

The Rise Of Chinese Transnational ICT Corporations: The Case of Huawei

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Abstract

This dissertation considers the case of Huawei Technologies, a China-based transnational ICT corporation, as a microcosm to investigate the rise of China's ICT corporate power and its relevant global implications. By focusing on the interrelation of transnational capital, state and class, this study aims to understand how China's most competitive ICT firm was born and developed, how it forged connections with the Chinese state and intertwined with the trajectory of China's ICT development, and how it responded to various forces of corporate China's globalization and evolving geopolitical economic tensions.

This dissertation establishes the transnational corporation as an analytical unit and places the emphasis on Huawei's corporate activities and structure, including the firm's domestic capital accumulation, international expansion, technological capability development, organizational structures and labor process. It argues that the rise of Huawei was closely tied to the turns and twists of China's digital revolution. It came to symbolize a continuity of China's nation-centric developmental strategy and the legacies of self-reliant development on the one hand, and was enmeshed with the country's aspirations of reintegration into transnational digital capitalism on the other. The company's strategy of internationalization, in conjunction with the Chinese state's outward expansion, illustrates a peculiar logic, pattern and ramification of Chinese capital's outward expansion. By investigating the dynamics and contradictions of Huawei's capital accumulation, this dissertation also foregrounds the geoeconomic and geopolitical tensions arising from the globalization of China's corporate power. This case suggests a potential realignment of the global political economic order.

Huawei's story sheds light on certain indigenous experiences and distinguishing features that contribute to a path-breaking model of development. The firm's path to technological innovation provides an example to look into the possibility of nurturing a self-reliant model of technological development in the context of China's industrial restructuring. Its innovative design of the ownership structure also illustrates a distinct corporate structure and managerial practices with Chinese characteristics. This dissertation concludes that at the core of China's path-breaking model lies in local alternatives and indigenous agencies that have the ability to insist on self-reliant, open-minded, innovation-oriented development strategies.

Keywords: Huawei; transnational ICT corporation; digital capitalism; globalization; Chinese model; geopolitical-economic tension.

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List of Abbreviations

CADF	China-Africa Development Fund
CDB	China Development Bank
FDI	Foreign Direct Investment
FIE	Foreign-invested Enterprise
FOCAC	Forum on China Africa Cooperation
FYP	Five-Year Plan
ICT	Information and communication technology (ICT)
IP	Internet Protocol
JV	Joint Venture
M&A	Mergers and Acquisitions
MEI	Ministry of Electronics Industry
MII	Ministry of Information Industry
MIIT	Ministry of Industry and Information Technology
MOF	Ministry of Finance
NGN	Next Generation Networks
OBM	Own-Brand Manufacturer/Manufacturing
ODM	Own-Design Manufacturer/Manufacturing
OEM	Original Equipment Manufacturer/Manufacturing
OFDI	Outward Foreign Direct Investment
PTB	Post and Telecommunications Bureau
SDH	Synchronous Digital Hierarchy
SDPC	State Development and Planning Council
TVE	Town and Village Enterprise
WFOE	Wholly Foreign Owned Enterprise

Chapter 1.

Introduction

Debate regarding “China’s rise” has been evolving along with the structural reconfiguration of transnational capitalism in the most recent decade. As critical communication scholar Dan Schiller (2007) argues, the rapid development of global information and communication technologies (ICTs) and China’s economic growth have constituted the “two poles of growth”. This dissertation seeks to examine the dynamic intersections of these two “poles”—that is China’s linkages to transnationalized digital or informationalized capitalism—with a focus of the rise of Chinese transnational ICT corporations in the context of China’s industrial development and its reintegration into transnational capitalism. The case of Huawei Technologies, one of the world’s leading ICT corporations, is explored as a microcosm to investigate the rise of China’s ICT corporate power and its relevant global implications. The story of Huawei illustrates how China’s most competitive ICT firm was born and developed, how it forged connections with the Chinese state and intertwined with the trajectory of China’s ICT development, and how it responded to the various forces of “the globalization of corporate China” (Wu, 2005) and evolving geopolitical economic tensions. As an expression of larger historical and political economic changes, this story aims to explore the relationship between transnational capitals, state interests and class transformation underlying the development of Chinese transnational ICT corporations.

It is important to recognize that China’s reintegration with the global market system has proceeded in concert with the evolution of global informationalized capitalism (Hong, 2011, p.2). Since the 1970s, the development of the global economy has been

characterized by the transition towards transnational informationalized capitalism within which information and communication technologies have increasingly played a pivotal role in the restructuring of the global capitalist system. The mushrooming of information and communication technologies not only underpinned the network connectivity of capitalism and facilitated transnational corporate powers' global expansion, but also became a leading growth engine and a lucrative site of capital accumulation (Schiller, 2007, 2014). The rapid growth of the ICT industry along with the accelerated process of corporate globalization enabled by the new information and communication technologies were heralded as harbingers of an entirely new epoch of transnational capitalism (Bell, 1973; Drucker, 2011; Stehr, 1994; Toffler, 1981; Touraine, 1971). Although the ICT sector was projected as a strategic impulse to drag the capitalist system out of the longstanding depression, the unsustainable development of digital capitalism still paradoxically contributed to "a resurgence of the very economic crisis" (Schiller, 2007, p.197).

The structural reconfiguration of global capitalism has prepared the stage for the rise of emerging market economies, leading to the emergence of new political-economic power blocs in the global order. Despite a sharp slowdown of economic growth in Western countries, transnational informationalized capitalism has found a way to refuel the growth engine through relocation of capital accumulation sites from advanced economies to "emerging markets". As an integral part of the ongoing transformation of the global capitalist system as well as an indicator of the rise of emerging market economies, China has increasingly become a geopolitical and geoeconomic heavyweight capable of shaping the course of the global system and established itself as the other pole of growth in global informationalized capitalism. The country not only possesses the largest numbers of Internet, telephone and mobile phones users in the world, but has also become a leading provider of ICT infrastructure and services with its growing ICT

manufacturing capability. In 2003 China overtook Japan and the European Union and then in 2004 replaced the United States to become the largest exporter of ICT products in the world. In 2006 China became the world's second largest ICT manufacturer, accounting for over 15 per cent of the international trade of ICT products (Hong, 2011, p.2). At the same time, China strove to make a leap "from being a simple manufacturing center to becoming an advanced technology 'superstate'" (Ning, 2009, p.103). This effort is exemplified by the rise of a number of Chinese ICT enterprises that are approaching transnational stages and obtaining outstanding presence in global high-tech markets. An analysis of the juncture of the "two poles of growth" is able to provide an entry point to look into the impact of the rise of the Chinese ICT corporate power in the ever-reconfiguring transnational informationalized capitalism.

This study establishes the transnational corporation as an analytical unit and places the emphasis on the patterns and implications of transnational corporate activities, including the dispersal of production, the labor process, organizational structures and their interactions with various social forces. Here transnational corporations (TNCs) are defined as incorporated or unincorporated enterprises comprising parent enterprises and their foreign affiliates.¹ As Peter Dicken (2007) notes, TNCs act as the primary "movers and shapers" of the global economy, constituting a key integrating agent of capitalist globalization. Since the 1970s, the process of capitalist globalization has been marked by the worldwide spread of TNCs. The number of TNCs increased from 7,000 in 1970 to more than 60,000 by 2000 (Robinson, 2004). The significance of TNCs not only lies in the large scale and size of their operations across the world but also in their control of a significant share of global economic activities. They have become the largest and most powerful institutional form through which international production and capital

¹ Definition by the United Nations Conference on Trade and Development (UNCTD). Retrieved from [http://unctad.org/en/Pages/DIAE/Transnational-corporations-\(TNC\).aspx](http://unctad.org/en/Pages/DIAE/Transnational-corporations-(TNC).aspx)

accumulation are organized. According to the *UNCTAD World Investment Report 2011*, TNCs worldwide, in their operations both at home and abroad, generated approximately US\$16 trillion worth of value in 2010, accounting for more than a quarter of global GDP (UNCTAD, 2011). The output of the world's largest TNCs has even outstripped the growth of world production. In addition, the value chains administered by TNCs now account for 80 per cent of global trade each year (UNCTAD, 2013). As an embodiment of transnational capital, TNCs also account for a major part of global foreign direct investment (FDI) flows. The expansion and diversification of TNCs' global investment tremendously facilitate the cross-border mobility of transnational capital.

The expansion of TNCs, however, also illustrates the uneven nature of capitalist globalization. It is apparent that a large proportion of TNC operations are still concentrated within high-income economies. TNCs originating in core countries constitute the dominant forces in shaping internationalization of production networks, capital and technologies. But in the shadow of this uneven development, another important change is taking place: some enterprises from emerging market economies have increasingly claimed the status of emerging multinationals and become internationally competitive players. In particular, a few Chinese dominant "national champions" have increasingly gained leverage in global markets, spearheading "the globalization of corporate China" in alliance with the state's "going-out" policy (Wu, 2005, p.4). As noted by Alon and McIntyre (2008), "the next frontier in the economic battlefield [for global leadership] is the globalization of Chinese enterprises" (p.2).

Anecdotal evidence from China illustrates the rapid growth of China-based multinationals. For example, *The Fortune Global 500* witnessed the spectacular rise of Chinese companies on the list in the most recent decade: in 2000 China only had 10 companies appearing on the list; but in 2012 China overtook Japan, ranking second on

the list;² by 2015, a record 106 Chinese companies have made the list.³ The majority of these “super” TNCs were concentrated in energy, finance, and telecommunications sectors. Chinese corporate players’ high-profile cross-border investment, their thirst for external worldwide markets, and the strong alliance of business and government, all characterize China’s new initiative of corporate globalization. Among these rising China-based multinationals, Huawei has been established as one of the most celebrated cases that represented the powerful force of “globalizing China” and the great potential of China’s endeavor of climbing up the global value chains in the strategic telecommunication sector. The trajectory of Huawei’s development, especially its course of internationalization, not only provides firm- and sector-specific information in regard to China’s corporate globalization, but also sheds light on the political-economic dynamics and tensions underlying the intersections of “the two poles of growth”.

Historizing the TNC: The Evolution of the Global Corporate-led Communication System

The evolution of the transnational corporation actually can be viewed as a microcosm of the history of capitalist transformation. As international political economist Susan Strange (1994) puts it, the unit of “the firm” in general, and the “TNC” in particular, must be “brought back” to the historical account of changes within contemporary capitalism. Therefore, before we investigate the case of the modern transnational corporation, it is vitally important to trace back how the transnational corporation has evolved historically, how it organized the capitalist mode of accumulation and how it represented differing interests of nation-states and fractions of capitalist groups. Corporations operating in information and communication industries in particular have

² Chua, J. (2012, July 9). China Overtakes Japan in Fortune Global 500 Companies for First Time. Retrieved from <http://www.cnbc.com/id/48128996>.

³ The Fortune 500 List (2015). Retrieved from <http://beta.fortune.com/fortune500/list>.

brought epochal changes in the evolution of capitalism and rapidly enjoyed a significant rise to economic power. They not only laid the foundation for the infrastructure and business models of the global communication system, but also functioned “as a primary axis of expansion for transnational capitalism” (Schiller, 2014, p.91). While there has been a large body of economic literature that highlighted the historical development of transnational corporations (Hymer, 1982; Letto-Gillies, 2012; Jenkins, 1987; Williamson, 1981), this research said little about the role of information technology in them. Historians of international communication (Alleyne, 2016; Fortner, 1993), in contrast, have simply abstracted the analysis of media corporations away from the systematic changes of capitalism. This section thereby looks closely at the interconnections between the historical evolution of transnational corporations and the rise of international communication system, paying particular attention to how the corporate-dominated communications system was established in the transformation of global capitalism.

The emergence of corporations finds its historical roots in the process of capitalist expansion. The earliest forms of capitalist corporations emerged in the 16th century. During this period, trading ventures, which were also “part-governmental, part-business organizations”, were primarily formed by merchant capitalists to engage in overseas trading activities (Arrighi, 1994, p.242). These early forms of companies, such as the Dutch United East India Company, British East India Company, and London Company, were granted trading monopolies by their respective governments for overseas exploration. Under the terms of their charters, these companies enjoyed sovereign powers for self-governance. But they were also subject to the direct hand of the state, acting as an important instrument of settlement and colonization. Such corporate practices in the early stage of capitalism actually accorded with what Giovanni Arrighi (1994) referred to as the “territorialist logic of power accumulation”. At the same time, the joint-stock companies were formed as a key model of corporate organization. In such

business structures, corporations can raise capital by issuing stock or shares to stockholders or shareholders. The primary goal of a corporation was to generate a profit and to increase shareholder value. These organizational forms have laid the fundamental principle for modern enterprises' business operations.

