tender was an important case for Huawei and its global image. The amount of project is approximately $37.6 billion and aims to bring fiber optic broadband connectivity to 93% of Australia by 2020. Australian government prohibited Huawei from the tender due to advice of the Australian Security Intelligence Organization (ASIO), because of the notion of the having strong links with the Chinese military. (http://afr.com/p/national/asio_forced_nbn_to_dump_huawei_FaglE6qWrqd5utgLpR0IdO).

Additionally, in Germany's national research and education network project (DFN), Chinese telecom equipment suppliers were excluded because of security concerns, as similar to Australian case. (Economic and Security Review Commission, 2012: 18)

> British intelligence officials have reportedly warned government ministers of potential infrastructure threats emerging from communications equipment provided by Huawei to networks operated by British Telecom.[53] In Australia, intelligence officials have reportedly investigated alleged links between Chinese military officials and employees of Huawei's Australian offices. In May 2010, Indian press reports revealed concern among intelligence officials about Huawei's activities in India, and the Indian communications ministry has placed limitations on the role of Huawei in India's communications networks. In Taiwan, representatives of the opposition Democratic Progressive Party have also expressed concern over the expansion of Huawei into the island's telecom and network equipment markets, identifying this as a threat to Taiwan's security. (US-China Economic and Security Review Commission, 2011: 16)

Huawei rejects all these alleged security concerns and explains its ownership status as Huawei is privately held and 100% owned by its employees and no other organizations – Chinese government and army does not have any shares in Huawei.[54]

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[53] See Michael Smith, "Spy Chiefs Fear Chinese Cyber Attack," *Sunday Times (London)*, March 29, 2009; and Alastair Jamieson, "Britain Could Be Shut Down by Hackers from China, Intelligence Experts Warn," *Telegraph (UK)*, March 29, 2009.

[54] Lemay, R. (2008) "Huawei Denies 'Ludicrous' Espionage Claims," *ZDNet News Online*

In 2007, Huawei Technologies Corp. with its partner Bain Capital Partners attempted to propose joint investment to buy US firm 3Com- data networking equipment manufacturer for $2.2 billion. According to 3Com 8-K (2007) Bain Capital would control 83.5 % and Huawei would get 16.5%. A group of Republican members of the House of Representatives resisted to this proposal by indicating Huawei's ties to PLA and its threat to national security of US. Thus, these members requested CFIUS to reject this acquisition. In an interview, Representative Hoekstra told that "there is no doubt as to why the Chinese want a partnership with 3Com. They look at this as a key connection to stealing additional secrets from U.S. corporations and from our national security apparatus." Finally, the proposal was withdrawn following a review of the deal by CFIUS (Committee on Foreign Investment in the United States). The main reason behind that decision was US national security concern. (Fagan, 2008:17, Morrison, 2011:18)

> ...the intended deal between Huawei and 3Com fell afoul of the U.S. government interagency Committee on Foreign Investment in the United States (CFIUS), which investigated the deal on national security grounds. Among the alleged concerns were (1) that Huawei had links to the Chinese military; and (2) that Tipping Point, a subordinate unit of 3Com, provides network security products and services to the Department of Defense (DOD) and a number of other federal agencies. Following failure to negotiate a "mitigation agreement" to answer government concerns, Bain announced in March 2008 that it was backing out of the deal.[55] (U.S.-China Economic and Security Review Commission: 2011:29)

U.S. The House of Representatives Permanent Select Committee on Intelligence report (8 October, 2012) also indicates Huawei's attempt to purchase 3Leaf Systems. In May 2010, Huawei offered to buy 3Leaf Systems – US technology firm, however, CFIUS (The Committee on Foreign Investment in the United States) officially warned Huawei to withdraw its proposal and then this acquisition was cancelled. After this period, Huawei Technologies published an open letter to U.S. government in order to deny the security

[55] Reuters (2008), "Opposition Leads Bain to Call Off 3Com Deal" March 21.

concerns with Huawei and/or equipment and services. (The allegation was about stealing the confidential information of United State or launch network attacks on entities in US). Additionally, Huawei requested a full investigation for its corporate activities in this letter.

The letter was issued by Deputy Chairman of Huawei Technologies, Chairman of Huawei USA Ken Hu, and publicly announced on Huawei's official website. In this letter, Huawei aimed to declare actual reason behind the proposed acquisition of 3Leaf, and thus some long-standing and untrue rumors and allegations regarding Huawei would be clarified.

In this official letter, importance of setting close relations with American people and firms and satisfaction being in America was emphasized. However, over ten years, Huawei was encountered by numbers of misperceptions, included unproven claims as "close ties with Chinese military, "stealing intellectual property", "financial support from the Chinese government," and "threats to the national security of the United States". In letter these allegations were answered.

For ties with military, letter continues as below;

> Mr. Ren Zhengfei was employed in civil engineering until 1974 when he joined the military's Engineering Corps as a soldier tasked with building the then French-imported Liao Yang Chemical Fiber Factory. From there, Mr. Ren was promoted to Technician, Engineer and Deputy Director, a deputy regimental- chief-equivalent professional role that had no military rank. Because of his outstanding performance, Mr. Ren was invited to the National Science Conference in 1978 and the National Congress of the Communist Party of China in 1982. After retiring from the army in 1983… He became the President of Huawei in 1988 and has held the title ever since.
> It is a matter of fact that Mr. Ren is just one of the many CEOs around the world who have served in the military, and it is also a matter of fact that Huawei has only offered telecommunications equipment that is in line with civil standards. (Huawei Open Letter, 2010, http://www.huawei.com/en/about-huawei/newsroom/press-release/hw-092875-huaweiopenletter.htm)

Moreover, on 5th October, 2011, a report was prepared by U.S. Open Source Center of the Office of the Director of National Intelligence. The report emphasizes that China's leader telecommunication company Huawei Technologies has links with Chinese intelligence services. Huawei

Technologies has series of formal and informal relations with Chinese People's Liberation Army and Ministry of State Security. Additionally, the report indicates that Huawei's chairwoman Sun Yafang was an employee of the Ministry of State Security (MSS) Communications Department prior to joining to Huawei in 1989.

> *Xinjing Bao* reported that Huawei Chairwoman Sun Yafang worked for the Communications Department of the Ministry of State Security for an unspecified period of time before joining Huawei (28 October 2010). (Open Source Center, 2011: 2)

Sun's another critical role was related to provide financial sources to Huawei. Prior to joining to Huawei, Sun helped Huawei and provided financial support when the company was founded in 1987.

> Sun also used her "connections" at the Ministry of State Security to help Huawei through financial difficulties "at critical moments" when the company was founded in 1987, according to an undated report on Feng Huang Wang, the website of pro-Beijing Hong Kong broadcaster Phoenix Satellite Television Holdings Ltd. (Open Source Center, 2011: 2)

According to the Washington Post- John Pomfret, the representatives of the National Security Agency (NSA) - the nation's electronic spying agency - warned with a call AT&T's (US telecom operator) senior executives about the risk of purchasing telecommunication equipment from Huawei during AT&T's LTE network investment planning. The reason is that China's intelligence agencies could embed digital trapdoors to Huawei's technology and products and thus secret listening on U.S. communications network could be possible[56]. AT&T did not make any public announcements about this case, however, at the end in February 2010 Swedish-owned Ericsson and Paris based Alcatel-Lucent were chosen as equipment suppliers for next generation LTE network.[57]

[56] Pomfret, J. "Between U.S. and China, a Trust Gap," *Washington Post*, October 8, 2010.

[57] Bender, R., Sandstrom, G. (2010) "2nd UPDATE: Ericsson, Alcatel Get 4G Network Deal From AT&T," *Foxbusiness.com*, February 10, 2010.

Finally, another topic is that Huawei's ownership model which is quite suspicious. Huawei officials claim that Huawei is an employee-owned company, however, official reports of other countries have questions about actual ownership structure of the company.

> Huawei Technologies Co., Ltd., is itself a wholly owned subsidiary of Shenzhen Huawei Investment & Holding Co., Ltd. The company's employee shareholding program is managed by a shareholder body called the Union of Shenzhen Huawei Investment Holdings Co., Ltd., whose governing board is made up entirely of senior company officials. The company's shares are not freely traded but rather allocated to employees annually as incentives. Only employees within China can hold shares, and they must sell them back to the company if they leave Huawei's employ[58]. (U.S.-China Economic and Security Review Commission, 2011: 15)

Huawei's ownership status is also suspicious topic for The House of Representatives Permanent Select Committee on Intelligence Report (2012). According to Huawei officials' declarations, Chinese government has no influence on corporate behavior and decisions, and Huawei is managed as an employee-owned enterprise through Huawei's Employee Stock Ownership Program (ESOP). This program provides an option to high-performing employees to buy dividend-providing shares and share in the value of company. These employees can only sell these shares when they leave Huawei or with corporate approval. According to Huawei, Union holds 98.7% of the ESOP shares; Mr. Ren Zhengfei has only 1.3%. Finally, Huawei refused to explain how the first Board of Directors and first Supervisory Board were chosen.[59] Huawei also refused to answer the Committee's questions about the company's interaction and regulation by the government bodies.

In sum, ownership status of Huawei is not a definite matter, namely, owners of the ESOP shares is not known.

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[58] Saarinen, J. (2010) "Analysis: Who Really Owns Huawei?" *ITNews (Australia)*, May 28, 2010. *http://www.itnews.com.au/News/175946,analysis-who-really-owns-huawei.aspx.*

[59] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 15-16

U.S. The House of Representatives Permanent Select Committee on Intelligence report (2012a) also investigated ZTE by interviews with ZTE officials, document reviews and so on. According to report, ZTE has current and historical ties with Chinese government and military research institutes and there is strong government effect on corporate management level.

> ZTE officials instead suggested that Mr. Hou Weigui founded ZTE in 1985 with five other "pioneer" engineers. Although they had all previously worked for state owned enterprises, ZTE officials insisted that the formation of ZTE did not arise from any relationship with the government. The company's written submission to the Committee admits that the company had an early connection to No. 691 Factory, which was established by the Chinese government. As described by ZTE, No. 691 Factory is now known as Xi'an Microelectronics Company, and is a subsidiary of China Aerospace Electronics Technology Research Institute, a state-owned research institute. In its submission, ZTE admits that Xi'an Microelectronics owns 34% of Zhongxingxin, a shareholder of ZTE. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 38-9)

Additionally, ZTE's largest shareholder is Zhongxingxin which is owned by other two state-owned enterprises -Xi'an Microelectronics and Aerospace Guangyu- there is ownership ties to Chinese state and there are operations related to technological research and development for military and government needs.[60]

Moreover, ZTE officials also did not give detailed answers to the Committee related to "formal interactions with Chinese government", "financial information beyond publicly announced" and "the former role of ZTE Communist Party Committee".

As similar with Huawei case, ZTE's relation with Chinese Communist Party is one of the key concerns for the report. Communist Party Committee takes place in the company; however "its functions", "who chooses the members and relations with Chinese Communist Party" are unclear aspects according to the report. ZTE officials refused to answer to the Committee

[60] U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 40

about detail information for these topics. However, Committee insisted to take more information:

> In response to questions posed at the September 13, 2012, hearing ZTE did provide the Committee a list of 19 individuals who serve on the Communist Party Committee within ZTE... ZTE has requested and the Committee has agreed to keep the names of these individuals out of the public domain... The company asked that the Committee not release the names of the individuals for fear that the company or the individuals might face retaliation by the Chinese government or Communist Party. The Committee has decided to keep the names of those members out of this public report, but the company's concern with the potential retaliatory measures it faces by the government for simply providing the Committee the names of an internal ZTE body highlights why this Committee remains very concerned that the Chinese state is, or could be, responsible for the actions of the company. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 40)

Another example for the effect of Chinese state over domestic telecom companies is that, in October 2004 Chinese government shuffled the top management of three major telecom companies; a senior executive of China Unicom became the new head of China Mobile, a vice president of China Mobile was made the head of China Telecom and head executive of China Telecom was moved to China Unicom.[61] This sudden management shift was directed by the Central Organization Department of the Chinese Communist Party.[62]

Another sudden personnel shuffle was in 2008.

> The president of China Tietong (China Railcom) and the vice president of China Unicom were all transferred to China Mobile; and the vice president of China Unicom, and the head of the CCP Discipline Inspection Team of China Unicom, were transferred to China Telecom.[63] The restructuring also

[61] Hille, K. (2010) "China Mobile in Board Shake Up," *Financial Times,* May 31, 2010.

[62] ibid

[63] ChinaTechNews.com, (2008), "China's Telecom Restructuring Plan Finally Announced," May 26, 2008. *http://www.chinatechnews.com/2008/05/26/6787-chinas-telecom-restructuring-plan-finally-announced.*

> mandated the merging of China Mobile and the smaller China Tietong and for China Unicom to be divided, with its CDMA network sold off to China Telecom and its GSM network business merged into China Netcom.[64] (U.S.-China Economic and Security Review Commission, 2011: 27)

At last, in 2010 new personnel shuffle and reorganization was carried out in telecom sector. The chief executive of China Mobile was removed and appointed party secretary of China Mobile's Communist Party committee. The Financial Times evaluated this management change as "left observers confused… underscoring the opaque nature of China's state enterprises".[65]

Finally, The American Enterprise Institute for Public Policy Research (AEI) held a conference on 22 March, 2012 as "Chinese Telecom Investment in the U.S.: Weighing Economic Benefits and Security Risks". There were speakers from US government officials and also academicians from university. According to conference remarks, recent attempts of Chinese telecom equipment firm Huawei have met resistance from Obama administration. Derek Scissors of the Heritage Foundation underlined that large private firms in Chinese telecom equipment industry are explicitly controlled by the Chinese government.

> U.S. officials have publicly claimed that there are over 3,000 Chinese "front companies" operating in the United States whose purpose is to gather intelligence and technology[66] .... The implications of these concerns over Chinese espionage are two-fold. First, Chinese FDI in defense, aerospace, telecommunications, IT, and other high technology sectors will face very close scrutiny from CFIUS and may not be permitted; if it is permitted, it would likely only be on the basis of an entirely passive investment and/or considerable mitigation commitments. Second, as the proposed Huawei-3Com transaction makes clear, the potential nexus between an individual investment from China and broader concerns over Chinese espionage will remain a focus for Congress. (Fagan, 2008: 20)

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[64] Xing, W. (2008) "Jury Out on Dramatic Telecom Restructure," *China Daily*, May 24, 2008.

[65] Hille, K. (2010) "China Mobile in Board Shake Up," *Financial Times*, May 31, 2010.

[66] http://www.cnn.com/2005/US/02/10/fbi.espionage/index.html

Consequently, there is a clear strategic map of state since Deng's 1979 economic reform. After the decision of integration with global economies, strategically important industries have been defined; one of these industries was also telecommunication. Since then, Chinese state has always actively involved through the industry with related strategies and policies and directly intervenes to the market via local players. As an owner, operator, and regulator of the telecommunications sector, Chinese government manages the industry according to interest of China.

In sum, Chinese state has critically important effect on Chinese telecom equipment industry; such as determined the industry as strategically important industry in five-year plans. Most of the players in the industry are state-owned and now are managed by SASAC (The "State-Owned Assets Supervision and Administration Commission), the rest of the companies are named as privately held; however, ownership structure of these companies is also suspicious. Market relations are also effected by state authority, because the most of the infrastructure equipment are demanded by telecom operators which are state-owned and in their tenders the greater shares always belong to domestic suppliers as indicated in above cases. Thus, the industry is strongly affected by Chinese state and related policies.

The next research question is about the effect of foreign investments during catch-up of telecom equipment industry.

Sub-Hypothesis-2

Foreign investments and Joint-ventures had played one of the most important roles during emergence and catch-up of Chinese telecom equipment industry.

> China continues to impose technology transfer requirements as a condition of foreign investment in many Chinese sectors, despite its WTO commitment not to do so. China continues to exercise control over technology transfers in its review of joint venture applications, as well as in the government's involvement

in contract negotiations between Chinese SOEs and foreign investors. (Daly, 2012: 4)

Latecomer industries need to acquire and disseminate the modern technology indigenously. Thus, technology transfer is quite strategic for upgrading the current capability of industries. In this scope, acquiring and internalize the modern technology within national industry is milestone for catch-up policies. Within this broad debate, attaining to modern technology is the critical point for catch-up and development. One of the most important ways to transfer the technology is foreign investments. Specifically in high-technology industries, the recent common models try to transfer the technology via foreign investments and have indigenous effort to absorb, disseminate and improve the technology with local capabilities.

In early 1970s, China's technology infrastructure was outdated and settled on imported machinery strategy with insufficient technology development capability. By the leadership of Deng Xiaoping, China opened doors by economic reform of market-oriented economic system. This new economic system aimed to update national technological infrastructure and create awareness for emerging strategic industries with foreign investments in order to succeed national catch-up and development. This open economy system was a strategic attack to enhance technological and industrial capability of China via the know-how dissemination from foreign investments of advanced industries.

As a part of this strategy, National People's Congress passed the Equity Joint Venture Law and gave legal permission for foreign investments in 1979. Through this strategy, foreign investments would be encouraged in strategic industries. During this strategy, Chinese great market potential would be the main attractive point for foreign companies and investments. Chinese government settled "joint venture" formations mainly on "The Law of the People's Republic of China on Sino- foreign Equity Joint Ventures" which tells that;

> Article 1
> …In order to expand international economic co-operation and technological exchange the People's Republic of China shall permit foreign companies, enterprises and other economic entities or individuals (hereinafter referred to as foreign partners) to establish, within the territory of the People's Republic of China, equity joint ventures with Chinese companies, enterprises or other economic entities (hereinafter referred to as ~ partners), in accordance with the principles of equality and mutual benefit that are subjected to the approval by the Chinese government.
> http://english.mofcom.gov.cn/aarticle/lawsdata/chineselaw/200301/20030100062855.html

In this joint-venture strategy, attractiveness of size of Chinese market was the key point. The official strategy of "Trading Markets for Technology" (TMFT)" encouraged and promoted the establishment of joint ventures between foreign firms and state owned enterprises since 1978. By means of this strategy, foreign companies would be allowed to access to Chinese domestic market with the requirement of sharing its technology with state-owned companies. Through this strategy, international technology spillover and know-how dissemination was the main objective. This strategy is also known as "providing market access in return for technology".

While open-economy policy aimed to upgrade outdated infrastructure of existing industries and create awareness for newly emerging industries, however, this strategy does not sign a fully liberalized system; instead of, this is also a kind of state-controlled and state-planned system, specific to China. The main difference between previous isolated closed-door system and Deng's open economy system was integration with the rest of the world in the limits of Chinese national interest.

Through this paradigm shift, strategic industries have been determined by Chinese state. One of these strategic industries was "telecommunication", because until 1978 Chinese telecom infrastructure was quite old-dated and insufficient and should have been upgraded. Therefore, Chinese government took a strategic political decision and opened Chinese telecom market to foreign enterprises.

China has encouraged the creation of joint ventures in order to rapidly acquire technology and develop a domestic industry capable of meeting the country's demand for telecommunications equipment.[67] These joint ventures involve the participation of the world's leading companies in the sector including such firms as Alcatel, Ericsson, Lucent Technologies (Lucent), Motorola, NEC, Nokia, Nortel and Siemens. (Carr, R. et al., 1998: 8-1)

Table 35: Telecommunications Equipment: Representative Examples of Joint Ventures in China

Foreign Partner/Domestic Partner	Joint Venture Name	Selected Products
Alcatel/Posts and Telecommunications Industry Corporation	Shanghai Bell Telephone Equipment Manufacturing Company	Switches
Ericsson/Shanghai Simtek Industrial Company	Shanghai Ericsson Simtek Electronics Company	Electronic components for telephone modules
Motorola/Shanghai Radio Communication Equipment Manufacturing Company	Shanghai Motorola Paging Products Company	Pagers
NEC/Benxi Communications and Electrical Appliance Industry Corporation	Benxi NEC Communications Company	Private Branch Exchanges
Nokia/Posts and Telecommunications Industry Corporation	Beijing Nokia Mobile Telecommunications Company	GSM Cellular Infrastructure Equipment
Nortel/China Tong Guang Electronics Company	Tong Guang Nortel Telecommunications Ltd.	Private Branch Exchanges
Siemens/Shanghai Posts and Telecommunications Authority	Siemens Shanghai Mobile Communications Company	GSM cellular radio base station equipment and handsets

Sources: Carr, R. et al., 1998: 8-3 and company reports.