The advent of industrial capitalism in the 19th century then saw the beginning of the internationalization of productive capital and the origin of modern transnationals (Jenkins, 1987, p.4), leading to profound changes in the capitalist mode of capital accumulation and production. One significant change was marked by the emergence of information and communication technologies, which prepared the stage for the creation of a more integrated international economy and a newly unified world market. As noted by Winseck and Pike (2007), "the growth of a worldwide network of fast cables and telegraph systems, in tandem with developments in railways and steamships, eroded some of the obstacles of geography and made it easier to organize transnational business" (p.1).

Accompanying with this trend, the communication industries came to the forefront of industrial reorganization. Many Western countries underwent a network-building boom to build out information infrastructure networks across national frontiers and to "wire the world"(Schiller, 2011a; Winseck & Pike, 2007). Since the mid-nineteenth century, this network-building boom gave rise to a number of leading telegraph and cable companies which rapidly moved into monopolized positions of power. For instance, Britain's Eastern Telegraph Company dominated almost half of the world's cable networks at that time (Winseck & Pike, 2007). After the launch of the first transatlantic submarine cables in the mid-1890s, European telegraph companies then made the effort to extend the reach of their networks, attempting to link Europe to the Middle East, India, and beyond. These companies' expansionary initiatives of building international communications grids not only coincided with European governments' imperial scramble for markets, natural

resources, investment sites, and labor (Schiller, 2011a), but were also in concert with peripheral countries' "modernization" initiatives. Functioning as part of "cooperative imperialism" (Winseck & Pike, 2007), European cable companies chose to cooperate with local elites to extend network connections from colonies to many other peripheral countries. More importantly, these early submarine cable projects, featured by "cross-national investments, overlapping directorships, alliances" (ibid, pp.26-27), played a critical role in tightening European countries' control over colonized nations.

The imperialist mode of capital accumulation had made some important changes in the organization of capitalist enterprises since the end of 19th century. The formation of cartels was one of the compelling evidences of such changes. To grasp more monopoly profits, large corporations allied to form a variety of international cartels to centralize their power in world markets. For example, leading cable companies created their own cartels in the Euro-American, Euro-Asian, South American, and Indo-European markets (Winseck & Pike, 2007, p.5). During this period, the growth of communication giants, coupled with the consolidation and cartelization of cable and telegraph industries in Europe and North America, had not only recast the very foundations of global network infrastructure but also remolded the international communications order.

By the late nineteenth century, growing inter-imperialist rivalry had extended to the domains of international communications. The United States eventually emerged as Britain's leading rival in advancing new communication technologies and moving toward a US-led international communications system (Schiller, 2011a). Along with British companies' expansion, some US telegraph companies, such as American Telegraph Company and Western Union, had established their own cartel—North American Telegraph Alliance in 1857--and rapidly acquired the unified control over independent networks in the US domestic market. As in Britain, consolidation of corporate power

within North America can be seen as “a prelude to expansion into global markets” (Winseck & Pike, 2007, p.20).

At the same time, in order to compete with Britain’s monopoly on wireless communications, the US government coordinated large American companies’ efforts to develop new communication technologies. An early generation of radio technology controlled by the US Navy was exploited as the new strategic technology to build out the US-centered extraterritorial telecommunications network (Schiller, 2011a). This initiative gave rise to the emergence of several large US-based electronic communications corporations such as the Radio Corporation of America (RCA) and International Telephone and Telegraph (ITT), which represented a new wave of concentration in the nascent North American electronic communications market. In collaboration with US political and military forces, these companies expanded quickly and crafted more ambitious regional and global strategies. For instance, starting in the late 1920s ITT made a vigorous entry into South America and Europe to internationalize its manufacturing and sales subsidiaries, which made it the “paragon of multinational telecommunications enterprises” (Mattelart, 1994, p.63-64).

Benefiting from the US government’s protectionist policies, US oligopolistic firms continued to grow in the twentieth century. After World War II, the US emerged as the strongest single power in the world system. The rise of the new “American Empire” was marked by “the growing international predominance of American corporations” (Panitch & Gindin, 2012, p.112). More importantly, the rise of American corporate power involved not only the spread of American firms’ transnational corporate activities but also the widespread emulation of the American corporate model. By the end of 1960s the proportion of firms that adopted US-style corporate share ownership had increased more than threefold in major European countries (ibid, p.114). This trend signified that the US

transnational corporation model has been embraced as a new global standard of “modern enterprises” and marked the rise of “corporate capitalism” in the history of world capitalism.

However, within the context of the Cold War, “corporate America” confronted greater challenges due to escalating geopolitical conflicts. The militarized technological development strategy became an investment priority for the US information and communications companies to deal with these challenges during this period. As Schiller (2014) argues, war supply became a lucrative industry that successfully lured American information companies into “war-related” commodity chains (p.59). This military-driven strategy spun off a large number of technological innovations in different ICT domains such as microelectronics, digital computing, data processing, networking computing and operating software. As Jerry Harris (2006) argues, the US defense industry was “tightly connected to the national state apparatus yet pulled by markets and global competitive pressures towards a transnational economic model” (p.129). The combination of the national interest to secure “national security” and commercial imperatives contributed to massive growth of US-based transnational ICT corporations on the threshold of the era of informationalized capitalism.

Another vector of change in communication technology in this period was the development of satellite technology, which laid the grounds for “the most efficient and expansive means of extraterritorial communications” (Schiller, 2011a, p.93). However, what was less noticed was that the rapid development of new communication technologies de facto precipitated new alliances of a few electronics giants and gave birth to new transnational conglomerates (Mattelart, 1994). The formation of Comsat (Communication Satellite Corporation) in 1962, with funding from the US government and large American telecommunications companies like ATT, ITT, RCA and GTE,

represented such a trend of alliance. In 1964 the United States proposed to Western countries to establish an international consortium Intelsat (International Telecommunications Satellite), with Comsat acting as an administrator. Acting more than an international corporate consortium, Intelsat also served as an instrument to increase the US political leverage in international governance and was organized to contain the power of the socialist camp and other competitors during the Cold War. The way Intelsat functioned actually exemplified what Armand Mattelart (1994) referred to as the “hypermodern corporation”, which was characterized by the spectacular extension of corporate power from the economic sphere into the political and ideological spheres (p.70).

The power of transnational corporations does not only come from their market domination but also from their capacity to reproduce economic, political and cultural inequalities in the global capitalist system. Their global expansion often conveyed destructive and inegalitarian development models implicit in the logic of capital accumulation. The information and communication transnational corporations occupied a prime place in producing such a capitalist logic in light of their significant influence on the production, circulation, and consumption of information. Although the issues of corporate control over global information and communications had been taken up by the movement of the New World Information and Communication Order (NWICO) during the 1970s, structural inequality underlying renewed corporate imperialism continued to plague Third World countries, bringing even greater systematic imbalance.

The NWICO movement did not resolve the issue of information sovereignty for Third World countries, whereas peripheral countries were even further integrated into the orbit of transnational capitalism along with capitalist restructuring in the 1980s. Meanwhile, this period also saw the rapid development of “digital capitalism” as a restructuring way out of

the capitalist crisis of the 1970s (Schiller, 2000, 2014). The overwhelming policy shift to neoliberalism further accelerated the process of corporate capitalism in which business power became a dominant expression in the global system. As Peter Nolan (2001) puts it, “privatization, trade liberalization, liberalization of capital flows, deregulation of national financial systems, the collapse of communism, and the advent of information technology” have all contributed to “the epoch of unprecedented concentration of global business power” (p.137). Especially technological development in computers, microelectronics and telecommunications had a dramatic impact on the global economic system, freeing capital to escape national restrictions and build a new transnationalized economy. In this process, a multinational-led communication system began to be crafted, with a new structural logic putting in place (McChesney & Schiller, 2003). It gave rise to a massive surge in expenditure on ICT products and services to support a large-scale intracorporate and intercorporate business process and transnational production chains. The technological revolution enabled these nationally based firms to extend their production, marketing and financial networks to achieve global reach.

The information and communication sector itself became the creation of a global oligopoly with accelerated capital concentration. The neoliberal reform in the realm of information and communications industries unleashed forces of transnational capital that sought marketplace dominance on the global scale. Global media and information giants like Disney and News Corporation rapidly consolidated power through large-scale merges and acquisitions (M&A) and extraterritorial capital expansion. Especially US media and telecommunication industries underwent a surge of consolidation after *the Telecommunications Act* of 1996. The 1997 World Trade Organization's (WTO) *Basic Telecommunications Agreement* further institutionalized neoliberal telecommunications reform on a global scale and empowered transnational corporations with “extraterritorial corporate charters” to expand abroad (Schiller, 2000, p.46-50). In the aftermath of the

burst of the Internet bubble in the early 2000s, another powerful wave of consolidation in media and information industries emerged, with a few communication and media conglomerates standing at the apex of convergence and concentration (Winseck, 2012, p.14-15).

Against the backdrop of impressive global consolidation led by Western transnationals, a continuing rise of emerging-market transnational corporations, coupled with surging outward foreign direct investment (OFDI) from developing countries, has changed global political-economic dynamics and tended to destabilize the US-led global economic order. According to the *UNCTAD World Investment Report*, in 1992 only 8 per cent of TNCs were headquartered in developing countries. But in 2008 emerging-market TNCs already accounted for 28 per cent of the 82,000 TNCs worldwide (UNCTAD, 2010, p.xviii). Foreign direct investment (FDI) from developing countries, mainly organized through and controlled by transnational corporations, has also increased sharply. In 1960 only 1 per cent of FDI came from developing countries. In 2013, Southern-based TNCs accounted for 39 per cent of global OFDI flows (UNCTAD, 2013, p.2). Especially China has made remarkable increase in its OFDI, becoming the largest source of OFDI among all of developing countries.

As an integral part of China's reintegration strategy, the Chinese state has made a consistent effort to construct globally powerful companies that can compete on the "global level playing field" (Nolan, 2001, 2004). The globalization of Chinese business was in tandem with the state's economic restructuring strategy that sought to move away from a FDI- and export-reliant model to a more balanced, innovation-oriented mode of growth. The strategy of informatization was implemented as "a means of spring-boarding into a stronger and more independent role within the transnational political economy" (Schiller, 2008, p.113). As a result of the Chinese state's restructuring of industrial

policies, Chinese ICT firms grew rapidly and emerged as new global giants in global markets. For instance, among the top 10 Internet companies worldwide, four are from China, namely Alibaba Group, Tencent Holdings, Baidu Inc, and JD.com.⁴ Chinese telecommunication equipment manufacturers Huawei and ZTE are ranked as the world's top companies in the network sector. The rise of Chinese ICT corporations represents the forces of corporate China that held considerable power within national, regional and international contexts.

The historical account of the evolution of transnational corporations is vitally important to understand what made corporate power reach such prominence. But history requires theory to make sense of the nature of capitalist transformation and the interactions of transnational corporations with the capitalist system as a whole. What is in question is not only the modalities of the transnational corporation but the way in which capitalist social relations have been shaped by the dynamics of capital accumulation. In expanding on this line of inquiry, some questions remain crucial: Has the rise of transnational corporate power undermined or transcended state authorities? Who actually benefits from the expansion of transnational corporations? What are the relationships between capitalist corporations and their hosting nation states? How have the changes of transnational capital accumulation affected the relations between capital and labor? And what is the impact of unprecedented concentration of global corporate power in the global political economic order? These crucial questions are framed to capture the nexus of capital, state and class, which can be seen as essential elements to analyze a transnational corporation.

⁴ He, Y. (2015, November 11). Top 10 Internet Companies in the World. *China Daily*. Retrieved from http://www.chinadaily.com.cn/business/2015-12/11/content_22686526.htm.

Theorizing TNCs: A Literature Review

In 1960 Canadian economist Stephen Hymer (1960) put forward the first modern theory of the transnational corporation in his doctoral dissertation. Since then the intense debate over activities and impacts of transnational corporations has generated a vast literature and theoretical views. However, the vast majority of these studies are dominated by the mainstream tradition of neoclassical economic theories. A common thread running through the mainstream neoclassical approach to transnational corporations is the primary concern about corporate efficiency and resource allocation (Buckley and Casson, 1976; Dunning, 1980, 1984; Rugman, 1981; Vernon, 1966, 1971). This analytical framework is inadequate to construct a holistic picture of the political economic context in which the TNC grows and expands.

In addition, conventional theories of transnational corporations primarily placed the analysis of transnational corporations in the context of advanced industrialized countries. Only two decades ago did some authors start to document the rise of multinational enterprises from emerging markets (Dunning, 1996, 2006; Goldstein, 2007; Sauvart, 2008). However, these theories, which tend to simplify a common pattern of internationalization and abstract the inherent diversity and uniqueness of a TNC's developmental trajectory, are no longer valid to capture the structural shift and complex modes of transnational investment by emerging-market transnational corporations. Other scholars tend to modify the traditional model of internationalization to analyze the accelerated internationalization process of the TNC from emerging markets (Luo & Tung, 2007; Mathews, 2002, 2006). Although these studies tend to propose new perspectives that seem to differ from traditional theories, they still draw on the assumption of the neoclassical theoretical framework by mainly focusing on strategic resource-seeking activities of latecomer firms (Yiu, 2011). This framework fails to take into account the

geopolitical-economic factors that shape the development of emerging-market TNCs in the world system and the political economic ramification in relation to the rise of emerging-market corporate power.

The rise of Chinese multinationals has raised particular attention in the field of international business in recent years. Some scholars tend to study this new phenomenon from the firm-specific advantage perspective (Backaler, 2014; Deng, 2010; Yeung, Xin, Pfoertsch & Liu, 2011). This efficiency-based, functionalist perspective directs the studies of Chinese transnational corporations to the focus of a firm's strategic motivation, behavior and internal structure. For example, the current literature on Huawei mainly focuses on the firm's international marketing strategies, business management, leadership skills and technological entrepreneurship (Sun 2010; Tian, Gremer & Wu, 2016; Wu & Zhao, 2007). These studies are not only limited to descriptive analyses of Huawei's business activities but also grounded in celebratory accounts for the expansion of Chinese capital and the Chinese firm's business strategies in international markets. These accounts lack critical insights into the nature of capital accumulation and abstract away from the structural analysis such as evolving social relationships that are embedded in corporate power.

Another groups of studies take the institutional approach to the globalization of Chinese firms (Alon & McIntyre, 2008; Buckley et al. 2007; Buckley et al. 2008; Deng 2004, 2007; Larcon, 2009). This approach focuses on the effects of China's institutional change on a firm's strategy and performance. However, this institution-based view is built on an assumption of the static relationship between the state and the firm. This starting point premises either the state as an agent of Chinese corporate power or the Chinese firm as a passive recipient of the state's institutional changes. This dichotomous state-capital framing neglects the dynamic processes and forces that shape China's

integration into global capitalism and the complicated interrelations between the state and capital.

This dissertation, in contrast, moves away from the mainstream neoclassical framework and adopts the political economic approach to analyze the case of Huawei. It not only delineates internal contradictions of Huawei's development at the firm level but also its complex interactions with other political economic forces that play the constitutive roles in shaping corporate power dynamics.

The mainstream neoclassical approach stresses that multinationals act in the interest of economic efficiency, whereas critical political economic scholars pay more attention to the relationship between the TNC and the global capitalist system. Marxist theorists believe that multinational corporations "represent merely the latest expression of capitalist exploitation and imperialism" (Gilpin, 1976, p.187). Although Karl Marx (1981) did not develop a distinct theory of capitalist enterprises, he provided the classic description of the expansionary nature of the capitalist system and the bourgeoisie's globalizing mission by putting forth the concept of "world market". In addition, Marx was fully aware of the growth of corporate economy and the tendency of concentration of capital in the hands of large capitals, implying that capitalism would eventually usher in the stage of monopoly capitalism. The classic Marxist theoretical framework laid the foundation for subsequent political economists to investigate the culmination of global corporate power in the capitalist restructuring.

The Marxist or critical political economic critique of the multinational corporation is well represented by the work of scholars from the monopoly capital school which views the multinational corporation as a major mechanism of monopoly capitalism and a vehicle of imperialism. Radical American economist Thorstein Veblen pioneered in the studies of

new forms of corporate organizations and the growing corporate domination in his book *The Theory of Business Enterprise* (1904). However, Veblen's work did not have a significant impact in the literature of Marxian economics. A breakthrough was made by Austrian economist Rudolf Hilferding (1990) who paid particular attention to the concentration of corporate finance capital. Hilferding built on Marx's work in the areas of joint stock companies and their monopoly forms. He argued that finance capital was marked by the highest level of concentration of economic and political power. Hilferding's work was extended by Vladimir Lenin in his *Imperialism: The Highest Stage of Capitalism* (1999). For Lenin, imperialism was characterized by the formation of international capitalist monopolies. Within this stage of capitalism, the export of capital has become a driving force of capital accumulation, and the order of inter-state rivalry among the biggest capitalist powers has been established. Lenin's work explored a key strand of Marxian approach to monopoly capitalism (Bukharin, 1929; Kautsky, 1914; Luxemburg, 2003). The themes of imperialism and capitalist empire have gradually gained importance in the critical globalization studies (Fuchs, 2011).

The new strand of theory opened up a new territory of inquiry that placed primary concern over the relationship between the expansion of corporate monopoly and uneven development in the global system. As Richard J. Barnet and Ronald E. Muller (1974) argued, the unparalleled monopolistic and oligopolistic power of transnational corporations primarily lay in their particularly access to capital, control of technology, and control of marketplace ideology to promote modern consumption-oriented values. These monopolistic or oligopolistic structures associated with corporate growth not only exist within advanced capitalist countries, but have been reproduced in the peripheries of the world economic system. Some authors argued that capitalists and big business were compelled to seek capital export outlets beyond territorial boundaries due to the problem of rising surplus capital within core countries (Baran, 1957; Baran and Swesszy, 1966;

Sweezy and Magdoff, 1969). In addition, some writers linked TNCs' international extension to imperialist exploitation. Foreign investment by transnational corporations in the Third World was primarily seen as a contributing factor to the "blocking of development" or "development of underdevelopment" in the peripheries (Jenkins, 1987). These authors attributed such a structural inequality to "an inherent and dialectical result of a system of corporate imperialism" (Girvan, 1976, p.3). As noted by Samir Amin (2012), under monopoly capitalism multinational corporations primarily play the imperialist role to acquire their superprofits through the extraction of imperialist rent from the peripheries. One form of such imperialist exploitation by multinationals can be found in their exploitation of cheap labor powers in the peripheries, which had been legitimized in the mode of the "international division of labor". Hymer (1982), who shifted his focus from TNCs' firm-specific advantages to the critique of uneven development in his later work, argued that:

[A] regime of North Atlantic Multinational Corporations would tend to produce hierarchical division of labor between geographical regions corresponding to the vertical division of labor within the firm. It would tend to centralize high-level decision-making occupations in few key cities in the advanced countries, surrounded by a number of regional sub-capitals and confine the rest of the world to lower levels of activity and income, i.e., to the status of towns and villages in a new Imperial system. Income, status, authority, and consumption patterns would radiate out from these centers along a declining curve, and the existing pattern of inequality and dependency would be perpetuated (Hymer, 1982, p.129).

In addition to labor exploitation, imperialist exploitation by multinationals also included extraction of developing nations' material resources, control over world markets and core technologies, and exclusive access to globalized financial capital. Such exploitative relationships between the centers and the peripheries accentuated global disequilibrium in the era of corporate imperialism.

Critiques of monopoly capital and media corporate power are also at the heart of the political economy of communications. Many critical communication scholars, such as Robert McChesney (2001, 2004, 2008) who is the key figure in the monopoly capital school, extended the general theme of monopoly capitalism to address the issues related to media conglomerates. The concern about unchecked economic, political, and cultural power of large media conglomerates has become the central issue for critical communication scholars. To uncover the underlying power structure of media corporations, critical researchers typically rely on a range of approaches. Some scholars shared a primary focus on media ownership as a central measure of concentration, with a particular focus on corporate structure. Such a structural analysis provides important opportunities to reveal vast corporate structures of media giants and the power relationship within corporate units. However, as Graham Murdock (1982) argued, "it does not particularly matter who the key owners and controllers are. What is important is their location in the general economic system and the constraints and limits that it imposes on their range of feasible options"(p.125). Therefore, a complete analysis of the general structural context where corporate power is embedded is necessary. Nevertheless, it is also important to point out that the analysis of corporate power structure or ownership concentration embodies a static view of the political economic system that blots out issues of social relations such as class, race, gender and potential of resistance (Mosco, 2009; Winseck, 2012). Hence, it is necessary to incorporate a broader view that can reveal the dynamic processes and forces that shape corporate power.

While there has been a considerable amount of Marxist-inspired work on the role of transnational corporations in the framework of monopoly capitalism, some critical scholars enter and analyze the transnational corporation via social power relations, or class analysis. Based on a comprehensive analysis of the growing big business in their landmark work *Global Reach* in 1974, Barnet and Muller (1974) argued that the spread of

multinational corporations played an important role in spawning a new international corporate elite and acted as an instrument for accelerating the concentration of wealth. Hymer subsequently was among the first to clearly note the emergence of a nascent “transnational capitalist class” (TCC) in his work. He argued that “an international capitalist class is emerging whose interests lie in the world economy as a whole and a system of inter-national private property which allows free movement of capital between countries” (Hymer, 1979, p.262). His argument laid a foundation for the analysis of the transnational character of the capitalist class and its inherent linkage to growing transnational corporations.

As noted by William Robinson (2004, 2008, 2014), globalization is a class project. Some scholars who followed what Robinson called “the global capitalism school” went further to advance systematic theories to examine transnational class relations. This approach utilizes a historical-materialist understanding of the relationship between the rise of transnational corporations and the transnational capitalist class. For example, Leslie Sklair (1995, 2000, 2001), who is best known for his elaboration of the formation and structure of the TCC, proposed that corporate executives of TNCs constituted one of the fractions of the transnational capitalist class. According to Sklair, the making of the TCC was intrinsically bound up with globalizing corporate power. As Sklair (2000) suggested, “locating the institutional form of the transnational capitalist class within and around the TNCs” opened up the new consideration of the TCC in terms of empirical tests (p.36). Following Sklair’s thesis on the TCC, Robinson (2006, 2011, 2014) argued that transnational corporations played the role as active agents in organizing global production and shaping the TCC. Recently, some scholars (Carroll et al. 2010; Holton, 2011; Sklair, 2001, 2002) have paid particular attention to the organizational forms of the TCC through the wide-ranging analyses of corporate power networks and the hierarchical

structure of corporate organizations. This research focus has provided a perspective to examine interconnected power networks from an empirical perspective.

At the same time, scholars carried out expanded studies of the TCC in specific regions or countries to discuss the integration of the national bourgeoisie into the bloc of the TCC. For instance, Harris (2006, 2012) studied the “statist fractions” of the TCC in the process of China’s reintegration into the global economy. He argued that Chinese state-owned enterprises (SOEs) especially the “national champions” have been utilized to incubate and promote this dominant class’s interest in global economic integration. This “statist fraction” constituted a unique character of the Chinese transnational capitalist class. Other scholars paid particular attention to the sectoral factions of the TCC that emerged out of some transnationally oriented economic sectors. For example, Carol Upadhyia (2004) researched on the Indian TCC rooted in Indian software outsourcing companies. In short, these studies shed light on the interactions of various power blocs and factions of the TCC in the process of transnationalization in specific political-economic conditions.

The TCC has received the lion’s share of attention in international political economic (IPE) research. On the contrary, transnational labor, or “global proletariat” remains “under-explained and under theorized” (Struna, 2009). Transnational capital exploits the advantages of mobility along with globalized operations of TNCs while labor is still predominantly tied to particular territory under the state’s and corporate labor control. Moreover, the TCC establishes itself as “a conscious class”—a class in and of itself (Robinson, 2004; Sprague, 2015)—while transnational labor remains fragmented and dispersed. However, as critical communication scholar Nick Dyer-Witford (2010) argues, the development of capitalism has always relied on world-wide labors. With the changes of globalized production organized around the TNC, the labor force linked to

transnationalized circuit of accumulation constitutes the major segment of “transnational labor”.

However, it is important to note that global workers are not just aggregate, collective laborers controlled by transnational corporate power. Jason Struna (2009) posited the theory of “global proletarian fractions” based on six fraction typology of the global working class, comprising three transnational fractions (dynamic-global, static-global, and diasporic-global fractions), and three national or local fractions (dynamic-local, static-local, and diasporic-local fractions) (p.234). Struna’s approach presents a useful conceptual map to understand the segmentation of the global working class. However, this typology lacks sufficient empirical clarification. In addition, the absolute “spatial-productive fractionated perspective” (Struna, 2009) is static and inadequate to capture the complex class fractionation and global workers’ everyday experience. Besides the structural analysis of the formation of transnational labor, it is also equally important to document workers’ lived experience of social relations in the workplace.