The official strategies of "defining telecom as a strategic industry and government's investment policy for upgrading the national infrastructure" and "new policy which gave rights for foreign telecom equipment vendors to sell in Chinese market" provided great market potential for foreign telecom

[67] International Telecommunications Union (1997), "World Telecommunication Development Report", Geneva: ITU, pp. 22-23.

equipment vendors. As shown in Table 35, foreign multinationals became leading suppliers of telecommunication products in Chinese market, as switches, transmission equipment, cellular equipment, satellite equipment and so on. These firms were upgrading the outdated telecommunication infrastructure of China by sales of their products.

Through this strategy, multinational telecommunication equipment vendors were strictly attracted by China's enormous market size, mostly for sales and low-value added manufacturing operations. Major state owned telecom equipment companies established joint ventures with multinationals specifically between 1984 and 1993. In 1980s, central office switch suppliers, optic fiber and wireless communication system manufacturers launched joint ventures in China. The joint ventures aimed to deploy their technologies to Chinese market; however, these investments also directly and indirectly assisted to increase Chinese national technology production capacity in telecom equipment industry.

> While China encourages joint ventures in order to develop the domestic industry, foreign telecommunications equipment manufacturers are attracted to China's enormous market potential industrialization, and ambitious equipment development program. The Chinese partner in these joint ventures is typically a national, provincial, or local government agency. For instance, Shanghai Bell Telephone Equipment Manufacturing Company (Shanghai Bell), which has been producing central office switching equipment since 1983 is jointly owned by the French company Alcatel and China's Ministry of Posts and Telecommunications (MPT). (Carr, R. et al., 1998: 8-1-2)

In telecom equipment industry, first foreign joint venture was Shanghai Bell Telephone Equipment Manufacturing Co., established in 1983. Shanghai Bell's shareholders were PTIC (The Posts and Telecommunications Industrial Corporation) of MPT (60%), Bell Telephone Manufacturing Company (BTM) (32%) and Belgian government (8%). Shanghai Bell became a major player in Chinese ICT sector and Bell was the largest manufacturer of telecom equipment in China with the product of S-1240 switch in 1990s. (He, Mu, 2012)

Table 36: Main Joint Ventures in the Digital Phone Switch Market

Product Type	Company	Multinationals	Equity share by Chinese Partner	Start Year of Production
S-1240	Shanghai Bell	Alcatel Belgian	60%	1986
EWSD	Beijing International Switching Communication	Siemens Germany	60%	1992
AXE10	Nangjing Ericsson	Ericsson Sweden	43%	1993
NEAX-61E/61	Tienjing NEC	NEC Japan	60%	1994
5ESS	Qingdao Lucent	Lucent USA	49%	1995
DMS-100	Guangdong Nortel	Nortel Canada	60%	1995
F-150	Jiangsu Fujitsu	Fujitsu Japan	35%	1995

Source: Key Industry Innovation, 1997

As shown in Table 36, the foremost multinational telecom equipment vendors Alcatel, Siemens, Ericsson, NEC, Lucent, Nortel and Fujitsu established joint ventures with Chinese partners in order to get share in Chinese market with their products. Shanghai Bell took nearly half of switch market in China via the assistance and support of Chinese government. According to statistics in Table 37, Alcatel had 43% market share in China for digital switching equipment which was an advanced technology in 1990s.

Table 37: China: Digital Switching Market Share, 1994

Firms	Market Share
Alcatel	43%
Ericsson	12%
Fujitsu	12%
Siemens	11%
NEC	10%
Nortel	7%
AT&T	3%
Other	2%

Source: Pyramid Research estimates, company reports,
Rehak, A., Wang, J., 1996:6

> After a brief period of restricting the switching market to a handful of foreign manufacturers, China has effectively permitted seven foreign switching suppliers to sell to the MPT, doubling competition and pushing prices to the lowest level anywhere in the world. Alcatel is the dominant supplier of central office exchanges, thanks largely to its highly successful joint venture Shanghai Bell. (Rehak, Wang, 1996: 6)

By Deng's open economy reform, defining the telecommunication as a strategic industry, then authorization for joint ventures, in time, local firms enhanced technology production capacity including reverse engineering, labor turnovers, imitation and international and domestic R&D activities.

This period initiated a new stage for the industry. Thus, the first indigenous digital switch (HJD-04) was developed by a R&D consortium constituted of three organizations in 1991; The Center for Information Technology (CIT) under the Zhengzhou Institute of Information Engineering of the People's Liberation Army, the Posts and Telecommunications Industrial Corporation (PTIC), and the Luoyang Telephone Equipment Factory (LTEF) of MPT. (He, Mu, 2012: 277). HJD-04 was firstly commercially marketed by the company of Great Dragon which was established as an affiliate of Luyang Telephone Equipment Factory in collaboration with other Chinese SOEs. Under the leadership of MPT, technology of HJD-04 was diffused to local industrial community. Then, HJD-04 development team provided consultant services for Huawei and ZTE and development period of their own switches.

> After the development of the HJD-04 in 1991, knowledge diffusion was further amplified through the inter-flowing of engineers or related persons, which finally led to successive development of four types of digital automatic switches (EIM- 601, ZXJ-10, SP-30 and C&C08) by other indigenous firms. The later development of other types of digital switches by Jinpeng, ZTE (Zhongxing), Datang, and finally Huawei benefited from knowledge diffusion via inter-firm mobility of skilled engineers. (He, Mu, 2012:278)

Thus, domestic firms Huawei, ZTE, Datang, which had previously focused on Public Digital Switch Systems (PDSS), developed their own digital

switches and attained to significant market share specifically in rural market which had been neglected by multinational equipment vendors.

In sum, China learned digital switches with the evolution period of direct import, joint ventures and developing indigenous products within 10-15 years. In that period, technology imitation and reverse engineering were major strategies of national telecom equipment companies; ZTE and Huawei for development of own digital switches. Li summarizes the catch-up strategy in telecom equipment industry as follows;

> Specifically, the Chinese government and telecom manufacturers adopted a three-stage priority plan: 1) "importing and transferring," 2) "digesting and absorbing," and 3) "growing and exporting" with the hope that the Chinese homegrown firms would eventually catch up with foreign companies."[68] (Li, 2006: 5)

On the other hand, these multinational rivals also alleged Chinese telecom firms about industrial espionage and industrial property privacy in recent years. For instance; Cisco Systems Inc. filed suit against Huawei in 2003. Cisco has allegation about Huawei for misappropriating and copying Cisco's source code, copying router technology, duplicating Cisco's user interface, and plagiarizing from Cisco's user manuals."

> John Chambers, the boss of Cisco, an American supplier of network equipment, recently claimed that Huawei does not always "play by the rules" on intellectual property; many in America are convinced that Huawei stole the design of one of its early products from Cisco, though the Chinese company hotly denies this. Cisco settled a lawsuit it had brought against Huawei in 2004 in a way that both sides spun as vindication. (The Economist, 2012: 20)

Another multinational competitor of Huawei, Motorola filed suit against Huawei in 2010 concerning stealing proprietary trade secrets from Motorola. The lawsuit alleges that Motorola employees (two of them Shaowei Pan and Hanjuan Jin) colluded with Huawei and its founder Ren Zhengfei and stole proprietary technology and gave it to Huawei. The intermediary firm was

68 Tan, 2002: 24-29

Lemko which was founded by Shaowei Pan and other Motorola employees. (US-China Economic and Security Review Commission, 2011)

> "…one day after quitting Motorola, [Ms. Hanjuan] Jin was stopped at O'Hare airport with over 1,000 Motorola documents in her possession, both in hard copy and electronic format. A review of Motorola computer records showed that [Ms.] Jin accessed a large number of Motorola documents late at night. At the time she was stopped, Jin was traveling on a one-way ticket to China… [the charges against her] are based on evidence that Jin intended that the trade secrets she stole from Motorola would benefit the Chinese military." (U.S. Department of Justice, 2010)

In sum, digital switch technology was the base technology for Chinese telecom industry through the evolution to today's mobile technologies. In time, Chinese telecom equipment vendors achieved the learning period from switch technology through mobile technologies and attained to market leader position for latest technology 3G in Chinese market and attained to significant market shares in overseas market.

Know-how spillover from joint ventures of foreign partners provided important source to learn the newest technologies. Although Chinese telecom manufacturing industry's growth story mainly starts at end of 1980s with Equity Joint Venture Law, Chinese telecommunication market has attained to a rapid development at the beginning of 1990s by developing national digital switches. Meanwhile, Chinese national equipment vendors began to emerge and increase their market share year by year, firstly in rural market, then Chinese market as a whole. The sales revenue came from domestic market also financed R&D operations for newer technologies; as optic fiber transmission systems, wireless mobile base stations and mobile handsets and so on.

Sub-Hypothesis-3

Chinese huge domestic market financed emerging and growth stages of national telecom equipment industry.

Domestic market has strategic role in financing local industries and the local firms could benefit and finance their operations from domestic market sales. Thus, size of domestic market is just an advantageous for emerging industries of latecomers, because, until being globally competitive, this market provides benefits for local industries (in the scope of financing the operations, market feedbacks etc.)

After Deng's reform and definition the telecommunication as one of strategic industries, Chinese telecom market had great potential for both of foreign and local telecom equipment vendors, because telecommunication infrastructure of China was insufficient and also full of old-dated equipment. In first years, by joint ventures, multinational telecom equipment vendors attained to significant sales volume in Chinese telecom market.

Table 38: Sales Value and Annual Growth Rate of China's Telecom Industry (1998–2005)

Year	Sales Value (billion Yuan)	Annual Growth Rate (%)
1998	156.2	-
1999	216.0	38.3
2000	314.5	45.6
2001	409.9	30.3
2002	520.1	26.9
2003	647.9	24.6
2004	914.8	41.2
2005	1,157.5	26.5

Sources and notes: http://www.mii.gov.cn/col/col169/index.html, Zhuangjun, H., Chuanwu, H., 2006: 57, Li (2006).

Chinese state (after open-economy decision) considered telecom sector as one of the most strategically and commercially important industries. Then,

China telecom industry attained to significant growth rates in time. As shown in Table 38, telecom industry growth had average 34 percent annually between 1998 and 2005 and totally 3.179,4 billion Yuan sales value.

The potential of domestic market has become important tool for growth of local firms; Huawei, ZTE, Great Dragon and Datang. Emergence of indigenous firms in the market started with development of their own national digital switches and focus on rural market which had been neglected by multinational rivals in 1990s.

Table 39: Breakdown of Market Share in Central Office Switches Market

	1982	1987	1992	1997	2000
Direct Import	100%	89%	54%	5%	0%
Joint Venture	0%	11%	36%	63%	57%
Indigenous Suppliers	0%	0%	10%	32%	43%

Source: Tan, 2004

After open-economy decision central office switches market was dominated by imported products. As shown in Table 39, in 1982 there were only imported switches in Chinese market. However, in 1987 joint ventures had 11%, 36% in 1992 and 63% market share in 1997. Meanwhile, indigenous suppliers began to get market share since 1992 10%, 32% in 1997 and 43% in 2000. In 2000, direct import was not in the market and the joint ventures and indigenous suppliers shared the revenues of the market. In sum, this table indicates that indigenous suppliers increased market share in only 13 years from 0% to 43% in central office switches market.

The sales revenue, market experience and know-how accumulation of switch technology were used for the development of next generation telecommunication technologies. Addition to network technologies (switches, routers etc.), telecom equipment industry found a new field as mobile technologies. 1G, 2G and finally 3G became popular technologies and created great markets in worldwide. The countries for infrastructure equipment (base

stations, mobile switches etc.) and people for mobile terminals became new targets for telecom equipment vendors.

China is also a great market for mobile technologies for telecom equipment vendors, too. Both of foreign telecom vendors and Chinese vendors have become in a fierce competition in the market.

Table 40: Breakdown of Market Share in China's 2G Wireless Market

Year		**1994**	**1999**	**2000**	**2001**	**2002**
Infrastructure Equipment (Base Stations, Mobile Switches)	Direct Import	100%	31%	25%*	23%*	n/a
	Subsidiaries & Joint Ventures	0%	66%	70%	67%	n/a
	Indigenous Producers	0%	3%	5%	10%	n/a
Terminal Equipment (mostly handsets)	Direct Import	100%	5%	2%	2%	2%
	Subsidiaries & Joint Ventures	0%	92%	88%	83%	59%
	Indigenous Producers	0%	3%	10%	15%	39%

Source: Survey by MII's Telecommunications Information Research Institute
*Tan's estimate (Tan, 2004)

As illustrated in Table 40, all infrastructure equipment of mobile market (2G base stations and mobile switches) were imported in 1994, however in 2001 direct import decreased to 23%, "subsidiaries and joint ventures" attained to 67% and successively indigenous producers got %10 market share. Similar trend is seen for terminal equipment market, too. In 1994, direct import operations had 100% market share, however, in 2001 "subsidiaries and joint ventures" got the biggest share as 83%, indigenous producers had 15% market share, and direct import stayed at only 2%.

After 2G, the next technology was 3rd generation of mobile telecommunications technology-3G. Chinese indigenous vendors took the greater share in 3G market. While Chinese vendors were the followers in switches, 1G and 2G eras, they attained to a big success in 3G. According to Table 41, Chinese vendors Huawei, ZTE and Datang got nearly two thirds of 3G equipment in China domestic market in 2009.

Table 41: China 3G Equipment Market Share: 2009

Huawei	21.9%
ZTE	29.3%
Datang	12.6%
Ericsson	10.9%
Nokia Siemens	6.8%
Alcatel Lucent	6.8%
Motorola	2.7%
Nortel	2.3%
Others	6.7%

Source: DBS Vickers Securities, 2010: 28

> According to statistics from the Ministry of Industry and Information Technology (MIIT), the telcos' total capex on 3G reached RMB160.9bn and built 325,000 3G base stations in 2009. With the intensive investments, the telcos have built 3G coverage in most major cities. While the Chinese vendors are followers of overseas technologies and products in the 2G era, they have made big comeback from 3G. Looking ahead, we believe the two Chinese telecom vendors will become leading global providers in the forthcoming LTE era. China vendors' key competitive advantages over global vendors: The huge domestic market will give a strong boost to local vendors' overall competitiveness... (DBS Vickers Securities, 2010: 28-31)

After the study on role of indigenous suppliers, the next discussion point is the main buyers of Chinese telecom equipment market. There are domestic telecom operators (both of mobile and fixed operators) which are important customers for telecom equipment industry. The three largest are China Mobile, China Telecom and China Unicom, all of them are state-owned enterprises (SOEs). According to the Asia Times' article of, "3G is Key to a Foreign Telecom Role in China" (2006), although China government's promises again and again about to open the market to foreigners as free market, government continue to strongly support domestically produced telecommunications products and services. Office of the United States Trade Representative's "Foreign Trade Barriers-China Report (2009)" tells that Chinese market is directed by Chinese state authorities and their policies in order to purchase domestic components and equipment during the telecommunication infrastructure investments.

> There have been continuing reports of the Ministry of Information Industry (MII) and China Telecom adopting policies to discourage the use of imported components or equipment. For example, MII has reportedly still not rescinded an internal circular issued in 1998 instructing telecommunications companies to buy components and equipment from domestic sources. (Office of the United States Trade Representative, 2009:79)

China Mobile is currently world's largest mobile telephone operator and centrally managed as state-owned enterprise. In 1997, Chinese government began to restructure telecommunications industry by combining the provincial telecom enterprises. In this plan, Chinese government merged the Guandong Mobile and telephone operator of Zhejiang through a subsidiary of China Telecom Hong Kong BVI, called China Mobile Ltd. 74.22% of China Mobile equity stake is owned by China state.[69] Number of subscribers is over 720 million (April 2013). By this great potential, China Mobile is an important opportunity for indigenous suppliers and generally selects domestic vendors as major suppliers.[70]

> China Mobile has announced the winners of the tender for the construction of the company's fourth phase TD-SCDMA network. Huawei snagged 28 percent to 29 percent of the total. ZTE Corporation won 22 percent to 23 percent of the total. DT Mobile won 18 percent to 19 percent while Fiberhome was awarded five percent of the total.
> http://technoadoption.typepad.com/english/2010/07/huawei-zte-win-lions-share-of-china-mobiles-tender.html

[69] *Business & Company Resource Center: Novel NY*, "China Mobile Ltd." http://ezproxy.library.nyu.edu:2081/servlet/BCRC?rsic=PK&rcp=CO&vrsn=unknown&locID=nysl_me_nyuniv&srchtp=cmp&cc=1&c=1&mode=c&ste=74&tbst=tsCM&tab=4&ccmp=China+Mobile+Ltd.&tcp=china+mobile&n=25&docNum=I2501313383&bConts=13119.

[70]Recently, China Mobile concluded its first TD-LTE tender session, with Chinese telecom equipment suppliers being awarded more than 70 percent of the TD-LTE contract. Alcatel-Lucent managed to grab 13 percent of the contract. Ericsson took 8 percent with Nokia Siemens Networks taking less than that. Among domestic telecom equipment suppliers, Huawei Technologies and ZTE topped the list with approximately 24 percent of the contract awarded each. Each of the two Chinese companies will be responsible for the TD-LTE network construction in five cities. Datang Telecom Technology and Alcatel-Lucent Shanghai Bell were each awarded 13 percent of the contract.
http://www.chinascopefinancial.com/news/post/17699.html

> ZTE is reported to have picked up just over a third of the latest TD-SCDMA tender from China Mobile, reports the Interfax news agency. Huawei won 22% of the contract, while Datang Telecom was awarded 16%. Other equipment manufacturers share the remainder, every company to have 5-6%. The contracts awarded are for two-thirds of the ongoing TD-SCDMA tender, with the remaining RMB 8.6 billion (US$1.26 billion) due to be finalized in August.
> http://www.cellular-news.com/story/38622.php

Secondly, China Telecom is the world's largest fixed-line telecommunications operator, broadband service provider and third-largest wireless operator in China- after China Mobile and China Unicom. US national security reports mention that China Telecom was established by Chinese state to oversee the nation's public telecommunications operation.[71] China Telecom is also another important customer of indigenous suppliers for telecom equipment market.[72]

> Only five months after Huawei was awarded a one-million-line ADSL contract in China Telecom's ADSL tender project in June, it announced recently that it has won another two-million-line contract among China Telecom's 5-million-line new round of ADSL tender project that just closed, thus becoming the No. 1 strategic partner of China Telecom.
> http://www.lightreading.com/document.asp?doc_id=44536

> China Telecom has handed ZTE a 40% share of a 4 billion Yuan ($629.3 million) broadband equipment procurement project…ZTE has taken the lion's share of this year's contracts for the upgrade, which forms part of the Chinese government's ambitious Broadband China project…China Telecom has this

[71] U.S.-China Economic and Security Review Commission: 2011: 26

[72] July 27 news, informed sources concern the 2012 CDMA a Central Purchasing circumstances, It is reported that the bid system equipment manufacturers, ZTE (microblogging), the largest share, followed by Huawei (micro- Bo), and the third is the Alcatel-Lucent, including China Telecom (microblogging), system equipment, auxiliary equipment, network optimization, including CDMA investment in the construction budget of 11.2 billion yuan... In this case, the three major CDMA vendors to obtain a larger share of ZTE won 40% of the share for the country's 27 provinces, more than 220 cities in the CDMA network expansion and optimization, Huawei 30% share, Alcatel-Lucent won more than 20% of the share.
http://www.venturedata.org/?i453799_China-Telecom-CDMA-Central-Purchasing-Details-of-the-tender:-ZTE-Huawei-Alcatel-Lucent-to-carve-up-the-large-single

> week also contracted Alcatel-Lucent to deploy IP/MPLS technology to support the network expansion.
> http://www.telecomasia.net/content/zte-wins-40-china-telecom-upgrade

The third operator of the market is China Unicom that is China's second-largest telecom company. China Unicom is a state-owned enterprise with two largest shareholders; China Netcom Group Corporation (BVI) Limited and China Unicom (BVI) Limited. In 2009, China Unicom sold its CDMA mobile infrastructure and assets to China Telecom and merged with China Netcom. National equipment vendors are also the main suppliers of China Unicom investment, too.