The studies on the transformation of labor in digital capitalism have also received greater attention from writers in the political economy of communication in most recent years (Brophy, 2006; Dyer-Witthford & de Peuter, 2006; Fuchs, 2014; Hong, 2011; McKercher & Mosco, 2008). This transformation encompasses the change of labor process in the reconstructed, globalized “commodity chains” (Schiller, 2014). Specifically, one of the hallmarks of this political economic analysis is its focus on how various forms of digital labor, such as Chinese ICT manufacturing workers, Indian outsourcing software engineers, and digital slavery in underdeveloped countries, are subsumed to new forms of labor exploitation in the restructuring of global informationalized capitalism. The accelerated emergence of Chinese ICT firms onto the global stage offers an opportunity to re-assess the labor structure and labor relations tied to Chinese transnationalized

capital. The work and labor implications in relation to the rise of Chinese transnational corporations is a vital research topic, yet it has also been largely absent in the extant literature. This calls for a new research agenda to examine the restructuring of global labor forces, the nature of the labor process and the capital-labor relations in the context of China's reintegration into transnational capitalism.

The Nexus of Capital, State and Class: An Analytical Framework

This dissertation rejects the reified idea that views the transnational corporation as a static institutional unit. Rather, the formation and restructuring of the transnational corporation should be seen as a historical process, replete with contradictory elements and complex historical consequences. At the core of these central tensions is the mutual constitution of capital, states and classes, which is embodied in the transnational corporation's activity and its interaction with the political economic system. This dissertation locates the analysis of Chinese ICT corporation in the international political economic framework. This framework offers a historical-materialist ontology to capture the dynamics of power structure and social relations underlying the globalization of corporate China. To this end, this section first lays out the different paradigmatic perspectives and theoretical debates in the critical studies of globalization to gain a deeper understanding of the three interrelated dimension of my analytical framework and to explain my own theoretical propositions

First, on the one side of the debate is the structuralist view of globalization, which situates the internationalization of capital and productive forces within an institutional system that centers around the nation state. Among diverse critical paradigms, the world system theory that draws on the historical structuralist perspective provides an eloquent explanation on the exploitative relationship and material division within the system of

capitalism (Wallerstein, 1974). However, this perspective implies a nation-state-centric approach and reifies the nation-state as a concrete sovereign territorial and institutional unit. In a similar vein, communications scholars working within the world system paradigm also lay emphasis on inter-state competition for the control over communications among superpowers, with corporations mainly serving as tools of the state (Winseck & Pike, 2007, p.8). Such structural functionalism sees power is anchored in states and the capitalist interest is an external relation to state power.

Second, on the other extreme, the post-structuralist perspective deconstructs the nation-state power by emphasizing the borderless logic of capital accumulation in a post-modern condition. It claims that the unbridled flow of transnational capital, which is primarily embodied in TNCs' cross-border activities, actually transcends the traditional sovereignty of nation-states and gives rise to a new capitalist logic (Hardt & Negri, 2000). Although the post-structuralist perspective foregrounds a new logic of global capital accumulation, the argument is still a problematic one for characterizing the current stage of capitalism in many respects. The post-structuralist perspective overestimates the "smoothness" of transnationalized capital accumulation on the one hand and downplays the role of the state power in the production of capitalist social relations on the other.

The debate from both sides highlights the tension between the nation-state and capital. But it should be noticed that neither state-centrist nor post-structuralist thinking grasps a full picture of the dynamics of capitalist globalization. Instead, my theoretical framework adopts the premise that global capitalism is constituted by the interplay of the territorial logic and the capitalist logic, or two forms of competition, geopolitical and economic (Callinicos, 2009; Harvey, 2003; Woods, 2005). On the one hand, the territorial logic ensures the political, diplomatic, economic and military strategies that are used to sustain the sovereign power and exert external influence over other states. In the context

of international relations, the competing territorial logic of power is reflected in the form of geopolitics or geopolitical competition—that is inter-state conflicts for control over territory, resources, and important geographical positions (Callinicos, 2009). In the contemporary era, geopolitical rivalries over communication and information have also remained as a primary form of competition in reconstituting power distribution in the global communication order (Schiller, 2011a). This directs our attention towards the interstate system through which state power remains as a constituent unit of transnational capitalism. On the other hand, the capitalist logic is driven by the imperative of endless capital accumulation across spaces and borders, which has already led to concentration of capital power in few TNCs' hands (Harvey, 2003; Wood, 2005).

Harvey (2003) has further argued that the new imperialism is a result of the assertion of the capitalist logic and territorial logic, through which the imperialist powers strive to realize the universal logic of capitalism and to sustain the legitimacy of the neoliberal regime on the global scale. Under these intertwined logics of global capitalism, other emerging centers of capital accumulation are compelled to become involved in the global capitalist system. It further drives these newly emerging states to look for geographical expansion for surplus capital outlets, resource extraction, market penetration and profit maximization in order to sustain their rate of growth and resolve the potential crisis of overaccumulation. Harvey (2003) referred to such a tendency as “sub-imperialism” (p.185). This perspective is useful to understand the pattern of capital accumulation and political power accumulation by the emerging powers.

The dialectic framework between the territorial logic and capitalist logic is important to overcome the dualism between the state and capital. However, as Robinson (2007) criticizes, Harvey offers no explicit concept of the “territorial logic”. The nation-state is still reified as a particular institutional form of closed territorial containers. This reification

views states as corporate agents that automatically respond to the needs of capitalist reproduction. On the contrary, Robinson (2004) argues that neither “capital” nor “state” is a “thing”; rather, they are both constitutive of capitalist social relations. Based on this assumption, the state system should be conceived as “a set of complex determinations of the capitalist mode of production”(Callinicos, 2009, p.80). This means the capitalist state should not be simply viewed as an apparatus of class domination but also a terrain of competitions among factions of capitalists and class struggles. It also reminds us to avoid the pitfall of reductionism, abstraction and reification in conceptualizing these key analytical dimensions. This dissertation premises on interrelated, dialectic relationships between state, capital and class. It sheds light on the constitutive role of the state that contends and colludes with transnational capital on the one hand and applies class analysis to examine class reconfiguration and class relations in the transformation of global capitalism on the other.

National/Transnational Articulation: Contextualizing the Rise of the TNC in the “Chinese Model”

As discussed earlier, there is too much of a tendency to set up transnational firms as the only actor in the transnational process and to view the nation-state as a passive actor responding to the transnational project. This has created what Carroll (2012) terms an “abstract dualism” between the transnational and national structures. To overcome this dualism, it requires an understanding of “dialectic interplay” between global capitalism and national conditions or even local and regional forces (Mattelart, 1983; Robinson, 2014). A study on the rise of Chinese transnational ICT corporations, therefore, should involve an exploration into the dynamic of China’s transformation especially its process of reintegration into transnational informationalized capitalism.

As Zhao (2011) argues, the studies of the global political economy should shift its focus from the “hub-and-spoke” power relations based on the West-centered perspective to multi-polar globalization. This required a considerable challenge to the epistemology dominated by the West. However, conventional approaches to China studies often place the “world” as the reference point and China as the subject to reflect global realities. Rather than simply applying established theories to explain the Chinese experience, this study attempts to develop more productive, decentered ways of knowledge production. In this framework, China and the world become “dynamic, interentangled processes instead of static entities in isolation” (Xiang, 2013, p.5).

China’s impressive development over the last thirty years has evoked wide-ranging debate in regard to the nature of the “Chinese model” and global impacts of “China’s rise”. Some scholars emphasized the “peculiar path” of China’s post-Mao transformation toward “neoliberalism with Chinese characteristics” (Harvey, 2007), or “full-fledged capitalist restoration” (Hart-Landsberg & Burkett, 2005). While some writers acknowledged the social legacy and industrial foundation laid in the Maoist period, they also asserted that there is no unique Chinese model existing in China’s trajectory of modern development (Harris, 2012; Hung, 2009a, 2015). For these authors, China’s rise in the post-Mao era merely represents “a major, competitive capitalist power” in the world market, which has no difference from other capitalist powers (Hung, 2015, p.5).

Alternatively, some scholars argue that China has experienced a different pattern of development from prevailing neoliberal-oriented capitalism. They contend that China’s development has moved closer to the pattern of state developmentalism in East Asia (So, 2009, p.57). By drawing on the experiences of the industrializing countries of East Asia such as the so-called “Japanese model” (Johnson, 1982), scholars of the “developmental state” school advocate for state intervention in fostering China’s industrial policies. For

them, the essence of the “Chinese model” lies in the Chinese state’s strong capacity in defining developmental priorities and promoting strategic industrialization.

For some intellectuals like Chinese scholar Zhang Weiwei (2012), China’s experience of development proves that there are viable alternative paths to the capitalist road. The so-called “Beijing Consensus”, defined in contrast to the Neoliberal-oriented “Washington Consensus”, is hailed for its greater capacity and effectiveness in sustaining China’s robust economic growth. However, as political scientist Lin Chun (2006) argues, the weakness of such mainstream arguments in most recent “Chinese model” debate is the absence of a critical appreciation of China’s socialist commitment. According to Lin (2006), the distinctiveness of the Chinese model is first and foremost about socialist development. Nevertheless, it is crucial to remind that any label of “capitalism” or “socialism” used to legitimize China’s current development logic is too vague and superficial to make sense of the complexity of China’s reality. In fact, China’s post-Mao developmental reform is characterized by a process fraught with twists and contradictory dynamics. Such a complex process of development can be better understood within a “social-national-developmental” framework (Lin, 2006). According to Lin (2006), socialism stands for the Chinese state’s commitment to equality and social justice; developmentalism implies the effort to overcome backwardness and to “catch up with” the West; nationalism denotes nationalist ambition for national building and development. These three interconnected dimensions constitute the vital elements of China’s socialist modernity and developmental trajectory. The tensions and dynamics underlying these three pillars provide an insight to examine the policy framework that shaped the contour of China’s ICT firm’s development.

This framework incorporates an analysis of China’s engagement with particular social relations, policy struggles and geopolitical interests. Lin’s analysis opens up a

space for rethinking the possibility of an “alternative modernity”. In the same vein, it also sheds light on a critical research question related to China’s ICT industry’s development: Does China’s ICT developmental trajectory represent an alternative model of technological development and social development? This was also the fundamental question posed by critical communication scholar Dallas Smythe (1994) when he questioned China’s choice for technological development and economic growth in his reflective piece *After Bicycle, What?* Smythe argued that the distinct pattern of China’s technological development was China’s ability to reject the capitalist logic of development and its search for the “proletariat politics”. Smythe’s argument about the politics of technology was useful to unravel the myth of “neutrality of technology” by pointing to the ideological orientation of technology policies and innovation. However, as Zhao (2007a) puts it, Smythe’s binary analytical framework regarding the “socialist road” versus “capitalist road” was inadequate to comprehend the geopolitical economic conditions China had encountered and the complex path of China’s post-Mao development strategy.

Departing from Smythe’s inquiry about the technological politics in China, Chinese communication scholar Hongzhe Wang (2014) has provided a detailed account of the political and social history of China’s digital technology. By drawing on Lin’s social-development-national framework, Wang places the evolution of China’s computer technology in conjunction with the transformation of Chinese socialism, examining how such a historical formation was shaped by the Cold War structure, class struggle and the neoliberal ethic in the different stages of development. Wang’s study provides a complement to Smythe’s inquiry by incorporating more dialectic analyses on the geopolitical structure, socioeconomic factors and class agency. Of particular significance is Wang’s discussion about the socialist legacy existing in China’s technology-related policy struggle, the class character of technological development, and the relevance of a self-reliant technological development model to China’s revolutionary modernity.

Wang's inquiry provides profound insights into China's early socialist history of digital technology and its transition to neoliberal development. Nevertheless, China's rise in the ICT sector in the post-Mao era to model status has drawn more scholars' attention. Bearing the questions about China's "catching up" strategy in mind, Lutao Ning (2009) pays particular attention to the role of the state in China's ICT industry's development with specific reference to the East Asian developmental model. Ning's work offers a detailed account of the rapid growth of China's ICT industry against the background of China's overall economic reform and against the big picture of China's engagement in global markets based on the analysis of China's ICT industry's competitive advantage. However, the developmental and institutional framework Ning uses commits to the dualism between the state and market. It also fails to capture the transformation of relations of production and social struggle that underpinned the contradictory development of Chinese ICT industry. Moreover, the state is not a monolithic unity as suggested by the developmental state literature (Segal, 2003). Instead of viewing the Chinese state as a centralized organizational structure, Adam Segal (2003) pays particular attention to the interaction between the central and various local governments that are involved in promoting the development of Chinese high-technology enterprises. Segal's work sheds light on the complex role of the "state" in shaping different patterns of industrial policy in local economic systems. This framework avoids abstract generalizations of a country's developmental model and re-embeds local trajectories in specific institutional, political and social configurations.

Although Segal's institutional analysis provides insights into the role of the locality in the national economy, it is important to note that China's ICT development must be situated in the transnational political economic context. Following this inquiry, Schiller (2007) contextualizes Chinese initiatives in the ICT sector in his theoretical framework of "digital capitalism" and discusses the role of China as a new "pole of growth" in renewing

the structure and function of transnational capitalism. Although Schiller remains open to the discussion of the nature of China's development, he agrees that China has constituted "a pronounced exception to the post-World War II historical pattern" (Schiller, 2011b, p.933). For Schiller, the vital feature of such a pattern lies in the Chinese state's capacity to foster the import-substitution policy to reserve its own national market for homegrown ICT corporations. By taking up Smythe's developmental questions and Lin's framework, Zhao (2007a, 2010) engages in a dialogue with Schiller by further re-embedding the analysis of Chinese ICT-driven development path in a broader discussion of political, economic, social and cultural contexts. Zhao emphasizes the impact of the Maoist socialist legacy on China's "digital revolution" during the post-Mao era on the one hand, and offers a profound critique on unsustainability of China's entrenched developmental strategy on the other. According to Zhao, the development-centered, market-driven "digital revolution", which holds hostage the social needs of the vast majority of the Chinese population to demands of capitalist accumulation on a transnational scale, has engendered heightening social upheaval and class struggle. But at the same time, Zhao also argues that Chinese contradictory developmental path was not only constituted by the state's policy readjustment in setting developmental priorities but also by social forces' bottom-up resistance. An examination of China's "digital revolution", according to Zhao (2007a), should not be blind to various social forces' struggle for social justice. In this sense, China's socialism is not only rhetoric from above, or a "name without substance", but encompasses broader struggle from below and "a pursuable objective in reality" (Zhao, 2008a, p.342). Echoing Lin's conception of "alternative modernity", Zhao asserts that the legitimacy and outlook of socialism remains a defining element of China's future development.

In view of China's role as the "world factory" in the global ICT industry, some scholars pay particular attention to labor issues behind China's spectacular growth of the

ICT sector. They expand the discussion of China's ICT development from policy implications to class formation in digital capitalism. Their work distinguishes themselves from Western scholars' studies that focused on "knowledge labor" or "immaterial labor" (Dyer-Witherford, 1999; Hardt & Negri, 2000; McKercher & Mosco, 2008). Rather, they view the role of China's industrial workers as formative agents in the making of informationalized, transnationalized capitalism. These studies, starting from the Marxian conception of "class", present the transformative social relations between capital and labor and opened up the dimensions of class formation as an indispensable part of transnational networks of ICT production (Hong, 2011, p.18). Some critical scholars pay particular attention to the exploitative, exclusive, and unequal nature of China's information society (Hong, 2011; Qiu, 2016; Zhao & Duffy, 2007). Jack Linchuan Qiu (2016), for instance, examines how corporations and governments collude to build systems of exploitation by conceptually developing the idea of "manufacturing" and "manufactured" iSlave in his most recent book *Goodbye iSlave: A Manifesto for Digital Abolition*. But at the same time, Qiu (2008, 2009, 2016) also asserts that Chinese ICT workers such as Foxconn workers are more than subjects of corporate exploitation; rather, they also constitute active ICT users and social agents who possess agency in their daily practices, activities of innovations and resistances. As Qiu (2008) argues, the distinctiveness of the "Chinese model" is anchored to grassroots initiatives and social innovation in the lower strata of China's information society.

These studies have described China's development scenario from the inside, with particular focus on China's internal accumulation, or domestic development, in the ICT industry. Moreover, they are preoccupied with the common view that China is still entrenched in the low-value-added end of global ICT production network, or the renowned "Foxconn Model". This view neglects other less appreciated features of China's ICT industry—that is the rise of Chinese transnational ICT corporations and the

state's endeavor in industrial restructuring to climb up global supply value chains. In the meantime, the growing Chinese initiatives in pushing outward foreign direct investment to "buy the world" (Nolan, 2012) and the numerous market-building endeavors by Chinese ICT companies have raised some new research concerns: does this case represent a renewed "Huawei Model" that contrasts with the traditional "Foxconn Model"? Have Chinese ICT corporations provided a different pattern of internationalization from their Western counterparts? What are the political economic implications regarding to the growth and expansion of Chinese ICT corporations in global markets? Does the growing presence of Chinese capital outside China represent a neocolonial power or the redress against the US-dominated global order? These questions are highly relevant to understand the evolving features of the "Chinese model" and China's self-repositioning in the current order of transnational capitalism. They are also situated at the heart of my discussion in this dissertation.

Methods of the Study

This dissertation uses the case of Huawei as a central analytical unit. This empirical research, which focuses primarily on producing an empirically accurate account of the case, intends to contribute to the theoretical discussion on the "Chinese model" on the one hand and to the understanding on globalized corporate forces at play in China's ICT development on the other.

As discussed earlier, this study is built on the ontological foundation of transnational historical materialism. This approach first comprises a materialist conception of history and society, with the ontological primacy of "social relations of production" in the analysis (Overbeek, 2013, p.162). Unlike positivist methods that emphasize decontextualization, detachment and induction, the approach of transnational historical materialism tends to

articulate discrete social units with historical background by understanding reality as a dynamic totality. In avoiding “methodological individualism” (Arrow, 1994), this approach has to prevent a risk of turning the analytical unit into an individual and isolated case. Following these assumptions, this dissertation contextualizes the case in an analysis of capitalist accumulation with reference to the transformation of China’s national economic structure and its interaction with globalizing forces. The historical analysis of the characters and direction of China’s socioeconomic and technological development is central to understand Huawei’s growth and expansion against the backdrop of global restructuring.

One of the potential challenges of this research is associated with representativeness of the case of Huawei. In fact, it is important to stress that an intensive study of a case is able to seek generality from uniqueness and to achieve valid explanations of empirical phenomena. This entails a dialectic understanding of totality to strike a balance between particularity and universality. According to Robinson (2003), “[t]he general is always (and only) manifested in the specific; the universal in the particular (p.56).” In line with this perspective, cases should be selected specifically for their theoretical relevance and uniqueness to deal with heterogeneity. Although general conclusions may be achieved via theoretical inference and empirical generalization (Gomm, Hammersley & Foster, 2000), the understanding of complexity should be given precedence over the goal of achieving generality in the case-oriented approach (Ragin, 1987). Following this principle, studies of a case can also yield multifaceted observations and generate multiple readings given careful selection and appropriate analytical design. Meanwhile, it is important to note that an analysis of a case is not necessarily leading to any closure in findings. Rather, we can expect both determinacy and indeterminacy by viewing the case as a continuous, dynamic process of constructing.

Rationales of the Case: Why Huawei?

Keeping this in mind, the rationales of selecting the case of Huawei are manifest:

First and foremost, the story of Huawei's success in global markets is representative to understand the rise of Chinese indigenous high-technology enterprises in the period of China's transition from a state socialist to a market economy. Founded in 1987, Huawei has grown into a transnational ICTs giant with outstanding economic performance. In 2015 Huawei's revenue reached ¥395 billion (US\$60.8 billion),⁵ far exceeding other Chinese high-technology giants such as Baidu, Alibaba and Tencent (known as BAT). In 2012 the company's carrier network business segment first surpassed its key competitors Ericsson and Nokia in global sales, becoming the world's largest telecom equipment maker. The company has also served as one of the top suppliers of enterprise ICT equipment. In the consumer electronics market, Huawei has already become one of the top three global device companies in terms of market share. In addition to Huawei's market successes, the company also obtains technological leadership in the global high-tech industry due to its massive investment in research and development. In 2015, the company invested ¥59.607 billion in R&D, accounting for 15.1% of the company's total revenue; approximately 79,000 employees were engaged in R&D, comprising 45% of its total workforce.⁶ Huawei is also a highly "transnationalized" company. The company's overseas sale accounted for more than 50% of its total revenue; it operates over 1,500 networks globally, serving more than one-third of the world's population in over 170 countries and regions.⁷

⁵ Huawei 2015 Annual Report. Retrieved from <http://www.huawei.com/en/about-huawei/annual-report/2015/>.

⁶ *ibid.*

⁷ *ibid.*

Second, as Huawei's developmental trajectory was intertwined with China's neoliberal transformation since the 1980s, especially with China's insertion into transnational capitalism, the experience of Huawei's growth was typical to generalize the dynamics and predicaments of China's developmental model as a whole. The case provides a greater scope for addressing larger strategic efforts and concerns in restructuring China's developmental model.

Third, the case of Huawei is unique to present the "heterogeneity" of social process. It can be viewed as an "anomalous case" that serves to challenge and reconstruct the existing understanding of the "Chinese model" of the country's ICT development. As extant literature has paid more attention to the role of Chinese state-owned enterprises in the domestic sector as well as their performance in the process of globalization (Buckley et al. 2008; Harris, 2012), what was less noticed is the growth of non-state-owned high-technology enterprises in China. In comparison with Chinese state-owned enterprises and foreign multinational corporations, the uniqueness of Huawei's developmental trajectory can be reflected in many aspects, such as its patterns of capital accumulation in the domestic market, outward expansion, innovation strategy and ownership structure. Moreover, many Chinese ICT companies' low-end manufacturing activities have been documented in the context of China's integration into the global division of labor, yet the Chinese firms' endeavor to build up self-reliant high-tech capability and to extend their global reach lacks interpretation theoretically and empirically. Does such an "anomalous case" represent a distinct pattern of enterprise development in China and register a new force in global markets with its international competitiveness? The central task of this study is to generate understanding on both generality and "heterogeneity" arising from the case and seek broader discussion on the potential model of China's ICT development.

Methods

This study employed a triangular approach, encompassing the methods of documentary research, semistructured interviews, and nonparticipant observation. The primary data came from a period of field research I conducted between August 2013 to May 2014, with Beijing and Shenzhen as the major locations.

First, I employed documentary research as the primary method. As a qualitative research method, document analysis is particularly applicable to examine the historical event and policies at the macro level and produce rich description of a single phenomenon, organization, or program at the micro level (Bowen, 2009; Stake, 1995). In this research, the selection of documents was evaluated by the criteria of authenticity, credibility, accuracy, and representativeness (Scott, 2014). I collected and examined a variety of official and trade sources which include government reports, industrial annual reports, yearbooks, and industrial policy documents. A thorough review of these materials provided “a means of tracking change and development” (Bowen, 2009), which helped me formulate a historical account of China’s ICT development and understand the political economic context in which Huawei grew. In particular, I used the *Yearbook of China’s Electronics Industry* as a primary source to examine industrial development. This authoritative source not only provided me with official statistics and the evolution of China’s ICT policies but also the documentation of Huawei’s early development in the 1990s. These documents also provided evidences of the intersection between Huawei and state agencies. In addition to the government sources, the data produced by non-official agencies such as commercial market-research companies, research institutes, and professional bodies was also applied as evidences in the analysis. The combination of official and professional sources are particularly useful to help me

construct a clear picture of the historical roots of China's ICT sector and indicate the conditions of the changes in industrial structures.

The documentary analysis is necessary when direct access becomes an obstacle for researchers who focuses on "key centers of control over communication" (Deacon, Pickering, Golding & Murdock, 2007, p.15). In this research, access to Huawei's executive management is restricted. In the absence of first-hand information, I chose to explore secondary sources available in the public domain to obtain concrete information about Huawei's history and strategy. These include Huawei's annual reports, its internal journal *Huawei People*, media coverage, press releases, and especially biographies and speech of Huawei CEO Ren Zhengfei. These materials provided the documentation of Huawei's history and evolving business strategies at the firm level. Although these documents provided a rich source of data, they were still incomplete, selective, and fragmentary. As the available corporate documents are likely to be aligned with corporate policies and serve as cheerleaders of the company's development, I assessed these documents with a critical eye and was cautious in using these materials as evidences in my study to avoid potential biases.

Another important way to reduce the impact of biases is to combine other research methods as a means of triangulation (Bowen, 2009; Deacon et al, 2007; Scott, 2014). Triangulating data can provide the researcher with "a confluence of evidence that breeds credibility" (Eisner, 2017, p.110). In my study, I used semistructured interviews and nonparticipant observations as supplementary methods to gain data. By examining multiple sources of data, I can corroborate findings to construct a consistent picture of Huawei's story. In this triangulating research, multiple methods were conducted in an interactive way. For example, the documentary analysis helped me produce

contextualized knowledge to generate new interview questions. The data gained from interviews was used to cross-examine the findings from the documentary research.