> China Unicom recently concluded bidding in its 2012 WCDMA network expansion tender. Chinese telecom equipment and terminal manufacturers Huawei, ZTE and Alcatel-Lucent Shanghai Bell (ASB) won bids for system equipment, as did Ericsson and Nokia-Siemens Networks. Huawei and ZTE were the big winners, accounting for 60% of the total volume, with Huawei taking a slight lead over ZTE to become the biggest winner. The tender was announced in February 2012 and covers 100,000 base stations, making it Unicom's largest wireless network equipment tender in three years. The operator will spend RMB 6 to 7 billion on procurements for its network expansion.
> http://www.marbridgeconsulting.com/marbridgedaily/2012-07-09/article/57552/huawei_zte_win_china_unicom_wcdma_expansion_tender

> Huawei Technologies Co Ltd. announced it has deployed China's first UMTS commercial network for China Unicom in Zhengzhou, Henan province, China... In China Unicom's Phase One UMTS tender, Huawei was awarded the largest market share of over 30 percent based on number of transceiver to be deployed.
> http://www.3g.co.uk/PR/March2009/Huawei_delivers_China_Unicoms_first_3G_network.html

Table 42: China Telecom Operator Tender Statistics

	China Mobile	China Telecom	China Unicom
Owner	SASAC	SASAC	SASAC
3G Standard	TD-SCDMA	CDMA2000	WCDMA
3G Vendor Equipment Shares (2009)	**ZTE 36% Datang %26,9 Huawei + NSN %20.2 New Postcom 6.4% Potevio 3.7%** Ericsson 3.6% **Fiberhome 3.2%**	**ZTE had 42.4%, Huawei at 38.2%** Alcatel-Lucent 16.4%	**Huawei 30.6%**, **Ericsson + Fiberhome Telecommunication + Guangzhou New Postcom Equipment 26.5%, ZTE 21.5%**; Nokia Siemens Networks 11.1%; Alcatel-Shanghai Bell 10.2%.

Source:
http://www.zte.com.cn/cn/events/wireless_success_stories/china/200912/P020121108530838262598.pdf
http://www.isuppli.com/china-electronics-supply-chain/marketwatch/pages/zte-holds-off-china-competition.aspx
http://www.telegeography.com/products/commsupdate/articles/2009/01/28/china-unicom-selects-w-cdma-vendors/

As shown in Table 42, Chinese domestic telecom equipment vendors have majority of market in 3G investments of three telecom operators; China Mobile selected TD-SCDMA and Chinese telecom equipment vendors (Huawei, ZTE, Datang, Potevio) has 93.1%, China Telecom selected CDMA2000 and Chinese vendors (Huawei and ZTE) have 80.6% market share and finally China Unicom selected WCDMA as 3G standard and Chinese telecom vendors (Huawei, ZTE, Fiberhome Telecommunication, Guangzhou New Postcom) has 78.6% market share.

On the other hand, Chinese national third generation (3G) telecommunications standard, TD-SCDMA, has been also developed homegrown by the support of Chinese state. This research and development project is also planned and completed in order to support domestic market and local suppliers. Through this project, the license costs which are paid to CDMA2000 (US) and WCDMA (EU) standards are aimed to be decreased. For instance China's biggest mobile operator China Mobile (state-owned) chose national standard of TD-SCDMA as its 3G infrastructure standard with its over 680 million subscribers.

United States Trade Representative's 2011 Report of Congress on China's WTO Compliance explains that; in Chinese telecom market there is certain pressure from Chinese government to ensure the place for China's own developed 3G telecommunications standard, TD-SCDMA against CDMA2000 (US) and WCDMA (EU).

> In February 2006, China declared TD-SCDMA to be a "national standard" for 3G telecommunications, heightening concerns among U.S. and other foreign telecommunications service providers that Chinese mobile telecommunications operators would face Chinese government pressure when deciding what technology to employ in their networks... In January 2009, China's MIIT issued 3G licenses based on the three different technologies, with a TD-SCDMA license for China Mobile, a W-CDMA license for China Unicom and a CDMA2000 EV-DO license for China Telecom. However, despite the issuance of licenses for all three standards, the Chinese government continued to heavily promote, support and favor the TD-SCDMA standard. For example, China's economic stimulus-related support plan for Information Technology and Electronics, approved by the State Council and published in April 2009, specifically identifies government support for TD-SCDMA as a priority. (Office of the United States Trade Representative, 2011: 52)

In sum, China succeeded converting the disadvantageous of crowded population and large geographical area to an enormous market which has sales revenue potential for national telecom equipment vendors. Addition to the population and consumer markets, state-owned telecom operators also purchase equipment and services mostly from national suppliers. Although this market provides sales revenues for national vendors, market feedbacks and R&D operations also provide advantageous for overseas sales operations.

As shown, in domestic telecom equipment environment, the effect of state policies is also decisive. The state-owned operators mostly select national telecom equipment vendors and their products.

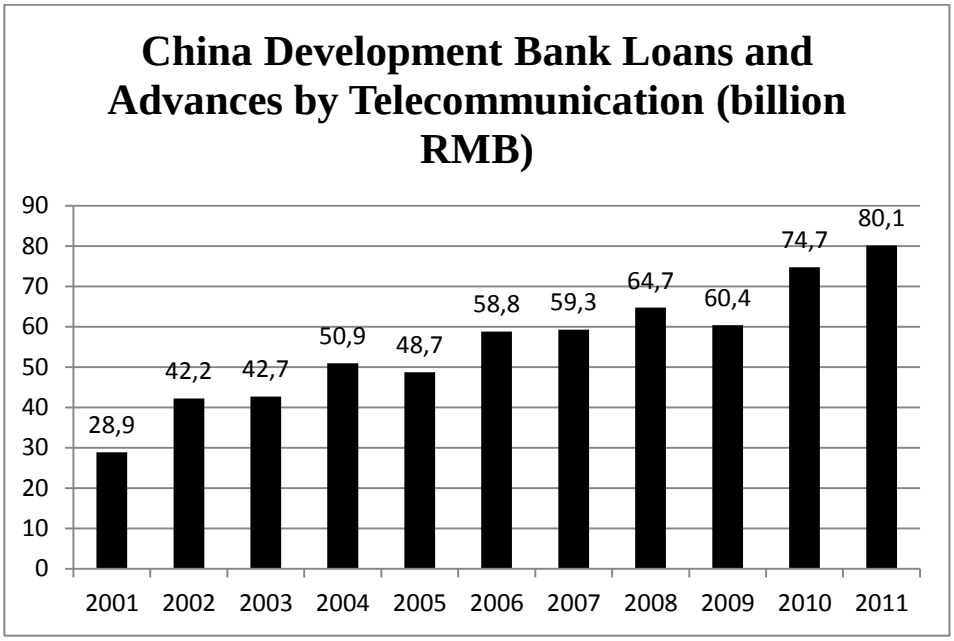
Sub-Hypothesis-4

"State-led financing by state-owned banks" policy funded national industry for both of domestic and export operations.

One of major problems of latecomers for catch-up in high-technology industries is the lack of capital accumulation. In that respect, interventionist state could have leadership role during catch-up period via providing financial subsidies and directing the capital through the industrial investments. The state funding mechanism is also certainly relevant with national strategic priorities which are defined by state authorities.

State-led financing (directly and indirectly) has had a strategic role for Chinese socialist economic development since 1949. This financing mechanism has been used as a tool according to strategic priorities. This mechanism also continued after Deng's reform in 1979. Despite open-door economy and integration with capitalist world and signing the agreements with WTO, Chinese government used state-led financing specifically for strategic industries which are defined in five-year development plans and similar official state reports. This policy- state-led financing- is applied during catch-up and growth phases of telecom equipment industry.

To study this topic, state-led loans and credits through the industry and specific credits to national companies from state-owned banks and other financial organizations will be discussed.



Source: China Development Bank Annual Reports 2001-2011

Figure 4: China Development Bank Loans and Advances by Telecommunication (Billion RMB)

Figure 4 shows that as a reflection of determining the telecommunication one of strategic industries, China Development Bank has funded great amount for national telecom industry. Bank loans for telecommunication industry are over 600 billion RMB for the period of 2001-2011. These bank loans directly and indirectly supported the industry and provided market for telecom equipment vendors in order to deploy their solutions through Chinese market. There is no classification analysis of these credits, however, most of these credits were addressed to Chinese telecom equipment vendors, because Chinese state is owner, operator and regulator of the telecommunication industry, thus, these credits directly and indirectly benefited to the national industry.

On 5 October, 2011, a report was prepared by US Open Source Center of the Office of the Director of National Intelligence. Report claims that China

state has funded Huawei with nearly a quarter billion dollars for "research and development" projects in the past three years.[73]

U.S. The House of Representatives Permanent Select Committee on Intelligence Report (2012) announced that Huawei wrote a letter to US government after the cancellation of Huawei's offer to purchase 3Leaf Systems (US) by CFIUS. The letter denies the allegations of "Huawei gets financial support from Chinese government". Additionally, Mr. Hu's letter continues with the examples of Huawei's received tax incentives are as other high-tech enterprises in China. Finally, China Development Bank's credits for Huawei's customers are also mentioned.

> …This is similar to tax incentives offered by American government agencies to U.S. companies. In 2010, Huawei received a total of RMB 593 million (USD$89.75 million) of financial support from the Chinese government for our research and development activities. All of this is consistent with financial support that is provided to normal businesses in China and in many other countries, including the United States...The credit lines made available through Huawei by China's commercial banks are actually designated for Huawei's customers, not Huawei.... In 2004, the China Development Bank agreed to offer a US$10 billion buyer's credit line to our customers and the amount was subsequently increased to US$30 billion in 2009. As of today, US$10 billion has been loaned to our customers from the China Development Bank. (Hu, 2010: 4)

Moreover, in the same report, Huawei officials deny that Huawei received any special financial incentives or support from the Chinese government.

> Huawei claimed that the company simply takes advantage of general Chinese banking opportunities, but does not seek to influence or coordinate with banks

[73]On 19 April 2011, Zhengquan Ribao a daily covering securities issues, sponsored by the State Council's economic daily Jingji Ribao, reported that Huawei received RMB 250 million (US$36.8 million) and RMB 430 million (US$63.2 million) in 2009 and 2010, respectively, from Beijing for "domestic development, innovation, and research." The company also received government funding amounting to RMB 328 million (US$48.2 million) and RMB 545 million (US$80 million) in 2009 and 2010, respectively for "completing certain research projects." (Open Source Center, 2011: 2)

> such as the Chinese Development Bank and the Export-Import Bank, which are both state owned... Huawei refused, however, to provide more detail about precisely how those lines of credit developed. Huawei also refused to answer specifics about its formal relationships with the Chinese banks, opting to simply answer that it maintains "normal business relations" with the Export-Import Bank of China... Huawei refused to describe the details of its relationships with Chinese state-owned banks. For example, in Mr. Ding's statement for the record, he explained that Huawei receives loans from ten Chinese banks. But Mr. Ding refused to answer how many of those ten banking institutions in China are state-owned. (U.S. House of Representatives Permanent Select Committee on Intelligence, 2012a: 28)

The Economist (2012) "Who's afraid of Huawei?, Security Threats and China's New World-Beater", also mentions that western governments are suspicious of the subsidies, low-interest loans and export credits of Huawei.

> Some people suppose that the Chinese government is helping Huawei win overseas contracts so that spies can exploit its networks to snoop on ever more of the world's electronic traffic… Still it is reasonable to worry about security in telecoms: recent reports have pointed to the efforts of Chinese state-sponsored hackers to vacuum up valuable Western commercial secrets on a massive scale. (The Economist, 2012: 9)

In fact, Chinese leader telecom equipment manufacturers; Huawei and ZTE benefit from export credit support from Chinese government. For instance, Huawei received $30 billion line of credit from China Development Bank- state-owned bank- in 2009.[74] This credit could be defined as export oriented credit and aims to finance Huawei's overseas customers to finance the equipment purchases from Huawei. Additionally, ZTE secured credit from China's Export-Import Bank for $10 billion and from China Development Bank for $15 billion in 2009.[75] Terms of conditions related to these credits are not public.

> Thousands of warring units that cohabit under the umbrella of the Chinese state control the SOEs. Consequently, SOEs enjoy direct subsidies stemming from state directives and elicit varying degrees of support.... Huawei, a maker of telecoms-network equipment, illustrates a third level of policies and subsidies.

[74] TradingMarkets.com, (2009) "China Development Bank Enhances Support to Huawei".

[75] Light Reading Asia (2009), Mobile Tech News (2009)

> Huawei is ostensibly privately owned, although many of its shares are owned by the local state telecoms authorities to whom it has sold equipment. It enjoys a $10 billion low-interest credit line from the China Development Bank, whose mission is to make concessional loans in support of the state's policy goals. Huawei also has strong ties to China's military. (U.S.-China Economic and Security Review Commission, 2006: 56)

Huawei and ZTE have significant market share in export markets. For instance, in African telecom equipment market these companies supply telecom equipment and services with flexible vendor financing terms and conditions. Huawei's president for eastern and southern Africa, Li Dafeng interviewed in Bloomberg on 14 November, 2012. Li told that;

> ...revenue in southern and eastern Africa may climb by as much as 30 percent in the next three years as growth on the continent outpaces most regions. The company posted revenue of USD 3.42 billion for the entire African region in 2011, up 15 percent from USD 2.98 billion in 2010, Li said. Total sales account for 13 percent of global sales. http://www.telecompaper.com/news/huawei-sees-african-revenue-up-by-up-to-30-in-next-3-years--907955

In fact, international credit of Chinese state-owned banks is one of the most important reasons for the growing market share in African telecom market. Cisse (2012) claims that between 2005 and 2010 Huawei and ZTE won over $3 billion from contracts with African telecom operators in Algeria, Angola, Ethiopia, Ghana, Libya, Nigeria and South Africa.[76] In this market Huawei and ZTE are also each other's competitors.

Moreover, Indian telecom operator -Reliance Communications- received $1.93 billion credit from China Development Bank in 2010 to use for

[76] According to the former head of Huawei's operations in West Africa, Wilson Yang, Huawei's profit margins in Africa can be up to 10 times greater than those it realizes in China. Huawei manages to achieve tremendous margins while still pricing itself only 5%-15% lower than its major international competitors, Ericsson and Nokia. Furthermore, Huawei is cautious not to price itself too low so that it will not be seen as yet another low-cost Chinese provider. In contrast, Huawei's main Chinese competitor in Africa, ZTE, consistently prices 30%-40% below European competitors and, consequently, its products are perceived as being of inferior quality. (The Wharton School of the University of Pennsylvania, 2009: 4)

3G network infrastructure investment with the condition of purchasing equipment and services from Huawei and ZTE. [77] Additionally, China Development Bank provided $375 million loan to Nextel Mexico to use the credit for purchasing 3G network equipment from Huawei. [78] China Development Bank (CDB) also signed the agreement with Russian operator Megafon and gave $1 billion loan for LTE development in 2011.[79] There are also similar countries to which China Development Bank provides export credits with the condition of purchasing telecom equipment from Chinese telecom equipment vendors; Huawei and ZTE.

Moreover, there are other variety forms of state support; tax treatments, equity infusions, direct grants etc. As published in Huawei 2010 Annual Report, Huawei received RMB 433 million in unconditional government grants and RMB 545 million in grants which were conditional on completing R&D projects. (p.37), ZTE also received RMB 471 million in government grants, contract penalty income and other miscellaneous gains in 2010 according to ZTE Annual Report 2010: 315.

> Huawei received an infusion of $5.8 billion from its equity holders in 2009. The company is 99 percent held by the union of its employees. There is very little information about the true ownership structure of Huawei and the nature of its employees' ownership of the company… In 2008, ZTE issued 40 billion RMB in bonds cum warrants, which were guaranteed by the China Development Bank, a state-owned bank. (McCarthy, 2012: 12)

In report of Kirk (2011) "2011 Section 1377 Review on Compliance with Telecommunications Trade Agreements", western countries and multinational equipment vendors complain that Chinese government heavily

[77] http://www.marbridgeconsulting.com/marbridgedaily/2010-12-17/article/41906/china_development_bank_finances_huawei_zte_deals_in_india

[78] http://www.prnewswire.com/news-releases/nextel-mexico-announces-375-million-loan-from-the-china-development-bank-cdb-to-fund-3g-network-build-out-126275733.html

[79] http://www.globaltelecomsbusiness.com/Article/2886858/Regions/25187/Megafon-signs-1bn-Chinese-loan-agreement.html

subsidizes Huawei and ZTE and this financial support also cause to unfair competition in telecommunication equipment market for both of China and other markets.

Gabriel (2012) wrote the same topic in Rethink Wireless with the title of "EU poised for anti-dumping probe of Chinese firms". The European Commission had an investigation on Chinese telecom equipment vendors. This investigation searched that if these firms received illegal state subsidies and thus, sold their products in European market with aggressive cost advantages rather than European and US rivals. According to Gabriel, European Commission has been collecting evidences for months related to illegal subsidies, and if China was found guilty, European Union could have punished and legalized tariffs against Chinese vendors for their sales operations in European Union.

Notably, in 2010, Option SA (Belgian wireless wide-area network modems manufacturer) complained of Huawei and ZTE's unfair pricing advantage which is financed from the credits of Chinese state-owned banks. According to Option SA, these credits allowed Huawei and ZTE to sell wireless modems in Europe for as little as €20 a device.[80] European Commission evaluated this complaint and answered that whether Chinese modems are subsidized and this subsidization causes to injury to the European Union industry.[81]

> European Union preliminarily found that government subsidies to the two firms (Huawei and ZTE) may be as high as 100% or more of their sales revenue. (McCarthy, 2012: 14)

China Daily's paper of "Beijing probing illegal EU subsidies" (30 May, 2012) by Ding Qingfen and Shen Jingting reports that an official from the Ministry of Commerce told China Daily that "if the report is correct, China will not put up with such trade protectionism". Also Zhang Xiangchen- the

[80] Dalton, 2010, Wall Street Journal.

[81] Stearns, 2010

director general of the Ministry of Commerce told that "if EU moves against China, would violate WTO rules".

In fact, China is the EU's second-largest export market and EU is China's biggest. According to Xinhua News Agency, Chinese Commerce Minister Chen Deming urged European Union that protectionist policies would damage the current win-win position.

> China hopes that the EU can stick to the consensus that no more protectionist measures should be rolled out, (as) agreed during the Group of 20 (G20) Summit… the two sides must exercise restraint in trade remedy measures through thorough exchanges and consultations. Otherwise, both sides are sure to be hurt"
> (http://www.china.org.cn/business/2012-06/01/content_25536349.htm)

Additionally, China's Ministry of Commerce prepared a report which emphasizes that European Union has been subsidizing leading European telecom equipment vendors in recent years. Chinese government aims to use EU's own financial support mechanism against EU's allegations of unfair state subsidies for Chinese telecom vendors.