In this research, I conducted 30 in-depth interviews with Huawei workers, employees of Huawei's business rivals, ICT market researchers and analysts, and media professionals. In the process of recruitment of interviewees, I started from several acquaintances to a growing list of respondents based on referrals from the initial informants. The interviewees from Huawei included its former and current employees in R&D, services, strategic marketing, intellectual property and human resource departments. Apart from workers from domestic offices, employees working in overseas branches, such as in North American, European, the Middle East, Latin American and African offices, were also recruited for interviews. These interviewees as insiders provided rich description of Huawei's development, their own working experience as well as their views on Huawei's strategies and management. The media professionals included two senior ICT industrial journalists who have written a series of news stories about Huawei since the 1990s. They not only provided rich information on the case of Huawei, but also helped me recruit other relevant participants. In addition, the market researchers and analysts I interviewed were from the institution of China Academy of Telecommunication Research under the Ministry of Industry and Information Technology (MIIT), who were expert in market and policy analyses in the ICT industry. By deploying the semistructured interviews, the interviewees with diverse roles and backgrounds were able to provide multiple sources of data and insights into the case at the micro level and the industrial development at the macro level. Apart from the interviews, I also engaged informal discussions with media administrators, scholars, communication students from other developing countries particularly from African countries. Their perspectives and comments contributed to my understanding on the influence of Chinese ICTs firms' expansion in their countries.

In addition to the documentary research and interviews, the techniques of observation, real and virtual, were also applied to obtain complementary information. In November 2013 I was accompanied by a Huawei worker to visit the company's Shenzhen headquarters, a spacious campus located in the northern suburb of Bantian District where Foxconn also has its huge campus. This trip provided me with an opportunity to observe the surroundings of these two companies' campuses especially Huawei workers' working and living conditions. The accompanying interviewee along with his co-workers provided me with very detailed accounts of Huawei engineers' everyday life experience. This field observation also helped me contextualize interviewees' accounts of working conditions in "real" locations and situations. In addition, during the research process I kept following some online forums and websites to collect data on Huawei employees' opinions and to observe their interactions. For instance, the virtual community *Voice of Huawei (Huawei Xinsheng)*, which was set up on the company's website and used as a platform of communication by Huawei employees to share their stories, experience and even criticism, was selected as an online setting for my nonparticipant observation. As the location of my interviews constrained my access to Huawei foreign workers, I used some websites such as Glassdoor and Indeed to collect Huawei employees' reviews of work, salaries on different positions, and comments on the company's management. In short, the deployment of multiple methods allowed me to bridge the real experience with virtual interactions in my research.

In the process of data analysis, I categorized the data collected from the documents, interviews and observations into five segments: (1) China's ICT industrial development; (2) Huawei's domestic accumulation; (3) Huawei's international expansion; (4) Huawei's innovation strategies; and (5) Huawei's management and labor practices. By identifying the conceptual boundaries and corroborating diverse sources of data across segments, I

extracted and interpreted the data on the basis of theoretical relevance to create a more complete picture of Huawei's development.

Organization of the Dissertation

This dissertation combines the “inside-out” and “outside-in” analytical perspectives and mixes the industrial studies with the critical political economic approach to examine the rise of Chinese transnational ICT corporations in the context of China's re-entry into global informationalized capitalism. This study sheds light on the following research questions:

- What are the attributes and developmental trajectory of Huawei? What are the similarities and differences between Huawei and its more established counterparts from the industrialized countries? Does this case generate an alternative pattern of “self-reliant growth” or merely repeat the capitalist model of transnationalization?

- What is the intertwined relationship between Huawei and the Chinese state? How have the state's policies of informatization affected Huawei's activities in production, marketing, internationalization, innovation and labor practices? And how has the Chinese developmental model in turn been reshaped by transnational corporate power?

- What are the features and geopolitical-economic implications of Huawei's external expansion in different countries and regions? What are the dynamics and contradictions arising from Huawei's transnationalization?

- What is the role of the transnational corporation in the making of the transnational capitalist class with Chinese characteristics? What are the features of Huawei's

managerial mechanism and labor relations? Has the company's distinct ownership structure and labor management changed the capital-labor relations?

In Chapter 2, I trace Huawei's history against the backdrop of China's ICTs development. The transition from self-sufficient and endogenous industrial development in the Mao era to FDI-dependent industrialization in the post-Mao reform is examined in this chapter to lay out a historical and political economic context to understand how Huawei has grown to its current state in the domestic market. On the other hand, this chapter also focuses on how Huawei's developmental trajectory epitomizes China's industrial drives in the ICT sector and the country's major policy shifts.

Chapter 3 and 4 shift the focus from Huawei's domestic growth to its extraterritorial expansion by exploring Huawei's strategy of internationalization. Chapter 3 first looks at Huawei's expansion into the global South in terms of its motivations, practices and implications. As an exemplar of China's "going-out" strategy and external economic engagement, the path of Huawei's internationalization is representative to analyze the patterns of Chinese corporations' outward expansion and the relationship between the state and corporate power underlying expansionary initiatives of China-based capital. Huawei's increasing presence as a new source of investment and technological support in the global South exemplifies the growing influence of "corporate China" in these regions. But at the same time, the Chinese firm's globalized operations also generate a great deal of conflicts with local communities in regard to its exploitative activities. The tensions between the state-backed Chinese corporate capital and local societies are discussed in this chapter. The analysis also tends to respond to the critiques on "China's threat" in regard to China's economic engagement in the global South.

Despite the growing presence of Huawei's products in other parts of developing countries, the company's entry into developed countries was faced with difficulties and obstacles. In Chapter 4, I examine Huawei's move to the global North particularly to high-end European and US markets. The differences of Huawei's practices in the global South and in the global North are manifest in terms of its entry modes, marketing strategies, and its relationship with local vendors, governments and labor. The inter-state and inter-capitalist competitions underlying Huawei's overseas expansion are given emphasis in the analysis.

In the following Chapter 5 and Chapter 6, I shift the focus from Huawei's external expansion to its corporate power as well as its innovative capability that are internal to the corporate structure. As a high-technology company, technological innovation has been viewed as a critical component for Huawei's strategic growth. Chapter 5 delineates Huawei's path to its cutting-edge technological and innovative development. Leapfrogging from a latecomer company, Huawei has increasingly taken a leading role on the technological frontier in the high-technology sector. Over the past decade, it has not only served as a major driver of technology upgrading in the domestic market, but also developed a wide range of international telecommunication technology standards and intellectual property rights in international markets. Analysis of China's technological innovation often focuses attention to initiatives by the state or local government, but rarely on the role played by firms. Huawei offers a distinct example to look into the firm-driven initiatives of technological innovation aligning with the state's endeavor. In light of Huawei's remarkable achievement in technology and innovation, Chapter 5 places the case of the indigenous firm in the evolution of China's technology policies and practices and looks into the implications of the Chinese firm's technological development in the global high-tech industry. This chapter also highlights the paradoxical dynamics

between the techno-nationalist initiative and the logic of capitalist accumulation underlying the initiative of Huawei's technological innovation.

Huawei's innovative capability not only reflects in its technological progress but also in its distinct innovation in the ownership structure. From the political economic perspective of communication, corporate ownership structure provides one of the clearest expressions of power distribution and capital-labor relations. But Huawei's case presents some distinctive experience from conventional political economic analysis. The company's experiments in designing its employee shareholding ownership structure can be viewed a result of an "organizational innovation" in the context of China's market-oriented institutional transformation, particularly in the context of China's corporatization and ownership diversification. But at the same time, Huawei's transnational production regime also gave rise to a wide web of transnational labor control in line with the emergence of transnational managerial technocracy. Chapter 6 attempts to examine Huawei's innovation of its ownership structure on the one hand, and incorporate class analysis to examine the resulting capital-labor relations on the other.

The conclusion chapter summarizes the main findings of the dissertation, and discusses the implications of Huawei's development experience in China's future economic restructuring and the potential direction of policy readjustment.

Chapter 2.

Huawei's Domestic Accumulation: A Path Intertwining with China's ICT Development

Huawei's developmental trajectory is deeply rooted in the systematic restructuring of China's national economy and the state's reinsertion into transnational capitalism. In the midst of China's capitalist transition, the ICT sector was posited as one of the most significant forces of China's post-Mao modernization drive and the beachhead of the neoliberal reform. Such a transformation provided Huawei with multiple opportunities and challenges in building itself as a globally competitive player. The policy struggle underlying China's ICT development shaped the company's strategies of production, research and development, and mode of accumulation, creating tensions between the state, domestic corporate players and transnational capital. The reorganization of global corporate power in turn redefined the role of the state in national policies. As such, the interaction of local dynamics and transnational accumulation circuits constitutes what Harris (2006) calls the "dialectics of globalization". The rise of China's corporate power should be examined in terms of such dialectics, or specifically in the context of a national-transnational nexus. This necessitates a dialectic analytical approach to understanding the rise of China's corporate power as the complex ways in which historical traditions, institutional arrangements and political forces interact with each other. Viewed in this light, the rise of China-based ICT transnational companies is not so much a disjunction from history; instead, the analysis of Huawei's development should be first contextualized in the country's history of industrial development that has led to its current status.

Before turning to an analysis of Huawei's development in China's domestic market, this chapter first provides an overview of China's ICT developmental trajectory, with an aim to better comprehend the domestic roots in which Huawei has been embedded. The transition from the self-sufficient and endogenous industrial development in the Mao era to export-oriented, FDI-dependent industrialization in the post-Mao reform is examined to understand the historical lessons and the structural context of domestic ICT firms' development. Against such a backdrop of the state's industrial restructuring and reforms, Huawei's development has followed a multi-stage path. This chapter then historicizes Huawei's three crucial stages of "domestic accumulation", which to some extent parallels the evolution of China's ICT sector and major domestic policy shifts: (a) the initial stage of capital accumulation in the fixed-line sector from the 1980s to the mid-1990s; (b) the "struggling" developmental stage in the domestic mobile telecom market from the mid-1990s to early 2000s; and (c) the stage of strategic reorientation since the mid-2000s.

A Historical Contour of China's ICT Development: From Mao's Self-reliant Development to Capitalist Restructuring in the Transition Period

Huawei was founded in the late 1980s, a period of epochal transition that synthesized historical continuities and contradictions of China's political economic development. One upholding neoliberal doctrines might attribute the success of Huawei to China's "reform and opening" policy. This assumption amounts to a total dismissal of industrial and technological achievements China has made during the Mao period. As historian of China Maurice Meisner (1999) argues, the Maoist experience in national development enabled China to enter the reform era "on relatively favorable terms and with highly successful economic results" (p.273). Therefore, the internal accumulation of

the Mao era should be viewed as one of the preconditions that made the rise of China's ICT industry possible. The impact of Maoist strategies was also illustrative of Huawei's strategic growth and practices. However, the policy shift of the post-Mao market reform completely changed the trajectory of China's ICT development as well as the nature of China's integration into the world system. The capitalist transition generated growing tensions and contradictions for Huawei's internal accumulation in the domestic market. Before unfolding Huawei's development trajectory, it is necessary to gain an insight into the contradictory development of China's ICT industry and comprehend a holistic background that shaped Huawei's initial stage of development in the transition period.

Search for An Alternative Path of ICT Development in the Mao era

China's electronics and telecommunications industries started from "poverty and blankness" after the Communist revolution in 1949. The telecom infrastructure during this period was extremely poor and unequally distributed: there was no nationwide network across the country; advanced telecom systems were concentrated in coastal cities, while the vast countryside had low penetration rates of telephone lines (Harwit, 2008, p.30); major telecom equipment was completely dependent on imports from foreign countries and dominated by various foreign telecom standards; and no domestic electronics or telecom firms enjoyed independent manufacturing capacities (MEI, 1986).

Starting in 1953, the Chinese state accelerated the pace of socialist modernization and industrialization. The electronics industry was placed as one of the priorities of the development of the national economy (Ning, 2009, p.49). The First Five-Year Plan (FYP 1953-1957) specifically set two goals in relation to the development of the electronics industry: the first was to modernize and strengthen the radio and communications technologies in relation to national defense; and the second was to set up automatic

telephone switchboard factories for the civilian network (Pecht, et al., 1999). These strategic goals were detailed in the 1956 *Long-Range Plan for the Development of Science and Technology from 1956 to 1967*. This plan listed key electronics projects of national importance: telecommunications and broadcasting systems, radio electronics, semiconductor technology, and computer and radio technology for national defense. Under the technical and financial assistance from the Soviet Union and East Germany, eleven national projects related to electronics and telecommunications industries were launched. These national projects included establishment of a number of pillar enterprises such as Huabei Broadcast Device United Enterprise, the Beijing Electronic Tube Enterprise, the Beijing Broadcast Device Enterprise, the Chengdu Xinxing Instrument Enterprise, the Hongming Wireless Electronics Enterprise, the Jinjiang Electronics Machinery Enterprise, and the Xi'an Huanghe Machine Factory, etc. (MEI, 1986). The creation of these electronics enterprises played important roles in the technical progress and improvement of manufacturing capacity in China's electronics industry. By the end of the First FYP, China was able to produce some key electronics components and products, including wireless communication equipment, automated telephone switch, broadcasting transmitters and a few consumer products. From 1953 to 1957, the electronics industry grew at the average annual rate of 49.5 per cent (MEI, 1986). Especially in the field of telecom equipment manufacturing, a breakthrough was achieved by the Beijing Wire Communication Plant in 1957 when the enterprise produced the first Chinese automated telephone central office switches. China's overall capacity of local office switches had improved rapidly, increasing from 320,900 ports in 1950 to 2.31 million in 1960 (Harwit, 2008, p.114).