> The Chinese study found the EU and a number of member states delivered subsidies through the award of R&D funds as well as export credits and loans. The support from the EU's R&D funds to Europe's three largest telecoms vendors (Alcatel-Lucent, Ericsson and Nokia Siemens Networks) totaled EUR 9.1 billion between 2007 and 2013, claims the Chinese study. Plus, export credit agencies in Sweden, Finland and France have offered to guarantee more than EUR 25 billion of loans on non-commercial terms for telecom network-related projects over the last five years, it is claimed. The European Investment Bank also awarded more than EUR 1.45 billion in loans on non-commercial terms to three major unnamed European telecom-equipment makers too, said the study, while Ericsson and NSN allegedly received subsidies from individual member states. (http://www.mobilebusinessbriefing.com/articles/chinese-government-hits-back-at-eu-with-its-own-unfair-telecoms-subsidy-allegations/6402/)
>
> Ericsson has agreed a €500 million (US$644 million) loan with the European Investment Bank to fund research and development work into next-generation radio and IP technology for mobile broadband.
> http://www.lightreading.com/document.asp?doc_id=225829

Finally, on 9 October, 2012, Reuters reported that European Union delayed the investigation about Chinese telecom equipment vendors Huawei

and ZTE in the scope of illegal state subsidies and financial support, because, there is no any formal complaint which has been received from stakeholders. The main reason behind the decision is that major telecom equipment vendors such as Ericsson, Alcatel-Lucent and Nokia Siemens Networks have significant businesses in Chinese enormous market, and there is the fact these businesses could be damaged if Chinese authorities act in retribution. In these cases the formal complaint is normally a prerequisite for an investigation, thus, EU delayed its investigation.[82]

> The EU suspects that the Chinese producers are hurting European telecoms equipment suppliers through artificially low prices, which are at least in part funded by the massive credit lines from the Chinese government… De Gucht (EU's Trade Commissioner) said in May the Commission was considering launching a case on its own initiative, without the need for an industry complaint.
> (http://www.reuters.com/article/2012/10/09/us-eu-china-trade-idUSBRE89810V20121009)

Recently, ZTE also announced its strategic partnership with China Development Bank in March, 2009 on ZTE's official website. This agreement will be in force for 5 years and during this time China Development Bank will provide US$15 billion credit line for ZTE's overseas telecom projects and ZTE's credit limits.[83] China's Xinhua news agency also reported that these state bank loans are quite strategic to provide opportunity for national companies in order to expand to overseas markets in the scope of China's globalization strategy.[84]

> ZTE announced on May 25, 2009, that it has entered into a strategic partnership with the Export-Import Bank of China (China Exim Bank) by signing a "Strategic Cooperation Agreement" for a US$10 billion credit line. This

[82] http://www.reuters.com/article/2012/10/09/us-eu-china-trade-idUSBRE89810V20121009

[83] http://wwwen.zte.com.cn/en/press_center/news/200903/t20090323_350829.html

[84] http://www.telecomasia.net/content/huawei-gets-30b-credit-line-cdb

> agreement further helps strengthen the leading edge of China Exim Bank in the financing area, as well as ZTE's leading position in the telecom technology industry.
> (http://wwwen.zte.com.cn/endata/magazine/ztetechnologies/2009year/no6/articles/200906/t20090612_172527.html)

China Development Bank's Chairman Chen Yuan told to Bloomberg News (2011) that "Our support for Huawei and ZTE and other high-technology companies has opened up the overseas market. We have become the principal source of finance of our country's overseas investments."[85]

Huawei and ZTE advocates that China Development Bank credits are given only to foreign countries in order to expand international sales of these firms, however, China Development Bank annual reports underlines that these credits also enhance R&D capabilities of Chinese telecom equipment vendors.

> CDB also provided strong financial support to communication equipment manufacturing enterprises that have independent R&D capabilities, such as Huawei Technologies Co., Ltd., ZTE Corporation and Datang Telecom. (China Development Bank, 2007)
> …. The Bank focuses on supporting leading telecommunications device manufacturers, including Huawei Technologies, ZTE Corporation and Datang Telecom Technology, to enhance their R&D capabilities, develop their proprietary products, upgrade their technologies and equipment and explore international markets. (China Development Bank, 2006)

Furthermore, while China state funds telecom equipment vendors, R&D projects of government research institutions are also financed by the state in telecom industry. Chinese third generation (3G) mobile standard of TD-SCDMA is also a state-led financing project. Datang -the leader of the development consortium- has also been financed by Chinese state-owned banks during the development of TD-SCDMA. This is one of the most strategically important R&D project for Chinese telecom industry.

> State directed national bank, such as Industry and Commerce Bank (ICBC), Construction Bank of China and Huasia Bank, to offer loans Datang group

[85] http://www.bloomberg.com/news/2011-04-25/huawei-counts-on-30-billion-china-credit-to-open-doors-in-brazil-mexico.html

> approximately RMB$ 1.5 billion. Additionally, China Development Bank offered RMB$ 38 billion during 2005~ 2007 for TD SCDMA network building and testing (Liu, 2008: 63-64; Whalley et al., 2009: 13-14; Datang, 2010). (Tsai, Wang, 2011:11)

According to article of "Datang Telecom Receives another RMB 20 Billion Line of Credit" Datang Telecom received RMB 20 billion credit from China Construction Bank. In June 2007, Datang Telecom signed a new agreement with China Development Bank for RMB 30 billion line of credit to develop TD-SCDMA.

> Datang subsequently signed strategic cooperation agreements with financial institutions such as the China Development Bank, China Construction Bank, Huaxia Bank, Export-Import Bank of China, and Shanghai Pudong Development Bank. These agreements provide financial support in the follow-up process of the technological development and industrialization of TD-SCDMA. Such a financial arrangement in the TD-SCDMA industry chain would create a strong support for innovation work in enterprises and create growth in the industry.
> (http://en.datanggroup.cn/templates/00Content%20Page/index.aspx?nodeid=58)

These supports were used to boost the development of TD-SCDMA.

In sum, China state-owned financial institutions directly and indirectly support Chinese telecom equipment industry, as seen in these cases. The national infrastructure investments are indirectly finances national vendors, because most of these investments are also supplied by Chinese vendors. Additionally, state-owned banks directly support domestic/overseas operations of telecom equipment companies. This direct support is mostly seen as export-oriented credits, funding of research and development operations and tax incentives.

For another discussion, are these subsidies and credits in Chinese telecom equipment industry appropriate to WTO rules? As known, WTO rules prohibit the illegal state subsidies; however, in fact in strategic industries developed countries also continue to finance their national industries. For instance, in aircraft industry illegal subsidies is an important case between two major

companies; Boeing (US) and Airbus (EU). In 2011, WTO decided that Boeing took illegal subsidies for $5.3 billion from NASA. In 2010, WTO decided that European governments illegally subsidized Airbus, too.

This research question and related studies aim to prove the importance of state-led financing for catch-up and growth of high-technology industry in latecomer countries.

6.4 Discussion

After Deng's reform of 1979, Chinese state defined "telecommunication industry" as a strategic industry. Then, national technologic infrastructure was planned to be upgraded via opening the domestic market to foreign investments. Chinese market had an enormous sales potential for multinational equipment vendors. Meanwhile, forming joint ventures between these multinationals and the local firms was legalized as a state policy. The main target of this strategy was to acquire the recent technology and know-how by using the attractiveness of the Chinese enormous market and to achieve know-how dissemination through the local industry and state owned enterprises.

Joint ventures were founded by multinationals and state-owned partners. Meanwhile, national companies, which are state-owned or privately held, began to emerge in the telecom equipment market. At the end, there was certain know-how dissemination from multinational vendors to Chinese local industry related to switching technology, and the Chinese national switches were developed.

After the switching technology, next generation technology was mobile technologies. In a similar manner, Chinese state has supported the domestic suppliers via tenders of state-owned telecom operators. It is a fact that the state in China is the owner, the operator and the regulator of the telecommunication sector. Thus, state regulations could be manipulated in order to support the national vendors in their procurements. This is the positive effect of the Chinese market on the national industry and the companies.

Moreover, these companies are also supported by Chinese state-led financing model for research and development operations, domestic sales, overseas sales and similar activities. Specifically, China Development Bank, the Export-Import Bank of China and the Construction Bank of China provide credit to these companies' operations and also to their customers for overseas sales.

Final topic is related to the ownership and the shareholding structure of the major companies; Huawei and ZTE. The ownership structures are unclear and there are significant suspicions about their relations with the Chinese state, the military and also the Communist Party of China. Specifically, reports of the US and the EU accuse these firms of having relations with the Chinese intelligence services and provide specific information via their equipment and infrastructure from other countries. As known, the "State-Owned Assets Supervision and Administration Commission" (SASAC) controls most of the largest SOEs also in the telecommunication industry of China. Communist Party has also committees in all these companies legally, however, the responsibility and the effect over the decisions, the operations, and the strategy of these companies are unanswered by the company officials.

Since the reform of 1979, there is a conscious state policy behind the catch-up of the Chinese telecom equipment industry. In this success story, setting state policies as the central authority, managing foreign investment opportunities, using the potential of the enormous domestic market and the state-led financing mechanism have become critically important subjects, and these subjects are also connected to the state policies in a broad sense. Figure 5 illustrates transformation of economic system from Socialist China to Market Socialism and also transformation of poor telecom equipment infrastructure to globally leader telecom equipment industry with state-led development policies.

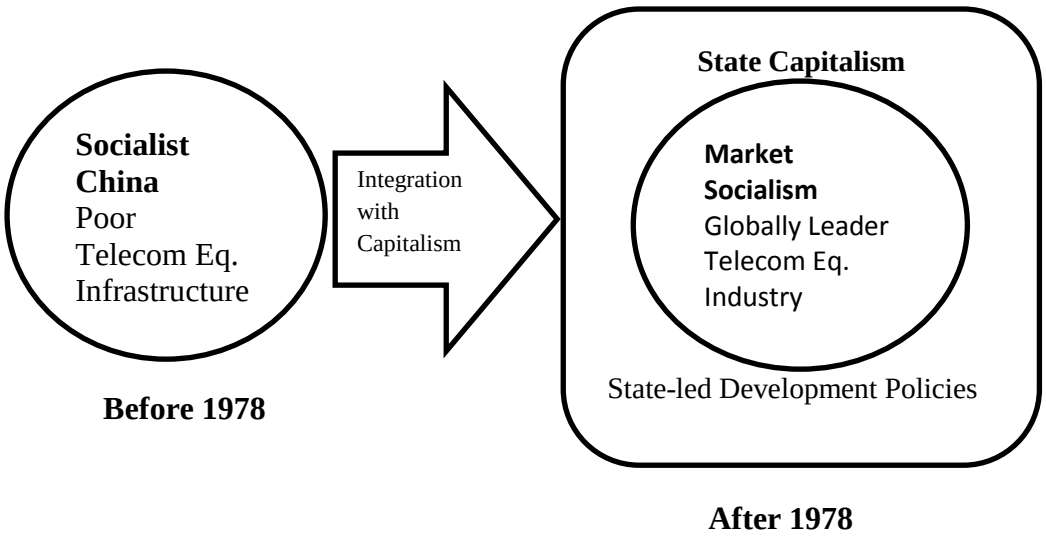


Figure 5: Transformation of Economic System in China after 1978

From this point of view, the central question is that;

"Is state-led catch-up possible for generating a high-tech industry for latecomer economies?"

In this case study, catch-up of the Chinese telecom equipment industry shows that the state has a central role for the latecomers' development struggle. The state, manages the other sub-parts according to the strategic targets defined previously, by taking national interests into consideration. This case study is the conclusion of a system which gives a central role to the state and the system is also supported by the multinational investments and the national capital industries. This triple system also has similarities with the *dependent development* model in a theoretical and macro perspective. Theory of dependent development had also been modeled for Latin American countries for their industrialization period with similar strategies.

In fact, all countries have different characteristics and dynamics. There is not any model which will be successful and be suggested to all latecomers during their catch-up in high-technology industries. Thus, the models should be modified according to the advantages and the dynamics of the countries. However, the thesis attaches importance to the role of the state and its sub-titles in high-technology industry catch-up, because capitalism has a fierce

competition and if an industry is a latecomer, it should be supported by the national resources and policies, at least in their emergence and growth phases.

In conclusion chapter, main conclusion of this thesis will be articulated with the help of the theoretical framework. State-led catch-up and its success in Chinese case will be modeled.

CHAPTER VII

CONCLUSION

Neoliberal policymakers and theoreticians advocate the market-based economy and the importance of the market forces for economic growth of developing countries. This hegemonic approach accuses interventionist state policies as a reason of the economic crises. Through this approach, neoliberal economic policies are suggested to the latecomers by the World Bank and the IMF under the name of the Washington Consensus.

In fact, the classic liberal approach and the free-market doctrines are combined within neoliberalism. "Reliance on market" and "dismantle the state intervention" strategies are suggested by the hegemonic organizations to the latecomer developing countries specifically since the late 1970s. This model has been widespread through the world under the name of the neoliberal programs and implemented with the policies of privatization, the limited role of the state and the free trade. Neoliberal approach oversimplifies the central planning and the state intervention with claiming that the state intervention is inefficient and counterproductive. This strategy presents a market-based economic development model by minimizing the state intervention to the economy for the latecomers. These neoliberal developmental programs are presented as the sole way for catch-up attempts of the latecomers with the limited state role; as passive, regulatory, focusing on legislation, taxing, and auditing etc. Thus, Adam Smith's "invisible hand" is also rediscovered after two centuries; capitalist markets should be self-regulated with the limited role of the state.

Against these policies, from leftist view, for instance, the dependency school and the Latin American Structuralist School also suggested alternative

development models against exploitative neoliberal programs. In addition to these developmental programs, state-led development models have also re-emerged. Listian state-led development models and Gerschenkron's assigning active role to the state and the state-led financing mechanisms are also popular approaches for alternative ways to latecomers. These theoretical approaches are also applied within different development models.

While market-based neoliberal development prescriptions are being suggested in the recent decades, there are latecomers which have used the state as an active development instrument and closed the gap with the developed countries. Specifically Asian countries; Japan, South Korea and China could be exemplified as different models of the state-led development. Although all these examples have different historical transformation periods and different potentials, the common point about their succession is to use the state's effective and interventionist role during their economic catch-up. In fact, the economic development of these countries was mainly sourced from the success in the strategic industries. The state authority actively involved by investments, and catch-up occurred within different industries which were popular in their periods; electronics, automobile, chemical, aircraft, information technologies, telecommunication, space and so on.

In this framework, the thesis aims to signify that there is a certain alternative way to the neoliberal policy suggestions, and this model works under the "active involvement of the state mechanism". State does not only have a regulatory role; but also it actively manages and controls all parts of the economic development with its own arguments which have direct or indirect relations with the state. This new type of state does not look like the socialist, neoliberal or recently emerged entrepreneurial state (Mazzucato). This state is actively involved in the economy with both policies and strategies and applies these strategies with state tools under a central planning mechanism. Additionally, this form of state differs from the closed economy structure of the socialist state by linking with the capitalist economic system and the capitalist markets. In this catch-up model, there are sub-mechanisms; foreign

investments and national industrial capabilities and capital which are managed by the state authority with the nation's own dynamics in a systematic perspective. This type of state-led development and its success in the case of China could be modeled for other latecomers, and this type of catch-up could take its place in the literature as a novelty.

In this model, one of the major concerns is "the role of the state". While today's laissez-faire and free market approaches are certainly opposite to any kind of intervention to the industry and the market system, this state-led developmental model provides active role to the state in each part of the economic system. State intervention mechanisms- for instance, guidance of the state and the role of the financial subsiding- could be considered as effective policy tools. In addition to the state's role, acquiring and assimilating modern technology is the milestone for this catch-up model. Especially, foreign investments could be the major channel for transferring the latest and modern technologies to latecomers regarding especially knowledge intensive, high-tech industries. The other factor of this model is "the national industry and capital" which have to establish related infrastructure and national capabilities in which national industries transfer, disseminate and use the modern technology according to the strategies of the state.

The thesis aimed to disclose the facts behind the model in China and one of the most important strategic industries; telecom equipment industry. In fact, China comes from the latecomers group and today it is one of the most powerful nations and the developed country in the scope of many strategic industries. Today's success is the result of a comprehensive state policy since late 1970s. China has a strong central state authority, and all strategies and policies are defined by the Communist Party and its bureaucratic institutions directly. Chinese industries are certainly affected and directed by the Chinese macro state-led catch-up strategies. This type of management is seen in all strategic industries, not only in the telecommunication industry.

State's role in China is a common and unchangeable fact since the socialist revolution of Mao Zedong in 1949. This specific position of the state

has not changed after Deng's reformist period, either. New China has changed its socialist economic priorities and integrated into the capitalist economic system, however, "the state" still controls all the phases of catch-up and economic growth in China.

Role of the state in China has certain differences from the common understanding of the state. The State is managed by related bureaucratic organizations which are directly/indirectly linked with the Communist Party. Chinese state plays an active role in all economic activities. State's role in national industries is not limited to the policy issue. The State plays an active role in industries with its state-owned companies, credits of national banks, state-owned markets and state-owned research networks and so on. Specifically, after Deng's reform period, China state changed its strict delinking positions from global economic systems and was integrated into the capitalist economy, however with its own rules.

China chose the way of struggle against capitalism by linking with the global economic system, thus, China constituted its new model by staying on socialist way and integrating into the capitalist world and taking the benefits of the global economy. Deng's reform period also provided a nation which could compete against the capitalist world by integrating into the capitalist economy. This model is newly emerged from China's own dynamics; has its roots from socialism and succeeded the integration into the capitalist market with the state-led and interventionist policies.

Table 43: State's Role in General Catch-up Strategy after 1978

Transformation to open-door and socialist-market economy
Determining of strategic industries by State and Communist Party
Allowing foreign investments and encouraging JVs with local partners
Using the attractiveness and potential of domestic market for JVs and support of national firms
State-led financing for these strategic industries
Emerging of national firms and reorganizing strategic SOEs in pre-defined strategic industries

Table 43 (cont'd)

Establishing of SASAC and management of SOEs of strategic industries under state control
Strong relations with state research institutes and strategic firms via national science and technology programs

The thesis underlines the milestones of the catch-up success of China in strategic industries in Table 43. All these phases have been achieved by active state involvement.

- Reformist period with Deng changed the economic and the politic system from the closed-door socialist economy to the integration into the global economic system.
- State authority defined strategic industries which would emerge and grow in near future and would support the economic growth of China.
- Foreign investments were allowed and encouraged to form JVs with the local partners under special conditions. Attractiveness of the domestic market potential was used as an attractive instrument.
- JVs were formed in strategic industries which had also been defined by the state authorities and the Communist Party. Through this new strategy, a learning and technology transfer phase was started in the strategic industries via national partners of the JVs.
- National companies were also founded in these strategic industries and SOEs were not privatized and reorganized in order to compete with the multinational rivals.
- State-led financing has also played a strategic role in order to fund the national industrial activities. Domestic market potential also funded these national firms as JVs.
- Active state involvement through organizations such as SASAC was also a critical decision, through this policy, all SOEs were reorganized

and stayed under the state control in order to compete with the foreign rivals and also the JVs.

- All these policies have also been supported by a strong network of research and development which is also controlled by the state, including government research institutions, university involvements and state-led financing mechanisms.

This specific model of China is named as “triple system of catch-up” in the thesis. The triple system (state, foreign investments and national capabilities/capital) in China has strong similarities with Latin American Structuralist School’s “dependent development” approach. Addition to this model, List and Gerschenkron’s development policies, specifically state-owned financing strategy is also applied as an active instrument in China. Addition to similarities of these models, China also has state-owned market in order to support national industries via public tenders

One of the strategic industries in which China specific “triple system of catch-up” has been applied is “telecom equipment industry”. Chinese telecom equipment industry success is the conclusion of a comprehensive state policy since reform of 1978 under the program of “four modernizations”. Table 44 summarizes the major steps of the telecom equipment industry catch-up chronologically parallel to the general catch-up strategy of China after 1978.

Table 44: History of Chinese telecom equipment industry chronologically

Policy	Date	Strategy/Action	Policy Maker/Strategy Owner
Paradigm Shift	1978	China reform of transition from central planning to market dominated economy	State, Communist Party
	1978	Chinese Communist Party declared a program of modernization for China on the base of "four modernizations"; industry, agriculture, science and technology and national defense.	State, Communist Party
	1979	Allowance for foreign investments	State, Communist Party
	1983	First foreign joint venture was Shanghai Bell Telephone Equipment Manufacturing Co.	State, MNCs
National Industry Emerges	1985	ZTE was founded	State
	1986	In 1986, the first national digital switch DS-2000 was developed by a government research institute under the Ministry of Posts and Telecommunications (MPT), (commercially not successful)	State
	1987	History of mobile technologies in China began with the deployment of wireless 1G phone system	State
	1988	Huawei was founded	Private, State, (Military, Communist Party)
Knowledge Diffusion for Switch Technology	1991	First national switch HJD-04 was developed by a government consortium and successful in market	State
		Knowledge diffusion to private firms Jinpeng, ZTE (Zhongxing), Datang, and finally Huawei switches	State, MNCs
	1993	Huawei developed own central office CC08-A for rural market	National firm
	1994	1G system was replaced by 2G technology GSM	State, MNCs
	1995	ZTE developed its own switch ZXJ10 for rural market which was neglected by MNCs	State
	2000	Central Office Switch Market was in 1982 %100 direct import, in 2000 %57 joint venture, %43 indigenous suppliers	State, MNCs

Table 44 (cont'd)

Knowledge Diffusion for Mobile Technologies	2001	Qualcomm licensed CDMA technology (2,5G) to Huawei and ZTE in fields of switches, base stations, handsets	State, MNCs
Supreme Board & State Management	2003	SASAC (The State-owned Assets Supervision and Administration Commission of the State Council) was founded	State, Communist Party
Innovation Phase	2005	TD-SCDMA (3G) was developed by a consortium under the leadership of Datang (government research institute); MNCs, national firms and state	State
	2009	Under the management of SASAC; China Mobile selected TD-SCDMA as 3G infrastructure technology in 2009	State

Policy-1: State defines the strategic industries for next decades and invest in these industries.

After Deng's reform, China defined strategic industries which would support China economy and close the gap with developed countries. One of these strategic industries was telecommunication industry.

Policy-1.1.: State funds industrial activities by state-owned banks.

State-led financing (directly and indirectly) has had a strategic role for Chinese economic development after Deng's reform of 1978; financing mechanism was used as a tool according to the strategic priorities. Chinese state-owned financial institutions have supported the Chinese telecom equipment industry directly and indirectly. The national telecom infrastructure investments are financing national equipment vendors indirectly, because most of these investments are also supplied by the Chinese telecom vendors. Additionally, state-owned banks support the domestic/overseas operations of these telecom equipment companies directly. Significant amount of credits are given to these firms in order to fund their operations.

Policy-1.2.: State-owned market is also a strategic policy to fund SOEs in a strategic industry.

State-owned enterprises (SOEs) which operate actively in the industry are also a strategic policy. SOEs in the strategic industries are not privatized and re-organized in order to compete with the multinationals. Today, these firms are international brands and have significant sales revenues. ZTE could be given as an example for the telecom equipment industry. Additionally, state-owned telecom companies were also founded and most of their equipment were supplied by the SOEs and the national companies. China Mobile, which is the biggest mobile telecom operator in the world, is the biggest customer of the Chinese telecom equipment suppliers.

Policy-2: Integration into the global economy in order to transfer modern technology via foreign investments.

Catch-up started by forming JVs for digital switches for fixed phones. Multinationals were allowed to enter the attractive Chinese market with a prerequisite to establish JVs with national partners. The strategy of "Trading Markets for Technology" (TMFT) promoted joint venture (JV) establishment between foreign firms and state owned enterprises since 1978. In the period of transformation, the main strategy was the know-how transfer from foreign investments, absorbing and assimilation by indigenous local industry and achieving in-house R&D. Technological know-how from multinational investments became an important source for national industry. National firms enhanced their own technology production capacity including reverse engineering, imitation and internal and international R&D activities. Through this strategy, China telecom equipment industry increased their value-added in time.

Policy-3: National private companies and capital invest and operate in these strategic industries via encouragement of the state.

There are many private telecom equipment companies in China and they operate in telecom equipment industry network. The most import one is Huawei which is as a private company however there is also suspicion about its strong relations between state authorities. Huawei competes ZTE in all fields of

telecom equipment industry in both of domestic and export markets, however, China state gains advantage from this competition.

State authority also manages private companies in indirect ways, for instance there are Communist Party Committees in companies, however, the main role and responsibilities of these committees are not known clearly.

Table 45 compares general catch-up strategy of China with the strategy of telecom equipment industry after 1978. The reflections of the state policies are seen in telecom equipment industry with industry specific policies.

Table 45: General Catch-up Strategy of China vs. Telecom Equipment Industry Strategy, after 1978

General Catch-up Strategy after 1978	Telecom Equipment Industry Catch-up Strategy
Transformation to open-door and socialist-market economy	Deng reform and integration with global economic system
Determining of strategic industries by State and Communist Party	Telecom industry was determined as a strategic industry in 1980s.
Allowing foreign investments and encouraging JVs with local partners	First foreign joint venture was Shanghai Bell Telephone Equipment Manufacturing Co.
Emerging of national firms and reorganizing strategic SOEs in pre-defined strategic industries	ZTE was founded in 1985 as a SOE, Huawei was founded in 1988 as privately owned national firm
State-led financing for these strategic industries	State-owned Banks; specifically China Development Bank funded the industry
Using the attractiveness and potential of domestic market for JVs and support of national firms	After Bell, other MNCs also invested in China; Cisco, Alcatel, Motorola, Nortel and so on.
Establishing of SASAC and management of SOEs of strategic industries under state control	ZTE as a supplier, telecom operators as demander are managed by SASAC.
Strong relations with state research institutes and strategic firms via national science and technology programs	Datang as a leader of consortium developed TD-SCDMA standard for 3G and gave licenses to ZTE and Huawei

Consequently, there is a clear strategic map of the Chinese state since Deng's economic reform of 1979 as a national policy. After the decision of integration into the global economies, strategically important industries have

been defined; and one of these industries was also telecommunication. Since then, Chinese state has always involved actively in the industry with its related strategies and policies and intervened directly in the market by the national players. As the owner, operator, and regulator of the telecommunication sector, the Chinese state manages the industry according to the interests of China.

Critically important SOEs of the industry are managed by "the State-Owned Assets Supervision and Administration Commission" (SASAC). The rest of the companies are held privately; however, ownership structure of these companies is also suspicious. There are official reports of the US and the EU which indicate these firms' strategic relations with the state, the military and also the Communist Party of China. The Party also has committees in all these companies legally, however, the responsibility and the effect on the decisions, the operations, and the strategy of these companies is unanswered by the company officials. Moreover, China succeeded in converting the disadvantages of the crowded population and the great geographical area to an enormous market which has a significant sales revenue potential for the national telecom equipment vendors. In addition to the population and the consumer markets, state-owned telecom operators also purchase their equipment and services mostly from national suppliers. Although this market provides sales revenues for national vendors, market feedbacks and R&D operations also provide advantages for overseas sales operations. In this success story, setting state policies by the central authority, managing foreign investment opportunities, using the potential of the enormous domestic market and the state-led financing mechanism have become the critically important subjects, and these subjects are also connected to the state policies in a broad sense.

Chinese telecom equipment industry is not the sole success story of the reformist policies of China. Catch-up cases are also observed in some other strategic high-tech industries in similar time-periods. In fact, all these catch-up cases are the result of the macro state-led development policies of the recent decades.

Table 46: The Commercial Aircraft Learning Curve in China (1978-2000)

Since 1972	Western era; China intensified its relations with Western aerospace companies
Early 1980s	Chinese firms signed subcontractor agreements with major aircraft firms; Boeing & Airbus
1993	Ministry spun-off a very large government company, China Aviation Industry Corporation (AVIC),
Since 1993	AVIC subsidiaries signed subcontracting agreements with companies based in the USA, Canada, France, Italy, and Germany
Late1970s to mid-1990s	Parts subcontracting for Boeing B-737, B-757
Late 1980s	International Co-Production for McDonnell Douglas and Boeing (MD-80-B-737)
1994	International Co-Development for AE-31X (100 set passenger jet) with China, Singapore and Airbus Industry Asia (AIA)
Mid 1990s to 2015	Indigenous development & Production (ARJ-21&C-919)*

*The development of the ARJ21 regional jet is key project in the "10th Five-Year Plan" of China. It began in March 2002 and was led by the government-controlled ACAC consortium

Table 47: Catch-up of Computer Industry of China

1980s	Chinese government hired Liu Chuanzhi (Xi'an Military Electronic Engineering Institute) to distribute imported computers
1984	Liu founded Legend (after named as Lenovo) in 1984
1998	Liu was a deputy to the 9th session of the National People's Congress
1986	China's drive to create a commercially oriented computer industry formed part of a larger effort to create an electronics industry, which formally began in 1986 with the Seventh Development Plan.
1990s	JVs with multinationals; IBM- Great Wall, Compaq- Stone Group Star Group, Hewlett Packard-Legend
1993	Compaq Computer Corp. (US) formed joint venture
1994	IBM settled joint venture with Great Wall; this venture provided IBM with local distribution channels and gave Great Wall access to IBM technology and manufacturing know-how.
2002	Legend changed its name to Lenovo and Liu was a delegate to the 16th National Congress of Communist Party of China
2005	Lenovo purchased IBM's personal computer business

Table 48: Automotive Industry in China

1983	Beijing Automotive Industry Holding and Daimler Chrysler signed first JV agreement
1984	Shanghai Volkswagen's contract with Volkswagen
1985	Guangzhou Peugeot was founded with Peugeot
1989	20 JVs were founded for automobile industry
1994	China's state defined "automotive industry" as one of pillar industries
1997	Chery Automobile Co was founded as a state-owned company
2000s	Chery Automobile is a multinational corporation

As seen in Table 46, Table 47 and Table 48, China achieved catch-up not only in the telecom equipment industry, but also in the other strategic industries after the reform in 1979 via similar state policies. These three industries are aircraft, computer and automotive industries which have also similar catch-up stories with another strategic industry of telecom equipment industry. Thus, telecom equipment industry could not be evaluated as an "industrial catch-up" via neglecting macro state policies. It is clear that, today's neoliberal policies and "the modernization theory" could not explain this success. China attended this achievement by not copying other nations and did not follow their developmental path. Despite staying on the socialist way (as Deng claimed), open market and integration into the rest of the world under state-led development approaches have been the major factors.

From theoretical perspective, China transformed itself with a new model via merging world trends and its national dynamics and potential. The triple system could be seen clearly in China case; strong state authority manages all stages of development, using foreign investment as a source of capital and modern technology, and increasing the capability of the national industry via related state policies; such as founding State-owned enterprises, providing state-led financing, encouraging the foundation of national companies and so on. This system has similarities with the Latin American

Structuralist School policies and "dependent development" approach. Meanwhile, state-led financing by state-owned banks and China state's strategies to protect the industry could also be evaluated around the approaches of List and Gerschenkron. Different type of infant industry protection strategies are used in China case, however, China state still continue to apply these protection strategies in different methods.

In sum, China state does not leave the authority to the market, state directly/indirectly manages all the phases of this catch-up in strategic industries and economic development. This type of development strategy is quite new for literature, because "state" plans, founds and also manages all parts of the industry. State transfers the modern technology via foreign investments, uses state-owned banks to financing, founds state-owned suppliers, creates state-owned market with state-owned companies and manages innovation side with state-owned research institutes and universities and supports state-owned suppliers with national technologies. This system is named in this thesis as "generative state" in which the state creates and sets up all related institutions and processes which are necessary to development and catch-up in a continuous manner. Although state actively manages the process, integration with the global economies provides know-how flow from foreign markets. State does not leave the control to the free market; all the processes in the industry are previously defined by the state and applied with predefined instruments.

Behind the success story of China, there are also negative effects of this development on China. Milestone of this paradigm shift has left the way of the proletariat dictatorship and integrated to the capitalist economic system after 1978. However, while Chinese economy grows with a significant rate and catches-up in the high-tech industries, on the other side of the medallion, economic disparities also increased. In China, the capitalist transformation and the integration into the global markets feed the national development of China; however, they negatively affect the Chinese labor market. In addition to the poorer working conditions and the lower wages, Chinese labor must pay a fee

for social services such as education, health, accommodation etc. After the socialist period, Chinese people began to pay a significant budget for healthcare expenditures. Central government's share in the total healthcare expenditure declined from 32 to 15 per cent between 1978 and 1999. In 2001, nearly 60% of the total health expenditures were paid by individual out-of-pocket payments. In 2008, government increased its contribution to the system and individual out-of-pocket payments share came to 42% of total health expenditures.[86] These numbers are still too high for Chinese people who have to work for less than $1 per day.

Moreover, new economic system strongly damaged peasants, too. In Mao's period, these social services were also free for peasants. Mao's "iron rice bowl"- had guaranteed lifetime employment in state enterprises- it was counteracted and the labor market was created. While China state creates its own upper class and millionaires, Chinese labor and peasants lost their importance with the disappearance of "the iron rice bowl" policy of the Mao's period. "The people's democratic dictatorship led by the working class and based on the alliance of the workers and the peasants" policy is now nostalgia and "socialist" China began to evolve through a "technocrat" state.

New China does not only negatively affect the Chinese labor market, but the world labor market is also damaged and lost their rights. Capitalist system is settled on increasing business margin, and it is decreasing the manufacturing costs continuously. Thus, China's lower labor costs cause the transfer of the production facilities to China from the rest of the world, thus, millions of workers lose their jobs or are forced to work with lower wages.

In addition to the negative effect on the working conditions, increasing rate of corruption in the bureaucracy of the Party and the State is another major problem for new China; bribery, embezzling and misfeasance could be given as examples. Unequal distribution of income also is one of the recent problems. There were 119 dollar billionaires in China and more than 500.000 people who

[86] Barber, S.H., Yao, L. (2010), "Health insurance system in China: A briefing not", World Health Report: 11.

have $1.000.000 financial assets.[87] (Beardson, 2013: 157). As a recent study, in 2012, Pew Survey completed a survey for Chinese people about which issues are important to them. According to the results, high-lighted rising prices, income inequality, corruption, air pollution, food safety and quality of the manufactured goods were announced.[88]

Another point is the sustainability of this model in China. Since 1978, China attended significant growth rates and closed the gap between developed countries in macroeconomic statistics. As mentioned above, the state has been in the middle of this development story. However, today hegemon organizations (World Bank and IMF) pressure for limiting the role of state on economy and applying neoliberal policies for China. In fact, the developed countries specifically US and EU are not peaceful about progression of China. Thus, these countries aim to obsolete this progression with increasing the effect of neoliberalism for China. However Communist Party defines this danger and resists to not applying these imposed neoliberal policies via using the gun of "Chinese huge market". Additionally, other negative effects of this rapid development as pollution, unequal distribution of income, bribery, embezzling has to be overcome for the sustainability of China's development.

From this point of view, the question which follows is that; "Is the Chinese state-led catch-up model with "generative state" approach replicable by the other latecomers?"
This part is clarified with policy recommendation for the other latecomers.

The objective of this policy recommendation is "to show an alternative development and catch-up way for the latecomers rather than the neoliberal policy suggestions".

[87] Forbes Rich, Merrill Lynch and Capgemini, Asia-Pacific Wealth Report.

[88] http://www.pewglobal.org/2012/10/16/growing-concerns-in-china-about-inequality-corruption/

Target of the policy recommendation is the latecomer countries and industries.

Policy recommendation: Against regulatory and limited role of the state in the neoliberal development models, "state-led" development could be suggested for the latecomers' development and catch-up, as in China. In this model, the state has an active role both in the policy and the execution stages. This system is a triple system which manages foreign investments and national industries with the state's active role.

Policy tools are defined according to this triple system of China.

Policy Tools:

Policy Tool-1: Active role of the state

- Defines strategic industries in which the state should invest
- State-owned companies should be founded in order to protect the national interests, however these companies must be organized in a way to compete with the multinational rivals.
- State-owned banks should fund these industries via strategic investments.
- State should create state-owned market via SOEs. This market is a valuable source for national industries in order to guarantee their sales revenues specifically in emerging and catch-up phases.
- State-led R&D should have a parallel target with the national industry and the national priorities. Network between state-led R&D activities, state-owned enterprises and national private companies should be formed and managed in an effective manner.

Policy Tool-2: Integration into the capitalist markets and the attractive policies for foreign investments

- Linking with capitalist economy and markets provides opportunity to learn modern technologies and consumer markets.
- Joint ventures structure is quite strategic; multinationals should be convinced to found joint ventures with the national partners. JVs are quite strategic for learning and know-how transfer.

Policy Tool-3: Encourage national companies and capital to operate in strategic industries

- Establishment of the national private and state-owned companies are quite strategic
- Related financial and political initiatives should be provided by the state authority
- Potential of the domestic market is a significant tool to fund the national industry, specifically for the emergence and the growth stages.

This policy recommendation is also illustrated in Figure 6.

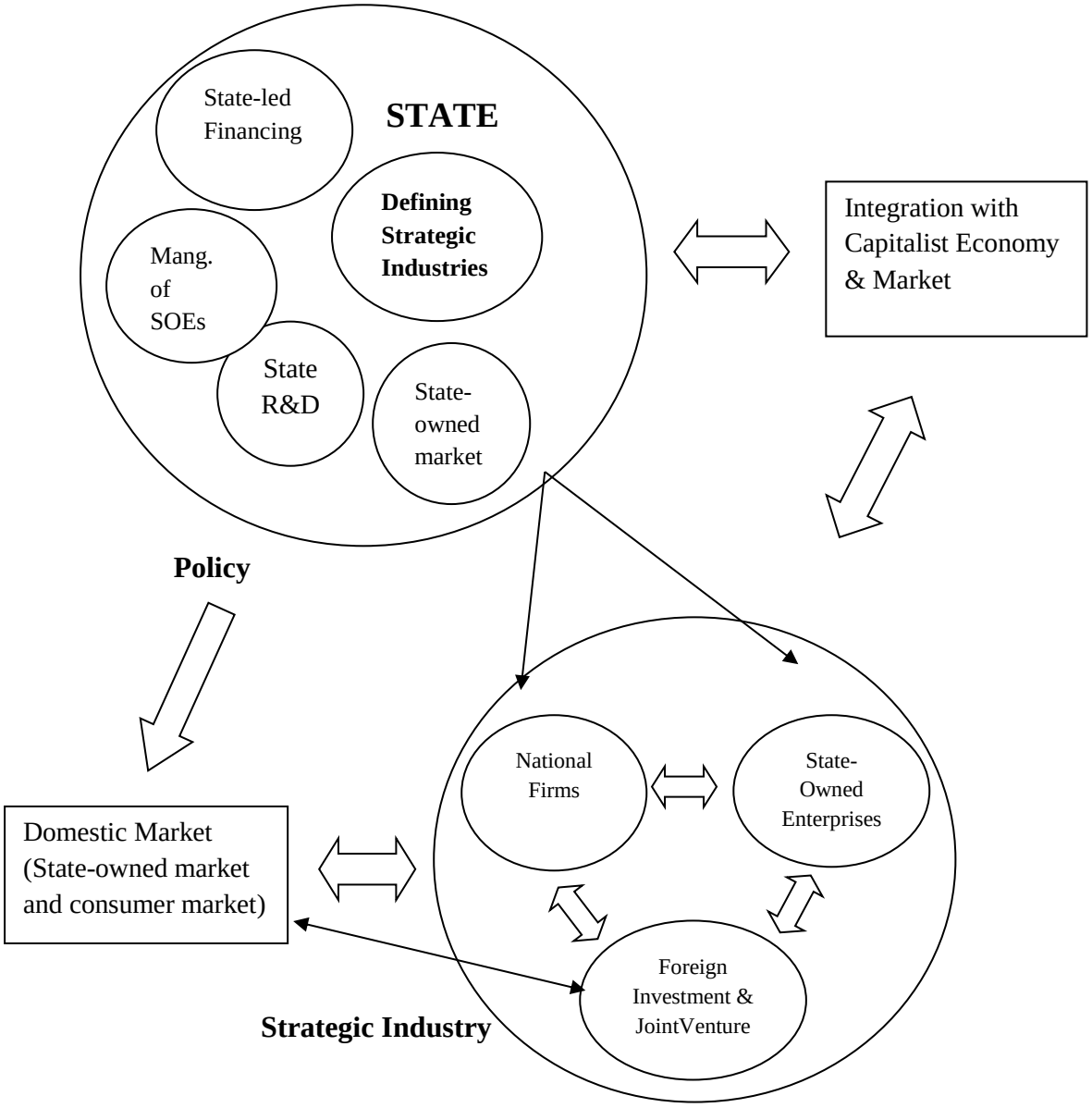


Figure 6: Policy recommendation for latecomers: State-led catch-up in strategic industries

This model underlines "the state" as a central authority that manages phases directly or indirectly during catch-up. State is a policy maker and defines the strategic industries for development. State enables integration with the other markets and economies, thus, encourages foreign investments via using attractiveness of the domestic market in order to enable the know-how

and the technology transfer. State is also a financing mechanism to protect and also support the national industry, at least during the emergence and the growth phases. State is also a market with its state-owned demand which also supports the national industry.