At the same time, the central government began to pay attention to the disparity of telecom infrastructure expansion between cities and the countryside. In 1956 the Ministry of Post and Telecommunications (MPT) set the goal of constructing telecom networks at

the county and commune levels as one of the central tasks of rural development. Substantial effort for telecom network construction was made via the nationwide campaign “*xiang xiang tong dianhua*” (telephone to every township). By 1960 the number of rural telephone subscribers reached nearly 920,000, almost twenty times of the 1951 number, which also greatly outnumbered urban telephone subscribers.¹ At the same time, 99.1 per cent of people’s communes and 86.9 per cent of production brigades installed telephones (Dangdai Zhongguo de youdian shiye, 1993, p286). The rate of telecom equipment installation increased several-fold (ibid). The rapid growth of rural telephone lines laid a solid foundation for rural industrialization. For example, in 1960 the country launched a mass campaign to construct irrigation systems in the countryside. Along with this campaign over 70,000 kilometers of telephone cables and 30,000 telephones were installed at construction sites to facilitate the project (Harwit, 2008, p.162-163). Moreover, in concordance with the expansion of telecom infrastructure, rural radio broadcasting networks also developed rapidly. Since the mid-1950s, expanding telephone lines had been used for transmitting broadcasting signals to vast countryside, fulfilling the country’s effort of constructing national broadcasting networks and serving public service for rural demands. Under the initiative of rural telecom development, the gap between the rural and urban areas was significantly reduced during this period.

However, the deterioration of international relations in the 1960s, especially the Sino-Soviet split, not only undermined developmental conditions inside China, but also confronted the country with another external military threat. In 1960, the Soviet Union withdrew all technical assistance and terminated provisions of key electronics components and equipment. In response to the risky international environment, Mao placed greater attention to “basic” industry and focused more on industrial construction in inland areas than coastal cities. In addition, the Maoists also called for China to develop

¹ Data from National Bureau of Statistics of China.

an independent and indigenous technology that combined “old considerations of national pride and new economic considerations” (Meisner, 1999, p.211). In line with this tenet of self-reliant industrial development, the primary task of electronics and telecommunications enterprises was readjusted to facilitate military-related development such as nuclear, missile defense and aviation technologies.

To carry out this strategy, from the mid-1960s to 1970s, China implemented a massive development programme—“the Third Front”—to reconfigure China’s industrialization. Increased investment was directed to the South-Western remote region and Western China to construct an alternative industrial base. A large number of existing factories and research institutions were relocated from coastal cities to the mountainous hinterland. The Third Front Plan actually dominated China’s industrialization effort in the late Mao era. Investment in this plan respectively accounted for 52.7 and 41.1 per cent respectively of total national investment in the Third and Fourth FYP (Naughton, 1988). As one of construction priorities, the electronics industry obtained substantial policy support and played an important role in this military-driven industrialization. From 1960 to 1970, the total number of electronic factories increased from 460 to 2,500. The value of industrial output increased from 2.33 to 10.6 billion yuan with the average growth rate at 31.4 per cent during the Third FYP. From 1966 to 1976, over 80 national projects were initiated (Ning, 2009). In the provinces of Sichuan, Guizhou and Shanxi, large-scale electronics industry bases were established, which were turned into local backbone enterprises under the policy of “Small Third Front Plan”. These Third Front enterprises then played significant roles in restructuring China’s ICT industry and rebuilding the country’s manufacturing capacities in the reform era.

During the period of Maoist industrialization, China made substantial technological breakthroughs in a few strategic sectors such as in satellite, telecom equipment and

computer technologies based on the self-reliant mode of development. For instance, in 1964 the first Chinese-developed digital computer was launched (Maciotti, 1971, p.237). In the same year, China's telecommunication technologies also achieved a major breakthrough with the launch of the first independently-developed symmetrical cable carrier telephone system and microwave cable. And in 1966, the first Chinese-made integrated circuit was invented, marking significant progress in electronics technologies (MEI, 1986). Since then China has enjoyed large-scale production of integrated circuits and wide application to other electronics products. These technological advances were noteworthy, indicating the country's dynamic technological and innovative capabilities under the self-reliant mode of development.

The rationale of China's military-led industrialization in the 1960s was evident: it was driven by Chinese techno-nationalism in the Cold War context to defend the country's sovereignty and to resist against imperialist hegemony and aggression. However, China's industrial development in the Mao era was not merely a response to external forces but a project of exploring an "alternative modernity"(Lin, 2006). This initiative was only made possible based on China's ability to self-determine its own model of development. Such a self-reliant mode of development, first and foremost, rested on the Chinese state's rejection of the blind importation of Western technologies, consumer goods and services as well as the development of "capitalist consumption relations" (Smythe, 1994). In the socialist logic of economic development, the means of modern science and technology was used in a fashion consistent with social needs of the vast majority of the Chinese population. Therefore, apart from military and national defense functions, the construction of China's electronics and telecommunication industries also included the aim of meeting basic social needs and building the socialist goal of egalitarianism. These social functions of modern electronic and telecommunication technology development were manifest in China's industrial policies.

In addition, China's industrialization during the Mao era was not simply a result of the top-down military-led mode of development; instead it highly relied on strong labor resource accumulated over the course of decades, the communist party's capability of social mobilization and promotion of socialist subjectivity. The scarcity of massive capital input in China's internal accumulation required labor input as a complement of productive resources. This effort included massive investment in labor resource during the Mao era, which led to the formation of a generally educated, healthy and disciplined workforce for China's industrialization and modernization (Meisner, 1999). The unique Chinese experience of industrialization also lay in adopting the approach of mass mobilization that fully integrated people's professional expertise with mass-based production. The Third Front Plan, for instance, was conceived as a mass movement that had mobilized nearly four million Chinese people including workers, technicians, and engineers to transfer from coastal cities to inland industrial bases. Moreover, it is important to note that the realization of self-reliance was first and foremost built upon "the recognition of the subjectivity of the people, and their ability to manage their subjectivities in accordance with social goals" (Dirlik, 2005, p.171). The emancipation of Chinese people's subjectivity constituted "the motive force and the end of development" (ibid). The realization of "socialist subjectivity" was particularly reflected in the Maoist strategy of "technical revolution" which envisioned the development of modern technology and science without creating a privileged technocratic elite (Meisner, 1999). The masses, who were capable of engaging in "the course of everyday productive work, learning the necessary skills and expertise in the course of doing, studying while working, and applying their newly-acquired knowledge to immediate productive needs, and in ways appropriate to suit local conditions", were believed to create and master modern technology (ibid, p.212). This "mass line" approach of technical development was exemplified in numerous practices and mass movements during the Mao era, such as the emergence of "barefoot

electronics engineers” (*chijiaodiangong*), the campaign of developing “people’s computer technology”, and the progress of automation technology achieved at the factory shop floor (Wang, 2014). In contrast to linear process of R&D, the Chinese “learning-by-doing” model emphasized extracting experience directly from production and applying it to local conditions. Taking the innovation of China’s first integrated circuit for instance, technicians and engineers who were sent to the shop-floor of Shanghai Electronics Components Factory accumulated experience and made breakthroughs in numerous experiments during the course of productive work. This unique approach was essential to bring collective wisdom and workers’ subjectivity into productive practice. In short, these practices amounted to a unique Chinese experience in self-reliant development, which exerted significant influence on the post-Mao development.

Relinking to World Markets in the 1970s

With the dramatic transformation of the world system structure and international relations in the 1970s, China underwent deep changes in its strategic and policy options in the late Mao period by seeking linkages to world markets. These changes were first marked by China’s regaining a seat in the UN Security Council and its normalizing relations with the United States, Japan and a few former foes such as some Western European countries in the early 1970s. The repositioning of China’s role in the world’s geopolitical landscape in turn geared the country to reorient its national economy. Specifically, the domestic development strategy was gradually shifted away from the autarkic, military-dominated strategy to the civilian economy.

Meanwhile, a number of top Communist Party leaders, including Zhou Enlai, Chen Yun and Li Xiannian, proposed to rebuild the country’s foreign trade system and to strengthen economic relations with Western countries. In the early 1970s the Chinese

government launched the “Four Three Plan”, investing US\$4.3 billion in technological transfer and machinery importation from Western industrialized countries. This plan was seen as the PRC’s second “opening-up” policy after the Soviet-assisted “156 national projects” in the 1950s as well as a prelude of China’s outward-looking market reform after 1978. The investment mainly concentrated in productive material industries such as in the chemical fiber, fertilizer, and petroleum industries, aiming to revive the Four Modernizations developmental strategy which had been superseded by the Third Front Plan and to balance the light and heavy industries in the national economic system. The electronics and telecommunications sectors were also involved in this wave of “opening-up”. In 1972 Canadian telecom giant Nortel Networks became the first Western telecommunication company to sell transmission equipment in China,² which was later used in televising the historic meeting of Mao and Nixon by Chinese broadcast media.³ Moreover, in the domestic market, production lines of consumer communication goods such as color televisions were established based on technological transfer and imports of key electronics components from Western countries. At the same time, China started to re-establish its network connectivity with the outside world especially with the West. In 1971 China restored direct telephone and telegraph lines to the UK and US.⁴ In the following year, the first data transmission circuit connecting Beijing, Shanghai, San Francisco, and Toronto was launched.⁵ In the same year, the International Telecommunication Union restored China’s seat, which strengthened China’s presence and power in global telecommunications governance.

These moves can be seen as China’s initial effort to relink with the capitalist system

² Chen, T. (2003, December 11). Rooted in the Chinese Market: Nortel Network Leads the Way Out. *People’s Daily*. Retrieved from <http://www.people.com.cn/GB/guojj/14549/2240636.html>

³ Li, Z. & Shen, J. (2009, August 3). The Collapse of Nortel Network with Lingering Doubts. *China Computer World*.

⁴ The Historical Events of China’s Telecommunications Development 1970-1979. Retrieved from http://www.chinatelecom.com.cn/news/06/hh60n/60nlsjc/t20090911_53999.html

⁵ Ibid.

in the late Mao era, which also paralleled concurrent transformations in the world system. To some extent, China's opening-up strategy in the early 1970s was more a triumph for capitalist countries than for China because the hope of saving capitalism out of the systematic crisis largely hinged on China during this period. As noted by Schiller (2016), the age of Nixon was marked by great changes of capitalist development along with restructuring of the global political economic order, which led to great transformations in the geopolitics of information in the following decades.⁶ To overcome the crisis of the 1970s, principal industrialized countries sought to explore alternative markets to export surplus products and capital to sustain profitable growth around digital networks (Schiller, 2016).⁷ The communication industry, especially the newly emerging ICT sector, undertook a special role in responding to this crisis by creating new territories of profit (Schiller, 2014, p.74). China was conceived as one of such new centers of capital accumulation. With China's "selective linkage" to world markets, the intersections of the "two poles of growth"—China's integration into transnational informationalized capitalism—were taking place, which constituted unique political economic conditions for the rise of Chinese ICT enterprises in the post-reform era. Meanwhile, starting in the 1970s capitalist restructuring around digital networks has accentuated international competition for leadership of the global communication order (Schiller, 2016).⁸

Post-Mao Reforms

China's post-Mao reforms underwent epochal changes, with a transition period marked by metamorphic policy reversals, industrial restructuring and market-oriented enterprise reforms (Bramall, 2009; Meisner, 1999). It essentially departed from the developmental ideology of the Mao era and embraced economic growth as a legitimate

⁶ Schiller, D. (2016, October 24). *The Geopolitics of Information in the Era of Digital Capitalism*. Sources from Dan Schiller's lecture at Perking University.

⁷ Ibid.