Joint ventures provide a suitable environment for the transfer of the know-how by the state-owned enterprises. There is a triple interaction mechanism between SOEs, JVs and national firms. SOEs in the strategic industries are not privatized, and re-organized in a way to compete with the rivals in the capitalist market, however, an upper state mechanism also manages these enterprises according to the national interests.

Additionally, this system enables a new platform for learning activities and know-how transfer via foreign investments, as shown in Figure 7. Joint ventures with multinational firms provide a great opportunity for the national industries as a tool for transferring modern technology and know-how which takes place in the foreign markets. Specifically, know-how transfer is succeeded by the bidirectional relation between the JVs and the national companies. This modern technology and the know-how flow upgrade the national industry. At the end, all these figures target the same domestic and global markets and they have interaction with the consumer market, too.

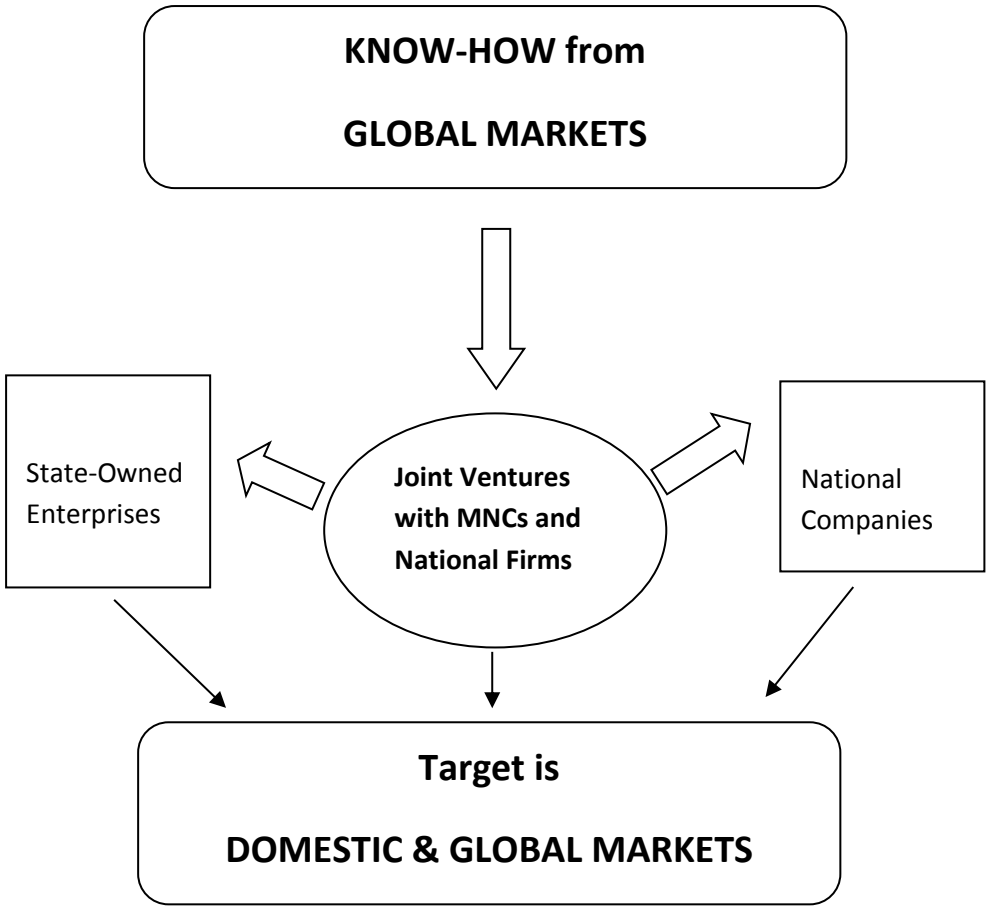
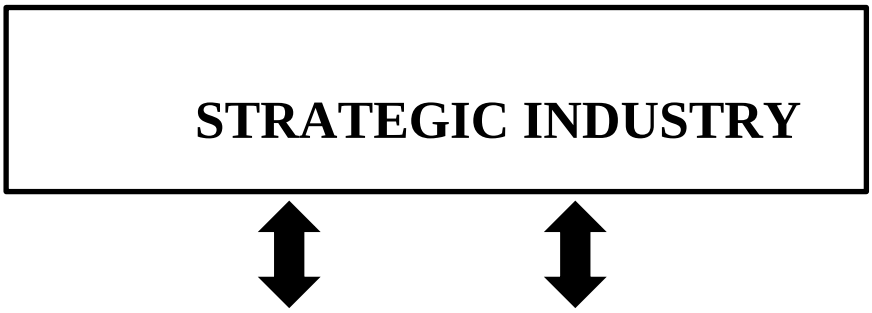


Figure 7: Learning and Know-how Transfer from Foreign Investments

As another tool of policy recommendation for the latecomers, state mechanism actively involves each aspect of the industrial catch-up. Figure 8 summarizes the role of interventionist state during the catch-up. These specific roles belong to state-owned companies, state banks, state-owned market and state research environment.



State-owned Companies No privatization, re-organization of State-owned Enterprises
State Banks State should state-owned banks to fund strategic investments
State-owned Markets State should have state-owned markets to fund state-owned enterprises
State Research Environment: R&D which requires significant financial sources, should be achieved by state universities/state owned institutions

Figure 8: Role of Interventionist State during Industrial Catch-up

As shown in policy recommendation part, this type of catch-up is China-specific and emerged according to Chinese interests and dynamics. In fact, China did not copy another country and transformed its main disadvantages (crowded population to the workforce and market) through the most important strength, and succeeded the catch-up. In this period, the most important factors have been the role of "generative state" in each period of development. State planned all the stages of this development itself. Additionally, Chinese huge market and low-cost workforce have been used in order to attract foreign investments to invest in China.

China achieved all these strategies under the management of "generative state", meanwhile, the sustainability of the "generative state" could also be another discussion issue. As mentioned in above pages, in "generative state" approach, state creates and sets up all related institutions and processes which are necessary to development and catch-up in a continuous manner. Although state actively manages the process, integration with the global economies provides know-how flow from foreign markets. State does not leave the control to the free market; all the processes in the industry are previously defined by the state and applied with predefined instruments. The sustainability of the "generative state" could be succeeded if the state continues to manage the system in the effective way for coming decades. First of all, the state has to re-define continuously the strategic industries which will sustain the development in future decades. Then, the state has to continue to set know-how flow from developed markets about these strategic industries. Meanwhile, the state has to manage the SOEs and national companies of these industries in effective and efficient manner during the competition in capitalist markets. State has to avoid privatizing state-led financing mechanism and continue to finance these strategic industries specifically for emerging and growth phases.

The replicability of this model is another issue; in fact all countries have different characteristics and dynamics. There is not any model which will be successful and may be suggested to all latecomers during catch-up in the strategic industries. Thus, the models should be modified according to the advantages, the dynamics and the interests of the countries. However, the thesis attaches importance to the role of the state instead of the neo-liberalism and the free market doctrines; because capitalism is a fierce but not fair competition between the previously developed countries and the latecomers. Thus, the factor of "generative state", which manages all the phases of this catch-up and continues to sustain the development, could be beneficial to the latecomers in order to close the gap with the forerunners. China has transformed the disadvantages of crowded population through a huge market and army of low-cost workers. Another country should define its specific dynamics and use them in catch-up period. However, the shared point is the active role of state as

defined “generative state” which should manage these all phases without leaving the control to the free market.

For further research beyond this thesis, similar industry cases should be studied in China in this framework; “generative state” policies. Because China’s recent success story in the economic development is not a coincidence case.

As a final sentence; Socialist China left Chinese for the future of the State of China.

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TÜRKÇE ÖZET

Özellikle 1970'lerin sonlarından itibaren, neoliberal ekonomi politikaları tüm dünyada hızla yayılmaya başladı. Sovyetler Birliği'nin yıkılma süreci ve tek kutuplu dünya sistemi ile birlikte bu politikalar ve kalkınma reçeteleri gelişmekte olan ve geri kalmış ülkeler üzerindeki etkisini artırmaya başladı. Bu politikaların en önemli özelliği devletin düzenleyici role sahip olması, kamu iktisadi kuruluşlarını ekonomiden özelleştirmeler yoluyla çekmesi ve ekonominin işleyişini tamamen pazar dinamiklerine bırakmasıdır. "Bürokratik ve atıl" devlet mekanizması dinamik ve rekabetçi pazar ekonomisi önünde büyük bir engel olarak görünmekle birlikte, bu politkalar devlet-kaynaklı kalkınma modellerinin alternatifi olarak konumlanmıştı.

Neoliberal kalkınma reçeteleri, Washington Konsensusu başlığı altında IMF, Dünya Bankası, Dünya Ticaret Örgütü gibi hegemon uluslararası finans kuruluşları aracılığıyla az gelişmiş ya da gelişmekte olan ülkelere hızla yayılmıştır. Bu politikaların ortak özelliği devletin stratejik önemdeki sektörel yatırımlardan uzak durması, devletin yerine pazarın bu fırsatları en iyi şekilde değerlendireceği bir denge yapısının kurulacağı söylemini kullanılmasıdır. Neoliberal politikaların bir sonucu olarak kamu iktisadi kuruluşlarının özelleştirilmesi ve devletin stratejik önemdeki tüm bu sektörlerden çekilmesi de şiddetle tavsiye edilmektedir.

40 yıldan daha fazla bir süredir birçok az gelişmiş ya da gelişmekte olan ülkede uygulanan bu politikalar, ciddi bir başarı sağlayamadıkları gibi, bu ülkelerin kapitalist ekonomik sisteme tam bağımlı olmalarının yanı sıra, uluslararası iş bölümünde düşük katma değerli işlere odaklanmalarından öteye de gidilememiştir. Ancak bu politikaları geriden gelen ülkelere dayatan gelişmiş ülkeler ise, geçmişte devlet mekanizmasının aktif olarak çalıştığı kalkınma stratejileriyle bugünkü gelişmiş yapılarına kavuşmuş olduklarını da açıkça dile getirmemektedirler. Bu gelişmiş ülkeler hala kimi stratejik alanlarda devlet mekanizmasını aktif olarak kullanmaya devam etmektedirler.

Devlet mekanizması ana otorite olarak ülkelerin kalkınmasından temel sorumlu olan yapıdır, ekonomik gelişmeyi ve kalkınma sorunsalını aktif politikalarla ülkede yaşayanların refahını sağlayacak şekilde yönetmek durumundadır. Bu kalkınmacı misyon, pasif düzenleyici politikalarla değil, aksine aktif, piyasaya müdahale eden stratejilerle sağlanmalıdır, çünkü serbest pazar ekonomisi adı altında neoliberal politikalar tarafından dayatılan yapı, gerçekte adil bir piyasa değildir. Bu piyasada ana iki grup ülke – gelişmiş ülkeler ve diğerleri- pazardan pay almak için çalışmaktadırlar. Gelişmiş ülkeler geçmişten bugüne taşıdıkları üstünlükleriyle pazara hakim olmakta ve asıl katma değerli alanları yönetmektedirler. Bu üstünlükleri, sermaye birikimi, ileri bilgi düzeyi, yetişimiş insan gücü, pazar avantajları vb. olarak sayılabilir. Gelişmekte olan ya da az gelişmiş ülkelerin bu dezavantajlı durumla birlikte serbest pazar ekonomisi şartlarında rekabet edebilmeleri mümkün değildir. Bu dezavantajlı durumu ise dengeleyebilecek yegane unsur devlet mekanizmasının kendisidir. Geriden gelen ülkeler stratejik önemdeki sektörlerde yakalama fırsatlarını ancak devletin aktif yönetimi ve lider özelliği ile değerlendirebileceklerdir.

Bu kapsamda tezin amacı, geriden gelen ülkelere yüksek teknoloji içeren endüstrilerde yakalama ve gelişme fırsatı sağlayacak, neoliberal kalkınma politikalarına alternatif oluşturacak politikayı "Çin telekom ekipmanları endüstrisindeki yakalama, devlet yönlendirmesinin ve devlet kaynaklı yakalama politikalarının başarısıdır" hipotezini test ederek oluşturmaktır.

Tezin araştırma sorusu; son 30 yılda Çin telekom ekipmanları endüstrisinin yakalama (catch-up) başarısının hangi politikaların sonucu olduğunun belirlenmesidir.

Tezin alt hipotezleri ise şunlardır:

- Çin devleti tarafından stratejik endüstri olarak belirlenen telekom ekipmanları endüstrisinin tüm gelişim evreleri Çin devleti tarafından yönetilmiştir.

- Yabancı yatırımlar ve ulusal firmalarla kurulan ortak girişimler, Çin telekom ekipmanları endüstrisinin ortaya çıkması ve gelişmesinde önemli bir rol oynamıştır.
- Çin'in büyük pazarı Çin telekom ekipmanları endüstrisinin kurulma ve büyüme aşamalarını finanse etmiştir.
- "Çin devlet bankaları aracılığıyla hayata geçirilen devlet-kaynaklı finansman" politikası ulusal endüstriyi yerel ve uluslararası pazarlardaki faaliyetleri konusunda finanse etmiştir.

Bu tez çalışması, müdahaleci devlet rolünün geriden gelen ülke endüstrilerinin gelişmesindeki önemini de ayrıca vurgulamaktadır. Tezin tamamında neoliberal politikaların aksine devlet otoritesinin aktif olarak yönettiği bir yakalama stratejisi önerilmektedir. Bu devlet-kaynaklı kalkınma politika önerisi, yüksek teknoloji içeren endüstrilerden birisi olan telekom ekipmanları endüstrisi üzerinden tartışılmaktadır. Devletin aktif rolünün ön plana çıkarılarak, 21. yüzyılın önde gelen endüstrilerinden birisinde görünen bu yakalama başarısının, 1900'lerin, 1940'ların ve 1970'lerin devlet-kaynaklı kalkınma modelleri üzerinden tartışılması tezin yenilik kısmını oluşturmaktadır. Bu sayede tez, yakalama çalışmalarını makro-devlet politikaları ile tartışarak da farklı bir bakış açısı ortaya koymaktadır.

Tezin teorik çerçevesi kalkınma teorileri üzerinden hareket ederek, Modernizasyon Teorisi, Bağımlılık Okulu, Latin Amerika Yapısalcı Okulu ve bu teorilerin kalkınma söyleminde devlet üzerinden yaptıkları tartışmalarla oluşturuldu. Ek olarak List ve Gerschenkron'un ulusların gelişmeleri üzerine ortaya koydukları politikalar da tezin teorik çerçevesinde yer aldı.

Özellikle "kalkınmacı devlet" yaklaşımı üzerine tartışmalar 60 yıldan fazla süredir ciddi paradigma değişiklikleriyle ülkeleri etkilemektedir. II. Dünya Savaşı'ndan sonra uluslararası alanda özellikle Afrika ve Latin Amerika'nın gelişmekte olan ülkelerine devlet-kaynaklı kalkınma politikaları önerilmekteydi. Zaman içerisinde devlet destekli kalkınma modelleri özellikle 1970'lerin sonlarına doğru ciddi anlamda eleştirilmeye başlandı. Devletin

verimsiz işletmelere sahip oluşu, devlet kaynaklarının yanlış alanlara yönlendirilmesi, devletin piyasaya gereksiz müdahaleleri gibi nedenlerden dolayı ekonomik krizlerin yaşandığı öne sürülerek, neoliberal kalkınma politikalarının altyapısı oluşturulmuştur.

İşte bu politikaların temeli olan ve tezin de teorik çerçevesinde tartışılan Modernizasyon Teorisi bu kısımda özetlenecektir. Özellikle II. Dünya Savaşı'ndan sonra dünya, ekonomik genişleme ve kutuplaşma süreciyle karşı karşıya kaldı. Teorisyenler ekonomik kalkınma ve siyasi istikrar bağlamında üçüncü dünya ülkelerine yeni kalkınma modelleri geliştirmeye başladılar. Modernizasyon Teorisi böyle bir dönemde ortaya çıkmıştır. Bu teori temel olarak geri kalmış ülkelerin bugün gelişmiş durumda olan ülkelerin izledikleri yolları ve aşamaları aynen takip ederek gelişebileceklerini savunmaktadır. Ülkelerin mevcut sosyo ekonomik yapılarını, gelişmiş ülkelerin dinamikleri ve koşullarına göre yeniden dizayn etmelerini önermektedir. Walter Rostow, Modernizasyon Teorisi'nin önde gelen teorisyenlerindendir ve 1960 yılında yazdığı ünlü kitabı Ekonomik Büyüme Aşamaları'nda üçüncü dünya ülkeleri için gelişmenin 5 aşamada mümkün olduğunu anlatmıştır. Bu aşamalar şöyledir; *Geleneksel Toplum Aşaması:* Bu aşamada toplum ve ekonomik koşullar tarımsal aktivitelerin baskın olduğu aşamadadır. Bu sistem bilimsel olmayan görüş ve gelenekler tarafından şekillendirilmektedir. Toplumda ciddi bir hiyerarşik sistem vardır ve çalışma süreçleri önemli bilgi akışları gerektirmemektedir. *Kalkışa Geçiş Aşaması:* Bu aşamada ülke modern bilim ve kalkınmaya önem vermeye başlamaktadır, kalkınma tek bir otorite olan devlet tarafından yönetilmektedir. Bu aşama sanayi devrimi ile birlikte tarım toplumundan sanayi toplumuna geçiş vurgulanmaktadır ve artan yatırımlarla birlikte ekonomik gelişme hızlanmaktadır. *Kalkış Aşaması:* Ülke dışarıdan herhangi bir girdi olmadan birkaç endüstri ile birlikte kendi kendine sürdürülebilen dinamik bir ekonomik gelişme ortamı yaratmaktadır. *Olgunluk Aşaması:* Teknik ilerleme bu aşamanın önceki aşamalardan temel farkıdır. Kalkış aşamasından sonra, ülkeler her endüstride teknolojik ve girişimcilik yeteneklerine kavuşmuş olacaklardır. Yeni bilimsel odaklanma alanları oluştukça sosyal ve ekonomik refah artacaktır. *Kitle Tüketim Aşaması:* Bu

aşamada ülke ekonomileri ekonomik refah ve zenginliğe ulaşır. Dünya'nın kuzey ve batı ülkeleri bu aşamaya erişmişlerdir. Rostow'un bu teorisi gelişmekte olan ülkelerin ABD ve Batı Avrupa'yla güçlü bağlar ve ilişkiler kurmaları sonucunda "kalkış aşaması"na hızla ulaşacaklarını vurgulamaktadır. Rostow'un ve modernizasyon teorisinin temel amacı geriden gelen ülkeler için tek düze, değişmeyen bir kalkınma modeli sunmak ve gelişmiş ülkelerin ilerleme tecrübelerini gelişmekte olan ülkelere transfer etmek ve bu ülkelerin kalkınma modellerini kopyalamaları sonucu başarının geleceğini göstermektir. Ancak bu model iki temel noktada eleştiriler almaktadır. Birincisi, geriden gelen ülkelere tek düze bir kalkınma modeli sunulmaktadır ve her ülkenin bu modelle başarılı olacağını dayatmasıdır. Halbuki geriden gelen ülkelerin kendilerine has özellikleri ve dinamikleri vardır. Bu sebepten ötürü tek bir modelin tüm geriden gelen ülkelere uyması beklenemez. İkincisi ise, sömürü ve azgelişmişlik sorunsalları bu teoride yer almamaktadır. Şöyle ki geri kalmışlığın tek bir tanımı vardır ve tüm ülkeler bu aşamadan başlayarak gelişmelerini sürdürmelidir. Ek olarak, teorinin üçüncü dünya ülkelerinin değerlerinin modern ülke değerlerine dönüştürülmesini zorunlu kılması da ayrı bir eleştiri noktasıdır. Bu yöntem oldukça irrasyoneldir, çünkü her ülkenin birbirinden oldukça farklı geçmişi, sosyo-ekonomik dönüşüm süreçleri, kültürel yapıları gibi özellikleri vardır ve tüm bu farklı özellikler tek bir model üzerinden tartışılamaz.

Modernizasyon Teorisi'ni eleştiren Bağımlılık Okulu ise Latin Amerika'nın az gelişmişlik sorunsalından ortaya çıkmıştır. Bu teorinin 3 temel kaynağı vardır; Amerikan-Marksistler (Paul Baran, Paul Sweezy, Andre Gunder Frank), Birleşmiş Millet bünyesinde kurulan Latin Amerika ve Karayipler Ekonomik Komisyonu (ECLA- Prebisch, Singer, Furtado) ve Marxist politik görüş. Bağımlılık Okulu temelde az gelişmişliğin sebebinin batının sömürgeci ve genişlemeci politikalarından ve gelişmiş ülkelerle üçüncü dünya ülkeleri arasındaki adaletsiz güç dağılımlarından kaynaklandığını savunmaktadır. Dış faktörler ve ülkelerin uluslararası sistemdeki mevcut yerlerinin içsel dinamiklerden daha belirleyici olduğu vurgulanmaktadır. Teori temel olarak kapitalizmden daha çok emperyalizmi ve dış güçlerin etkisini ön

plana çıkarmaktadır. Ülkeler gelişmiş, gelişmekte olan ve az gelişmiş olarak gruplandırılmakta ve bu grup ülkeler arasında güçlü bir sömürü ilişkisi olduğu ifade edilmektedir. Modernizasyon Teorisi'nin aksine Bağımlılık Okulu, gelişmiş ülkelerle güçlü ticari ve ekonomik ilişkiler kurulduğu sürece geriden gelen ülkelerin kalkınamayacağını ve bu ilişkilerin her seferinde sömürü ilişkilerini yeniden doğuracağını savunmaktadır. Bağımlılık Okulu azgelişmişilik sorunsalının çözümünü sosyalist devrim ve uluslararası sistemle bağların koparılmasında görmektedir. Gerçek bir gelişmenin de ancak bu şartlar altında ortaya çıkacağını savunmaktadır.

Bağımlılık Okulu ile aynı teorik çerçeveden gelen ancak zaman içerisinde farklılaşan Latin Amerika Yapısalcı Okulu da tezin teorik çerçevesinde yer almaktadır. Latin Amerika Yapısalcı Okulu temel olarak dış güçlerin etkisinden daha çok iç dinamiklerle kalkınmanın gerçekleşebileceğine vurgu yapmaktadır. Temelde bağımlılık okulunda olduğu gibi merkez ve çevre ülke ayrımı burada da vurgulanmaktadır. Özellikle Cardoso "bağımlı gelişme" modeli üzerinde çalışmıştır. Bu model, bağımlı kapitalist bir gelişmenin çokuluslu şirketler, devlet ve yerel endüstrinin ortak çalışmalarıyla mümkün olduğunu savunmaktadır. Peter Evans *Bağımlı Gelişme* adlı kitabında yapısalcı okul literatürüne önemli katkı yapmıştır. Devlet, çokuluslular ve yerel sermayenin işbirliğiyle kalkınmanın sağlanabileceğini özellikle vurgulamaktadır. Bağımlı gelişme yaklaşımı, merkezi devlet mekanizmasını yerleştirmektedir. Devlet düzenleyici bir rolden daha çok aktif bir rol üstlenmektedir. Çokuluslu şirketlerin hem sermaye açısından, hem de iş olanakları ve sağladıkları bilgi transferi fırsatları açısından önemi de ayrıca vurgulanmaktadır. Özet olarak, Yapısalcı Okul kalkınmanın yabancı sermaye ve içsel dinamiklerin ortaklaşa çalışmaları ve devlet mekanizmasının bu süreci aktif yönetimi ile gerçekleşebileceğini savunmaktadır.

Ek olarak List ve Gerschenkron'un gelişmede devletin rolü üzerine yaptıkları çalışmalar da teorik çerçevede ayrıca yer almıştır. List, ulusalcı bir bakış açısıyla gelişmenin sağlanacabileceğini vurgulamaktadır. Özellikle Almanya'nın İngiltere'yi yakalaması üzerine incelemeler ve çalışmalar yapmıştır. Yeni gelişmekte olan sanayilerin mutlaka hazırlanacak özel politika

ve stratejilerle korunması gerektiğini belirtmiştir ve ancak bu sayede ulusal ekonomik kalkınmanın sağlanacağını savunmaktadır. List bu görüşünü İngiltere'nin gelişme döneminde uyguladığı korumacı politikaların sayesinde kalkındığını anlatarak örneklendirmektedir. Ayrıca serbest ticaretin bir politik güç yarattığını ve gelişmiş ülkelerin avantajına olduğunu da vurgulamaktadır. List, 19. yüzyılda Amerika'da uygulanan korumacı politikaların ve ulusal banka kredileriyle desteklenen tarım, endüstri gibi sektörlerin ve bilimsel çalışmaların da önemini anlatmaktadır. List Kalkınma Modelini savunanlar bugünkü ABD'nin geçmişte İngiltere'ye karşı kullandığı korumacı devlet politikaları sayesinde kalkındığını belirtmektedir. Ek olarak Almanya ve Japonya'nın da benzer devlet politikalarıyla kalkındıklarını örnek olarak vermektedirler. Yeni-List savunucuları Washington Konsensusu'nun ve neoliberal politikaların karşısına devlet-kaynaklı kalkınma modellerini getirmektedirler. Gerschenkron da kalkınmada devletin aktif rolüne vurgu yapmaktadır. Az gelişmiş ülkelerin geriden gelmenin avantajını devlet desteğiyle birarada kullandıklarında aradaki farkı hızla kapatabileceklerini savunmaktadır. Gerschenkron ünlü şemasında devletin liderlik rolünü, organize edilmiş finansal kurumları ve ulusal endüstrileşme ideolojisini birarada değerlendirmektedir.

Bu teoriler temelde makro kalkınma modelleri sunmakla birlikte, Çin'deki bu özel durumu anlayabilmek adına katkıları oldukça önemlidir. Tüm bu bahsedilen teorik tartışmalar tezin teorik altyapısına önemli katkılar sağlamasın rağmen, tez tek bir model üzerinde oluşturulmamış, Çin üzerinden yapılan analizlerle yeni bir model çizilmiştir ve bu modelin de diğer geri kalmış ülkelere referans olması hedeflenmektedir. Sonuçta diğer geriden gelen ülkeler de temel değerleri kullanarak, yine kendilerine özgü dinamiklerle yeni modeller kurmak zorundadırlar.

Çin'in özellikle 1978'deki reform dönemi ile yaşadığı büyük dönüşümün endüstriler ve ekonomi üzerindeki etkileri tezde derinlemesine incelenmektedir. Çin telekom ekipmanları endüstrisinin örnek olay olarak incelenmesi sayesinde, sektörün gelişim döneminin her aşamasında devlet

otoritesinin aktif rolü görünmekte ve içerisinde devletin, yabancı yatırımların ve ulusal şirketlerin ve sermayenin olduğu "üçlü sistem" modellenebilmektedir. Çin'deki bu gelişimi önceki örneklerden farklı kılan temel nokta ise, sosyalist bir kültürden gelip, kapitalist ekonomik sistemle entegrasyonu sağlayan ancak devletin tüm bu gelişme sürecini kendi kontrolünde tuttuğu yeni bir modelin bu gelişmeyi sağlamış olmasıdır.

"Üçlü sistem" modeli olarak belirlenen yapıda, yabancı yatırımlar ilgili sektöre bilgi akışını sağlayan ve ulusal endüstrinin teknoloji düzeyini yükseltmek için kullanılan araçlardır. Kamu iktisadi kuruluşları, ulusal firmalar ve ulusal sermaye ise sektörün ana yapısını oluşturan ve sektörün gelişimini sağlayan unsurlardır. Üçünü mekanizma olan devlet ise tüm bu süreci aktif olarak yürüten, yabancı yatırımları hem teşvik eden hem de kontrol altında tutan, kamu iktisadi kuruluşları ile pazarı yöneten, devlet bankaları aracılığıyla sektörü finanse eden ve diğer tüm mekanizmaları aktif olarak yöneten ana mekanizmadır. Devlet, sektörün tüm bu dinamiklerini kontrol altında tutmakta ve ağ içindeki ilişkileri yönetmektedir.

Çin 1949'de Mao önderliğindeki sosyalist devrim ve 1978'de Deng liderliğinde açık ekonomi ve pazar sosyalizmi olmak üzere iki büyük dönüşüm yaşamıştır. Her iki dönemde de merkezi yönetim, süreci aktif olarak yönetmiştir. Tezin bu ilgili bölümleri, Çin için önemli tarihleri referans alarak Çin'deki bu siyasi dönüşümlerin endüstrileşme ve teknolojik gelişme alanları üzerindeki etkilerini ve devletin rolünü incelemektedir.

Mao önderliğindeki sosyalist devrim ile birlikte Çin, üretim araçlarını kamulaştırarak ulusal ekonominin devlet planlaması ile büyümesini hedefleyen bir sosyalist kalkınma modelini seçmiştir. Bu reform sürecinin ilk yıllarında Çin diğer ülkeler tarafından baskı altına alınmış ve uluslararası toplumdan izole edilmiştir. Bu dönemde en büyük müttefik Sovyetler Birliği olmuştur. Böylece yeni kurulan sistemde Sovyetler ile birlikte yoğun bir işbirliği sağlanmış ve deneyimlerinden faydalanılmıştır. Sovyetlerin yetişmiş iş gücü, finansal destekleri ve bilgi transferleri ile birlikte Çin, önemli bir kalkınma hamlesi yapmıştır. Çin devleti bu dönemde ağır sanayileşmeye önem vermiş ve bu süreçte oldukça da başarılı olmuştur. Büyük sıçrama (great leap forward)

hamlesi önemli bir atılım planı olmasına rağmen büyük bir sorun olarak Mao liderliğindeki Çin yönetimini olumsuz olarak etkilemiştir. Sonrasında ortaya çıkan Kültür Devrimi hareketleri de Çin'e istikrarsızlık ve siyasi bir kaos ortamı getirmiştir.

Mao felsefesi temel olarak gelişme, ulusalcılık ve sosyalizm üzerine kurguludur. Son dönemde yaşanan sorunlara rağmen Mao, Çin'i gelişmemiş feodal bir tarım toplumundan endüstrileşme hamlesini yapmış ve hızla gelişmekte olan bir ülke konumuna taşımıştır. Mao özellikle tarım, bilim ve teknoloji, endüstrileşme, ulusal savunma, eğitim ve sağlık gibi alanlarda ciddi başarılar göstermiştir. Mao döneminin temel eksikliklerinden birisi kapalı ve dünyadan izole bir ekonomi olarak mücadele vermesidir.

Mao dönemi sonrası Çin'de önemli bir paradigma değişikliği yaşanmış, Çin kapitalist ekonomik sistem ile entegrasyon sağlayarak açık ekonomi modeline geçişi sağlamıştır. Hem Mao döneminde hem de Deng döneminde en aktif yapı olan Komünist Parti, Mao dönemindeki tarihi rolü olan sınıf mücadelesini, ekonomik modernleşme ve dünya ile eklemlenerek üretici güçlerin geliştirilmesi olarak değiştirmiştir. Parti, dört ana alanda modernleşme atağı başlatmıştır; bu alanlar endüstri, tarım, bilim ve teknoloji ve ulusal savunma olarak gruplandırılabilir. Deng'in ekonomik reform programı pazar güçleri ile merkezi devlet planlamasını entegre ederek Çin'e özel bir model kurmaktı. Bu modelle birlikte Çin, dış dünyadan bilgi akışı sağlayarak, yenilikleri transfer ederek ve bu yenilikleri Çin sosyalist sistemine entegre ederek içselleştirme yolunu hedeflemiştir. Bu durumda Çin, sosyalizmi terketmeden, Çin'in gelişmesine katkı sağlayacak şekilde kapitalizme eklemlenmiş oldu. Deng üstün bir sosyalist sistemin kurulmasının önündeki en büyük engellerin yoksulluk ve sermaye birikimi olduğunu belirterek, bu yeni sistem ile pazar ekonomisini sosyalizmin içerisine dahil edip, geleneksel sosyalizm ile liberalizm arasında yeni bir model yaratmayı hedeflemiştir.

Bu yeni modeli ile Sovyetler döneminden kalan ve eskimiş bir teknolojik altyapıya sahip olan Çin'de, teknolojik altyapıyı yenileyerek ve modernize ederek ekonomik kalkınmanın da yolu açılmıştır. Çin yönetimi ve Komünist Parti ileri teknolojinin Batı ülkelerinden transfer edilmesi kararı ile

birlikte kapitalist pazarlara eklemlenme yolunda hızlı ve önemli adımlar atmışlardır. Bu dönemde Çin'in geri kalmış teknolojik altyapısına katkı sağlayacak ve stratejik olarak belirlenen endüstrilerde Çin'e bilgi transferi yapacak olan yabancı yatırımların önü açılmıştır. Bu süreçte yabancı yatırımları Çin'e çekme konusunda en önemli etken büyük ve bakir Çin pazarıdır ve Çin hükümeti bu fırsatı iyi değerlendirmiştir. Bu dönemde Çin, yabancı yatırımların ulusal firmalarla ortak işbirliği yapıları (joint-venture) kurarark ve modern teknolojilerini Çin'e taşıyarak pazara girmelerine izin vermiştir. Büyük potansiyeli olan Çin pazarına ek olarak ucuz iş gücü fırsatı da yabancı yatırımcıları hızlı bir şekilde Çin'e yatırım yapmaya teşvik etmiştir. Bu faktörlerle birlikte Çin tüm dünyaya ihracat yapan, dünyanın üretim üssü olma yolunda hızla ilerlemeye başlamış, ek olarak da özel ekonomi bölgeleri oluşturarak yabancı yatırımcılara özel fırsatlar yaratmıştır.

Ayrıca bu dönüşüm döneminde Rusya'da yapıldığı gibi toplu ve aniden gelişen bir özelleştirme politikası yerine, Çin devleti stratejik olarak belirlediği endüstrilerde özelleştirme yapmamış, kamu iktisadi kuruluşlarını pazar ekonomisinde rekabet edecek yeteneklere kavuşturmak üzere reform çalışmaları hayata geçirmiştir. Bu sayede devlet, stratejik endüstrilerde kendi aktörleri ile birlikte pazarı yönetebilme imkanını elinde tutmuştur. Bu duruma ek olarak, Çin kırsal bölgelerde yer alan verimsiz ve stratejik alanların dışındaki kamu iktisadi kuruluşlarını ise özelleştirerek o bölgelerin kalkınması konusunda da olumlu stratejiler izlemiştir. Kırsal kesimdeki ucuz iş gücü de bu dönüşüme önemli katkı sağlamıştır.

Bu dönüşümü destekleyecek ve altyapı hizmeti sağlayacak bilim ve teknoloji alanında da Çin devleti önemli yatırımlar yapmıştır. Özellikle stratejik olarak belirlenen alanlara yapılacak yatırımları desteklemek adına, devletin kendi araştırma geliştirme kuruluşları ve programları revize edilerek, ülke gelirlerinden her geçen yıl artan bir oranda pay araştırma ve geliştirme faaliyetlerine aktarılmıştır. Bu sayede gelecek dönemde Çin'in teknolojik alanlarda dışa bağımlılığını en asgari düzeye indirmek hedeflenmiştir.

Tüm bu politikaların sonucu olarak Çin özellikle son otuz yılda devlet kapitalizmi stratejisi ile ciddi büyüme oranlarına erişmiştir. Bu ekonomik

büyüme temelde düşük maliyetli iş gücü, yabancı yatırımlar ve ihraç odaklı ekonomi modeli ile başarılmıştır. Bu strateji ise direk devlet tarafından yönetilmekte olup, devlet kapitalizmi olarak adlandırılmaktadır.

Bu politikaların geçerliliğini göstermek adına Çin telekom ekipmanları endüstrisi örnek endüstri olarak seçilmiş ve tüm bu politikaların endüstrinin başarı sürecindeki katkıları gözlemlenmiştir. 1978 Deng dönemi ile birlikte stratejik endüstrilerden birisi olarak telekomünikasyon sektörü de belirlenmiştir. Yine Sovyet döneminden kalan ve oldukça eski bir teknolojik altyapıya sahip olan Çin telekom endüstrinin yabancı teknolojiler ile yenilenmesine karar verilmiştir. Bu süreci takiben 1978 Deng döneminin devlet politikası olan "yabancı yatırımların ulusal firmalarla iş ortaklığı kurmaları şartıyla Çin pazarına erişim hakkı" ile çokuluslu telekom firmaları Çin'in ulusal firmaları ile iş ortaklıkları kurmaya başlamışlardır. Dünyanın önde gelen firmaları ilk olarak dijital switch ürünlerini Çin pazarına satabilmek için ulusal firmalarla ortaklıklar kurmuşlar, bu sayede modern teknoloji Çin'e transfer edilmeye başlanarak sektöre bilgi akışı sağlanmıştır. Burada Çin devleti özel bir telefon sinyalleşme protokolü seçerek farklı marka cihazların aynı telefon ağına bağlanmalarına fırsat da sağlamıştır.

Yabancı iş ortaklıkları Çin pazarına üretim yaparken paralel zaman diliminde Huawei, ZTE gibi ulusal firmalar da kurulmuştur. Bu dönem sonrası Çin telekom endüstrisi ikinci aşamaya geçerek, devlet araştırma enstitülerinde ulusal ürünleri geliştirmeye başlamışlardır. Araştırma enstitülerindeki aynı ekip Huawei ve ZTE'nin kendi ürünlerini de geliştirmeleri konusunda ortak çalışmalar yapmışlar ve bu firmalar da kendi ürünlerini geliştirmişlerdir. Önemli olan bir diğer nokta ise, Çinli firmaların yabancı firmalar tarafından ihmal edilen kırsal pazarlara ürün geliştirmeleri ve önemli pazar paylarına erişmesidir. Sonraki aşamada mobil teknolojiler ile birlikte ulusal firmalar yabancı firmalardan daha ön plana çıkmaya başlamışlardır. Ulusal firmalar yalnız Çin pazarı için değil, uluslararası pazarlara da mobil teknoloji altyapıları ihraç ederek ciddi gelir elde etmeye başlamışlardır. Bu dönemde Çin hala yabancı firmaların patentli teknolojik altyapılarının lisanslarıyla üretim

yapmaktadır. Bu sebeple Çin devleti yeni nesil iletişim ağı olan 3G standardı için kendi teknolojilerini geliştirebilmek adına yatırım yapmış ve sonunda Amerika ve Avrupa Birliği 3G standartlarına ek olarak üçüncü standart olan TD-SCDMA'i geliştirmiştir. Çin, üçüncü nesil mobil teknolojilere TD-SCDMA geliştirilene kadar geçiş yapmamış, sonrasında ise üç mobil operatör firmasından en büyüğü olan China Mobile'a TD-SCDMA lisansı vermiştir. Böylelikle Çin'de 700 milyondan fazla abonesi olan operatör, üçüncü nesil iletişim için Çin'in kendi teknoloji altyapısını kullanmaya başlamıştır.

Bunların ötesinde Huawei ve ZTE firmaları Çin telekom ekipmanları endüstrisinin temel firmalarıdır. İkisi de 1980'lerin sonlarına doğru kurulmuş ve paralel gelişme dönemleri izlemişlerdir. ZTE bir kamu iktisadi kuruluşu olarak faaliyet göstermektedir. Huawei her ne kadar özel sektör firması olarak kendisini tanımlasa da, kurucularının Çin Halk ordusu komutanları olmaları, tam olarak açıklanamayan ortaklık yapısı, firmalar içerisindeki Komünist Parti Komiteleri vb. nedenlerden ötürü Huawei'in de Çin devleti ile önemli ilişkileri olduğu yönünde bir algı durumu mevcuttur. Her iki firma da yalnız Çin pazarına değil tüm dünyada faaliyet göstermekte ve özellikle mobil teknolojiler alanında önemli satış gelirlerine ulaşmaktadırlar.

Telekom ekipmanları üreten firmaların yanı sıra, bu altyapı ürünlerini satın alan da bir pazar söz konusudur. Bu kısımda Çin'de faaliyet gösteren telekom operatörleri anlatılmıştır. China Mobile, China Unicom ve China Telekom üçü de devlet yönetiminde olan telekom operatörleridir. Özellikle China Mobile 720 milyondan fazla abonesi ile dünyanın en büyük abone sayısına sahip operatörüdür. Bu üç operatörün özellikle 2G ve 3G yatırım ihalelerine bakıldığında hemen tüm ihalelerde büyük payları daima Çinli ekipman üretici firmalar almaktadır. Burada önem verilmesi gereken konu, Çin devleti bizzat destekleyerek yarattığı sektörü yine kendisinin yönettiği bir pazar üzerinden de finanse etmektedir. Özellikle Çin standardı olan TD-SCDMA ile Huawei ve ZTE önemli satış gelirleri elde etmiştir. Buna ek olarak devlet-kaynaklı finansman başlığı altında, ilgili Çin'li firmalar Çin devlet bankaları tarafından özel kredilerle desteklenmektedir. Bu krediler özellikle Çin Kalkınma Bankası ve Çin Ex-Im Bankası tarafından sağlanmakta olup,

firmaların hem ülke içerisindeki hem de uluslararası pazardaki faaliyetlerini desteklemektedir. Bu sayede sektör direk ve dolaylı yollardan devlet desteğini almaktadır. Ek olarak, devlet yönetimindeki araştırma ve geliştirme faaliyetlerini yürüten kurumlar da yaptıkları çalışmalarla sektörü desteklemektedirler.

Tez çalışması devam ederken, ABD Temsilciler Meclisi İstihbarat Komitesi'nin Çin'li telekom firmaları Huawei ve ZTE hakkında yaptıkları araştırmanın sonuçları da 2012 yılında yayınlanmıştır. Bu raporda özetle, ilgili firmaların direk olarak Çin devleti ve Komünist Parti tarafından yönetildiği ve desteklendiği, nihai hedeflerinin de ülkelerin iletişim altyapılarını kurarak istihbarat çalışmaları yapmak olduğu öne sürülmektedir. Tez, bu raporun istihbarat kısmından daha çok, firmaların Çin devleti tarafından nasıl desteklendiği ve aralarındaki ilişki kısmından faydalanmaktadır. Firmaların üst düzey yöneticileri ile yapılan görüşmeler ve eldeki çıktılardan hareketle, ilgili firmalar Çin devletiyle özel bir ilişki içerisinde bulunnakla birlikte sistematik şekilde desteklenmektedirler. Her ne kadar firmalar bu bahsedilen özel durumların tamamını kabul etmeseler de, Deng'in 1978 devrimi ile belirlediği alanlardan birisinde devlet kendi eliyle bir başarı hikayesi yaratmıştır.

Bu durumda, Latin Amerika Yapısalcı Okulu'nun bahsettiği "bağımlı kalkınma" modeli ve yabancı yatırımlar, devlet ve ulusal sermayenin birbirleriyle etkileşim içinde bulundukları "üçlü sistem"in başarısını Çin örneğinde açıkça görmekteyiz. Bu modelde, 1978 sonrası Çin'in uluslararası sistemle entegrasyonu ile açık ekonomi modeline geçmesi ve yabancı yatırımlara kapılarını açması ülkedeki dönüşümü olumlu yönde etkilemiştir. Bu kısımda en önem verilmesi gereken nokta, yabancı yatırımların direk olarak pazara dahil edilmesi yerine devlet kontrolünde ve ilgili devlet firmaları ile ortaklıklar kurarak pazara girmeleri ve bu sayede yabancı yatırımların kontrol altında tutulması politikasıdır. Buna ek olarak, aynı dönemlerde kurulan ulusal telekom firmaları (çoğu devlet yönetiminde) sektörün firma bazındaki yönetimini de Çinli firmalara taşımıştır. Çinli telekom operatörlerinin ihalelerinin çoğunluk paylarının Çinli firmalara ait olmasıyla birlikte ulusal endüstri dolaylı yollardan finanse edilmiş olmaktadır. Bu tablodan da

anlaşıldığı üzere "üçlü sistem"in ana yöneticisi devletin kendisidir. Ek olarak, Çin devlet bankaları tarafından finanse edilen bu yapı, List ve Gerschenkron'un ulusal sektörü korumayı öneren ve devlet finansmanını kritik önemde savunan politikalarını da haklı çıkarmaktadır.

Sonuç olarak, Çin telekom ekipmanları endüstrisi neoliberal kalkınma ve yakalama strateji ve politikalarının yerine "devlet kaynaklı" kalkınma politikalarını uygulayarak başarılı olmuştur. Bu başarıda temel rol bizzat Çin devletine aittir. Neoliberal politikaların devletin müdahaleci rolünü engelleyen önerilerinin aksine, bu örnekte Çin pazara müdahalenin ötesinde, pazarı bizzat yönetmektedir. Reform dönemi başında belirlenen temel makro stratejilerin izinde, devlet kaynaklı kalkınma modelinin benimsendiği bir devlet kapitalizmi politikası uygulanmıştır. Küresel ekonominin Çin'in gelişmesinde sağlayacağı faydaları gözönünde bulundurarak, yine devlet kontrolünde bir eklemlenme süreci yaşamıştır. Bu entegrasyon dönemi tam olarak neoliberal politikaların uygulanmadığı, yalnızca Çin'in kalkınmasına fayda sunacak alanlarla sınırlı bırakılmıştır. Mao döneminde olduğu gibi bugün de Çin yönetimi hala Çin Komünist Partisi'nin aktif yönetimi altında ilerlemektedir. Ancak yeni dönemde Parti, Çin'in modernleşmesi ve kalkınması üzerine odaklanmıştır ve bu bağlamda stratejiler geliştirmektedir.

Deng'in 1978 reform dönemi sonrasında Çin'in stratejik alanlarda yakalama stratejileri ana bir model üzerine oturtulmuştur, bu model şu şekilde özetlenmektedir.

- Deng ile başlayan reform süreci sonucunda kapalı ekonomik yapıdan açık ekonomik modele geçilmesi, küresel ekonomik sistem ile entegrasyonun sağlanması ve sosyalist pazar ekonomisi olarak adlandırılan Çin'e özgü yeni bir modelin inşa edilmesi,
- Çin devleti ve Komünist Parti tarafından yakın ve orta dönemde önem kazanacak ve Çin'in ekonomik gelişmesini destekleyecek olan stratejik endüstrilerin belirlenmesi,

- Devletin belirlediği şartlar altında yabancı yatırımlara izin verilmesi ve yerel firmalar ile iş ortaklıkları kurulması ve bu strateji ile stratejik endüstrilerde öğrenme ve teknoloji transfer sürecinin başlatılması,
- Yabancı firmalarla kurulacak olan iş ortaklığı yapısı ve ulusal firmaların desteklenmesi konularında yerel pazarın etkileyiciliği ve potansiyelinin kullanılması,
- Belirlenen stratejik endüstrilerde devlet bankaları tarafından sağlanacak krediler sayesinde devlet kaynaklı finansmanın kullanılması, ek olarak ulusal firmaların yerel pazar üzerinden de desteklenmesi,
- Belirlenen stratejik endüstrilerde ulusal firmaların ortaya çıkması ve mevcut kamu iktisadi kuruluşların yeniden organize edilerek daha verimli ve rekabetçi bir yapıya kavuşturulması,
- Kurulan üst kurul sayesinde stratejik endüstrilerde faaliyet gösteren tüm kamu iktisadi kuruluşların tek bir kurul tarafından yönetilmesi,
- Ulusla bilim ve teknoloji programları sayesinde devlet araştırma enstitüleri ve stratejik firmalar arasında güçlü ilişkiler kurulması,

Bu modeli politikalar üzerinden açıklarsak;

Politika-1: Devlet gelecek yıllar için önem kazanacak stratejik alanları belirler ve yatırımlarını bu alanlara yönlendirir.

Politika-2: Devlet kamu bankaları aracılığıyla stratejik endüstrilerdeki faaliyetleri finansal açıdan destekler.

Politika-3: Devlet yönetimindeki pazar (kamu iktisadi kuruluşlarının yaptıkları alımlar gibi) sektörü ve ulusal firmaları desteklemek için önemli bir enstrümandır.

Politika-4: Küresel ekonomi ile entegrasyonun sağlanması yabancı yatırımlar aracılığıyla modern teknolojinin transferi konusunda oldukça hayatidir.

Politika-5: Ulusal firmalar ve sermaye, stratejik alanlara yatırım yapmaları konusunda ve bu alanlarda faaliyet göstermek üzere devletin açık desteğine ihtiyaç duyarlar.

Örnek çalışma olarak anlatılan Çin telekom ekipmanları endüstrisi bu başarıyı sağlayan tek örnek değildir. Çin'in bahsedilen "üçlü sistem" kalkınma modeli ile havacılık, otomotiv, bilgisayar gibi diğer stratejik sektörlerde de aynı zaman dilimlerinde benzer başarılar elde edilmiş ve gelişmiş ülke endüstrileri ile rekabet edebilecek gelişmişlik seviyesine yükselme sağlanmıştır. Bu sebeple tezin örnek olayı olarak çalışılan Çin telekom ekipmanları endüstrisi sektörel bir yakalama stratejisinin ötesinde, makro düzeyde kalkınma politikaları üzerinden çalışılmış ve Çin'in üst düzeyde belirlediği bu politikalar sayesinde belirlenen stratejik alanların hemen tamamında benzer başarılı sonuçlar görülmüştür.

Bu noktadan hareketle Çin telekom ekipmanları endüstrisinin yakalama başarısı sektörel bir politikanın ötesinde makro bir devlet politikasının ürünüdür. Çin'de belirlenen bu "üçlü sistem" ile gelişmenin tüm aşamalarının devlet tarafından yönetilmesi, sermaye ve modern teknolojinin kaynağı olarak yabancı yatırımların kullanılması, ilgili devlet politikaları sayesinde ulusal endüstrinin yeteneğinin artırılması- bu alanlardaki kamu iktisadi kuruluşlarının özelleştirilmeden daha rekabetçi yapılara dönüştürülmesi, devlet kaynaklı finansman sağlanması, ulusal şirketlerin kurulmasının desteklenmesi sağlanmıştır. Ayrıca, bu sistemle devlet, yönetimi pazar dinamiklerine bırakmamakta ve direk ya da indirek olarak pazara müdahalelerde bulunmaktadır. Bu sistem tezde "doğurgan devlet" olarak tanımlanmaktadır ve Çin'deki bu başarının devletin sektördeki tüm değişkenleri aktif olarak yönetmesi sayesinde oluştuğu gözlemlenmektedir.

Çin bir yandan bu önemli gelişme sürecine girmişken, diğer yandan da kapitaizmle entegrasyon ve hızlı gelişmenin sonucu olarak ortaya çıkan ciddi sorunlarla da yüzleşmektedir. Çin'in büyük popülasyonunun sonucu olan ucuz işgücü, her geçen gün yabancı ve ulusal sermayenin sömürüsünden ciddi anlamda etkilenmekte ve olumsuz şartlar altında çalışmaya mecbur bırakılmaktadır. Çin işgücünün fabrikalarda yaşamaya başlaması buna en güzel örnektir. Bu hak kayıpları yalnız Çinli işçileri değil, dünya işgücünü de

olumsuz etkilemektedir. Firmalar birçok ülkede bulunan üretim alanlarını düşük maliyetli iş gücü avantanjından faydalanabilmek amacıyla Çin'e taşımakta ve bundan dolayı o bölgelerdeki emekçiler iş fırsatlarını kaybetmektedirler. Bu durum emekçilerin sermaye ile olan mücadelesinde emek gruplarının direnme gücünü olumsuz yönde etkilemektedir. Sosyalist dönemin kazanılmış hakları olan ücretsiz eğitim ve sağlık gibi temel gereksinimler, artık bireysel olarak satın alınacak bir yapıya dönüşmektedir ve sosyalist dönemin sosyal hakları hızla kaybedilmektedir. Merkezi hükümetin toplam sağlık harcamaları 1978-1999 yılları arasında yüzde 32'den yüzde 15'e gerilemiştir. Bu dönüşüm süreciyle yalnız işçiler değil kırsal kesimde ve köylerde yaşayan popülasyon da olumsuz etkilenmiştir.

Bunlara ek olarak, Parti ve devlet bürokrasisi içinde görevi kötüye kullanma, rüşvet, yolsuzluk ise diğer önemli sorunlar olarak gözlemlenmektedir. Bu sorunlar bürokrasinin en üst kademelerinde dahi görülmektedir. Diğer yandan gelir adaletsizliği hızla artmakta, belirli bir azınlık kesimin gelirleri astronmik oranlarda artarken, Çin nüfusunun çoğunluğu çok düşük gelir oranları ile yaşamlarını sürdürmek zorunda bırakılmaktadır. 2013 verilerine göre Çin'de 119 dolar milyarderi ve mal varlığı $1.000.000'dan fazla olan 500.000 kişinin olması bu gelir adaletsizliğinin örneklenmesi açısından önemlidir. Hızla artan milyoner sayısının yanı sıra, hızla yükselen tüketici ürünleri fiyatları, yoğun üretimden kaynaklı hava ve çevre kirliliği de yeni dönemin diğer sorunları olarak sıralanmaktadır. Çin'in dünyanın üretim merkezi olarak konumlanmasından ötürü, çevreye verilen tahribat önemli boyutlara ulaşmıştır. Özellikle üretim alanlarının yoğun olduğu ortamlarda Çin halkı ciddi sağlık sorunlarıyla karşılaşmaktadır. Buna ek olarak, bu üretim alanlarının doğaya verdikleri tahribatın, sonraki yıllarda Çin için daha önemli sorunların ortaya çıkmasına sebep olması muhtemeldir.

Son olarak, tezin temel bulgusu, Çin telekom ekipmanları endüstrisinde ve diğer stratejik endüstrilerde de görünen gelişmenin, devlet-kaynaklı kalkınma politikalarının sonucu olduğunun belirlenmesidir. Bu devlet yapısı

tez içerisinde "doğurgan devlet" olarak tanımlanmaktadır. Devlet bu dönüşümün tüm aşamalarını bizzat planlamış ve yönetmiştir. "Doğurgan devlet" yapısında devlet, gelişme ve yakalama için gerekli tüm kurum ve süreçleri doğurur ve onları sürekli olarak yenileyerek sürecin devamını sağlar. Devlet, tüm bu aşamaları kendi enstrümanlarıyla bizzat yönetir.

Tezin sonuç bölümünde üzerinde durduğu bir diğer konu ise Çin'deki bu önemli atılımın devamlılığı tartışmasıdır. Çin dönüşüm döneminden sonra önemli bir gelişme dönemiyle birlikte gelişmiş ülkeler ile aradaki farkı hızla kapatmıştır. Bu başarıyı da devlet-kaynaklı yönetim stratejisi ile sağlamıştır. Hegemon kuruluşlar (Dünya Bankası, IMF gibi) ve yürüttükleri neoliberal politikalar ise bu devlet ağırlıklı politikaların etksinin azaltılması yönünde Çin devletine sürekli baskı uygulamakta ve devlet müdahalesinin olmadığı bir pazar yapısının oluşturulmasını istemektedirler. Ancak bu öneriler, temelde Çin'de yaşanan gelişme döneminin neoliberal politikalar ile olumsuz etkilenmesini ve Çin'in son dönemdeki yükselişini engellemeyi amaçlamaktadır. Çin yönetimi ise bu baskılara en büyük silahı olan pazar gücü ile direnmekte ve şimdilik başarılı olmaktadır, çünkü gelişmiş ülkeler Çin'e yaptırım uygulayarak Çin pazarından sağladığı geliri kaybetmeyi göze alamamaktadır. Sonuç olarak Çin mevcut devlet ağırlıklı politikalarını devam ettirdiği, neoliberal politikalar, özelleştirmeler, serbest piyasa gibi dayatmacı politikalara direnebildiği sürece, buna benzer başarıları başka stratejik alanlarda da yakalayabilecektir.

Bu modelin başka ülkeler tarafından tekrarlanabilirliği ise başka bir başlık olarak tartışılmaktadır. Temel olarak her az gelişmiş ya da gelişmekte olan ülkenin kendine özgü dinamikleri ve değişkenleri vardır ve hepsi birbirinden oldukça farklı tarihsel ve sosyo-politik dönüşümler sonucu bugüne gelmiştir. Dolayısıyla tüm bu geriden gelen ülkelerin tamamında başarılı olacak bir model sunmaya çalışmak doğru bir metodoloji değildir. Ancak belirlenen model, diğer ülkelerin mevcut durumlarına ve avantajlarına göre yeniden düzenlenmelidir. Örneğin Çin, en büyük dezavantajı olan nüfus problemini Deng dönemi sonrası yabancı yatırımları çekecek güçte büyük bir pazar olarak kullanabilmiş ve önemli bir avantaja çevirmiştir. Halen

günümüzde hegemon kuruluşların ve ülkelerin Çin'e açık yaptırım uygulayamamalarının temelinde Çin pazarından vazgeçemeyecek olmaları yatmaktadır. Temel olarak ise gelişmiş ülkelerin ve onların çıkarlarını koruyan neoliberal politikaların etkisi altındaki dünya ekonomisinde, geriden gelen ülkelerin bu ortamda rekabet edebilmesi mümkün değildir. Bu dezavantajlı durumu daha adil bir yapıya kavuşturacak olan ise devlet mekanizmasının bu gelişme ve dönüşüm sürecine aktif olarak katılmasıdır. Tezde "doğurgan devlet" olarak tanımlanan bu yapı sürecin tamamını kendi mekanizması ile yürütmekte olup, süreçleri yeni dönemlere uygun hale getirerek sürekli yenilemekte ve gelişme sürecinin devamlılığını sağlamaktadır.

Tezin sonuç kısmında diğer geriden gelen ülkelere politika önerileri sunulmaktadır. Bugün dünyada yaygın olan neoliberal politikaların aksine bu model, bizzat devlet tarafından yönetilmekte olup, "ulusal firmalar ve çokuluslu firmalar ile kurulan ortak girişimler sayesinde modern teknolojileri transfer eden", "endüstriyel faaliyetlerin devlet yönetimindeki bankalar ve pazar tarafından finanse edildiği", "endüstri içindeki kamu iktisadi teşebbüslerinin re-organize edilerek rekabetçi bir yapıya kavuşturulduğu" "doğurgan devlet" tarafından yönetilen sistemdir. Çin kendinden önce gelen başka ülkelerin kalkınma süreçlerini aynen uygulamak yerine kendi dinamiklerine özgü bir kalkınma stratejisi ile bu başarıyı yakalamıştır. Bir dönem karşısında en büyük savaşı verdikleri kapitalist sistemi, kendi gelişme süreçlerine sağlayacakları fayda oranında sisteme dahil edip, kapitalist ekonomilerle bu şekilde mücadele etme yoluna girmişlerdir. Çin bu stratejisini uygularken ise sosyalizmin temel dinamiklerini bir yana bırakıp yeni bir hibrid modele geçmiştir.

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