⁸ Ibid.

part of the “socialist market reform”. As key part of the initial structural adjustment during the transition period, the national economic structure was shifted away from military-oriented heavy industry to consumer, labor-intensive light industry and consumer goods production. In this process of the policy shift, electronics and telecommunication industries were given greater weight in the national economy. In 1977, after the meeting of the National Electronics Industry Conference, the *People’s Daily* published an editorial on the electronics industry, declaring that:

[A]ll branches of the national economy must be equipped with the technology of electronics before they can advance at high speed...the electronics industry, as an important material and technological basis for the four modernizations, should be the first to be modernized.⁹

Later in 1979 Deng Xiaoping further noted that telecommunication should be placed as one of the most vital areas of public investment along with other strategic sectors like energy and transportation in order to lay the foundation for infrastructure construction (MEI, 1986). In 1982, “the acceleration of telecommunication development” was enshrined in the report of the Twelfth National Congress for the first time. The Minister of Post and Telecommunications Wen Minsheng even declared that this goal should be achieved through the expansion of telecommunication networks in the urban areas,¹⁰ a suggestion which dramatically contradicted Mao’s egalitarian policy in electronics and telecommunication development. Moreover, the post-Mao Chinese technocratic elite’s thirst for reintegration into the global capitalist system converged with the Western vision of the “informational” or “postindustrial” paradigm that viewed “information society” as a fetish of social development as well as an inevitable path toward modernization. This tendency was exemplified in the popularization of Toffler’s *The Third Wave* in China in

⁹ People’s Daily (1977, December 5). *Editorial on the Electronic Industry: The Level of the Electronics Industry is a Hallmark of Modernization*.

¹⁰ Looking for Breakthroughs—Wen Minsheng’s Reform in the Post and Telecommunications System. Retrieved from <http://www.cnii.com.cn/20080623/ca579840.htm>

the 1980s (Zhao, 2014), which further prompted the Chinese reformist elite to articulate the idea of “information revolution” with China’s modernization drive. However, as noted by Zhao (2008b), underlying the dominant ideology of “information revolution” or “the Third Wave” was the overriding logic of commodification and capitalist accumulation. China’s imperative of building an ICT-led mode of economic development was actually integrated as an integral part of the world’s capitalist restructuring, which was later translated into specific domestic policy initiatives at different levels:

First, at the central decision-making level, a Lead Group for the Revitalization of the Electronics Industry was formed within the State Council with Vice Premier Li Peng as its head. In November 1984, the lead group put forth the *Development Strategy for Our Country’s Electronics and Information Industry*, calling for the priority of application of ICTs in various social and economic spheres especially with the focus on the development of telecommunication equipment and computer technologies (MEI, 1986). During the Seventh Five Years (1986-1990) period, twelve principle ICT application projects, mainly concentrated in national public service spheres such as banking, transportation, public security and military services, were launched to restructure traditional industries with “modern” technologies (Guo, 2001).

Second, the industrial restructuring of the ICT sector was launched according to the market logic. The first step involved large-scale defense conversion projects. The central government cut down the investment budget for military-related projects and diverted resources toward the civilian sector. The share of military spending in central government spending dramatically fell from 25 per cent during the height of the Third Front Plan in the 1960s to around 8 per cent by mid-1980s (Bramall, 2009, p.410). As the market logic gradually gained legitimacy in the process of industrial reforms, the primary organizing principle of ICT production was no longer set to meet the demand of militarization or

public service, but to create new sites of commodification for consumer markets and to pursue the imperative of profit accumulation. If the uniqueness of Mao's industrialization and ICT development lay in China's rejection of capitalist consumption relations, the post-Mao industrial reforms, paradoxically, not only turned the country into a primary supplier of global consumer goods chain to serve global capitalist markets, but also unleashed "rampant consumerism" as a universal ideology (Zhao, 2007a). The market-oriented industrial drive had become the pivotal factor shaping the direction of China's ICT developmental trajectory.

Third, China's ICT enterprises also underwent dramatic transformations in many respects. Because of declining financial support as well as shrinking military-related demands, a large number of Third Front electronics enterprises were closed down. In 1985 a rectification plan was implemented to restructure and relocate Third Front enterprises. A number of traditional electronics enterprises were forced to relocate to coastal cities and to engage in export-oriented manufacturing activities. For example, the Zhenhua Electronics Corporation, which was one of the backbone electronics enterprises in the Third Front Plan, was reorganized by the MEI to established more than 10 business and production facilities in Shenzhen. The restructured enterprises primarily engaged in the production of printed circuits for export and color televisions for the domestic consumer market. By mid-1987 over 1,000 Third Front electronics enterprises had been restructured (Naughton, 1988, p.382). These enterprises played significant roles in post-Mao industrial reforms, contributing large shares of total output of the country's consumer goods production during the transition period. More importantly, their research and development capacity as well as the manufacturing know-how, which had been accumulated during Maoist industrialization, was absorbed by other homegrown ICT enterprises such as Huawei. The experience and practices of technological absorption by indigenous firms are elaborated in Chapter 5. There is no doubt that the legacy of China's

industrialization laid a solid foundation for the country to nurture indigenous technology and to build competitive domestic players.

Accompanying market-oriented industrial restructuring, China's ICT sector also witnessed a liberalized institutional reform. In the early 1980s, an initial SOE reform was launched in the ICT industry as part of wider market reforms. The primary goal of this SOE reform was to separate centrally-controlled administration from enterprise management by rendering SOEs relatively independent in product planning, marketing, R&D and profit retention. In 1982 the state council implemented a rectification plan covering 1606 electronics state-owned enterprises, accounting for about 56 per cent of the total number of enterprises in the ICT industry (Ning, 2009, p.59). With the policy of decentralization, provincial telecom enterprises obtained relative autonomy from the centralized government. In the mid-1990s, the Chinese SOE sector underwent a second wave of radical enterprise reform along with the country's neoliberal reform, which further accelerated the pace of China's liberalization in the corporate ownership control and management system.

Apart from the SOE reform, the non-state sector grew rapidly with the lift of ownership control. To escalate the scale and scope of China's "digital revolution", the state encouraged massive entries of non-state-owned enterprises into the ICT manufacturing industry. Although the SOE sector still dominated high-tech production within the industry, growing collectively-owned enterprises played a significant role in organizing labor- and process-intensive ICT production throughout the 1980s (Ning, 2009, p.62). Since the mid-1980s, a number of ICT companies, including Huawei, ZTE, TCL, Lenovo, and Haier, which had all registered as collectively-owned enterprises, sprang up and grew rapidly. Moreover, hundreds of thousands of township and village enterprises

(TVEs)¹¹ in periurban areas primarily took the subcontracting role by cooperating with urban SOEs (Naughton, 2007, p.280). Such a cooperative production relation not only recovered the urban-rural linkage in the early period of reform, but also strengthened the self-sustaining mode of development in China's domestic market. According to the statistical records, during this period the number of TVEs increased to 12,002 in the field of electronic goods production, and 4,536 in telecommunications equipment, with a share of 37 per cent and 13.9 per cent respectively of total electronics output (Cao, 1994; Ning, 2009). Before the Chinese state shifted the informationized policy toward the export sector and initiated the privatization of rural collective enterprises in the mid-1990s, China's burgeoning TVEs primarily served as the engine of rural takeoff and laid a solid foundation for the Chinese ICT manufacturing economy.

The ICT sector not only served as a forerunner of domestic market reforms, but has also been closely bound up with the Chinese state's opening-up initiative. In 1977, the Chinese government already expressed interest in cooperating with Western companies to build infrastructure for modern communication networks (Harwit, 2008, p.118). During the initial stage of economic reforms, demand for advanced communications services from the coastal areas especially from transnational business has exploded. On the other hand, China's underdeveloped domestic ICT products and technologies were unable to match the ever-increasing market growth. In 1980, telephone subscribers across the country barely reached 2.14 million, with a telephone penetration rate of 0.43 lines per hundred people (MEI, 1986). To leapfrog into the market-driven "digital revolution", the principle of self-reliance has gradually given way to an outward-looking mode of the ICT development. The acquisition of Western technology and foreign capital was used as the most efficient means to jumpstart the domestic ICT capital accumulation and capacity

¹¹ During the initial stage of China's post-Mao reforms, former commune and brigade enterprises were transformed into township and village enterprises as part of the project of China's rural industrialization.

buildup. In 1983, the Chinese state relaxed the restrictions of FDI in joint ventures and allowed wholly foreign-owned enterprises in the country. Then in 1986 the government further liberalized foreign direct investment through a series of preferential policies, which included lowering taxes and removing administrative restriction, allowing foreign firms more freedom in their operations¹² and easing restrictions on the acquisition of foreign exchange (Meisner, 1996, p.283). The field of ICTs became one of the most popular sectors for the inflow of FDI. According to the earliest available data from the Ministry of Electronics Industry (MEI), the output value of foreign-invested enterprises production increased 12 fold from ¥0.23 billion in 1983 to ¥2.9 billion in 1987 (MEI, 1988). Throughout the 1990s, inflow FDI soared at astonishingly high rates, which made China the world's number-one destination for foreign direct investment (Hart-Landsberg & Burkett, 2005).

The Chinese ruling class's enthusiasm for global capitalist markets also aligned with multinationals' interests that intended to "assign China a niche position" in the systematic restructuring of global ICT production (Hong, 2011, p.35). Since the 1970s East Asian countries have risen as outsourcing centers for transnational ICT corporations because of these countries' strategic status in the global geopolitical economic context and the low cost of labor. Yet rising production costs as well as labor shortages in Eastern Asian developmental states forced transnational capital to flow toward mainland China, "with the PRC functioning as an assembly hub for final products" in global ICT production networks (Hart-Landsberg, 2013, p.34). Encouraged by the Chinese state's export-oriented, "attracting-in" policy in the late 1980s, the total export value of electronics products in China increased more than ten times from US\$0.68 billion in 1986 to US\$8.11 billion in 1993, with foreign-invented enterprises accounting for 54.6 per cent

¹² The policy removed a variety of bureaucratic restrictions. The government put forward the idea of "delegating power and sharing profits" with enterprises. For example, foreign enterprises enjoyed autonomy in production, product sales, pricing, personnel, and distribution of wages.

of the total exports (MEI, 1994). By the end of 1991, more than 2,600 foreign-invested ICT enterprises had been established in the country (Hong, 2011, p.37). Despite the unprecedented growth of China's ICT industries in the past several decades, this uneven developmental path, one that was especially marked by the domination of transnational corporations, posed formidable challenges to the development of indigenous firms, a trend of which the Huawei story is illustrative.

As mentioned above, the development of Huawei was contingent on Chinese development strategies at both the general and ICT-specific levels. A historical review of China's ICT development from Mao's era to the initial stage of post-Mao reforms, which reveals a process of socialist construction, industrial restructuring and tendency of capitalist transition, provides a necessary "prehistory" to understand the political economic background in which Huawei developed. The following section moves to the analysis of Huawei's history. It can further shed light on the interaction between Chinese corporate power, the Chinese state and transnational capital.

Huawei's Developmental Trajectory in the Domestic Market

The First Stage: "Circulating Cities from the Countryside"

In December 1987, Huawei was founded in Shenzhen—one of the first four Special Economic Zones (SEZs) designated in 1979—with only six employees and ¥24,000 registered capital. As a key part of the country's opening-up policy, the establishment of SEZs was designated to attract foreign capital and technologies by offering foreign investors favorable conditions such as unlimited supply of cheap labor and preferential tax rates. As a result, Shenzhen, a once-obscure small town proximate to Hong Kong, was transformed quickly into a center of China's outward-looking economy and "the vanguard of China's urban reform". Since 1979, Shenzhen Municipal Government has

expressed the imperative to embrace the bandwagon of information revolution to promote its FDI-driven economic strategy. The local policy has increasingly geared toward the export-oriented ICT manufacturing industries. By the end of 1985, the output of Shenzhen's electronics industry had reached ¥1.4 billion with a 113.5 per cent increase from 1979, accounting for 49.7 per cent of total industrial output of Shenzhen; the exports had reached ¥120 million, accounting for 11 per cent of the electronic output value; and the number of Shenzhen electronics enterprises increased from 1 in 1979 to 170 in 1985 (Dangdai Zhongguo Dianzi Gongye, 1987). However, the overwhelming majority of these enterprises were primarily engaged in assembly, processing and packaging and compensation trade (*sanlaiyibu*).

Since 1986, Shenzhen Municipal Government has scaled up investment in and policy support for the high-tech sector in concordance with the Chinese state's economic restructuring toward ICT-led developmental strategies. In February 1987 Shenzhen government issued the *Tentative Provisions on Encouraging Technology and Science Personnel to Establish Non-state-owned Technological Enterprises*, officially lifting control on private ownership in the high-tech sector. This directive stipulated that science and technology personnel could be allowed to invest in a high-tech company in the forms of intellectual property, copyrights or other property rights; at the same time the government promised to provide these start-ups with a series of preferential policies such as exemption from enterprise income taxes. This policy stimulated a rapid growth of non-state-owned high-tech enterprises and an influx of private capital into the ICT sector in Shenzhen. As a result of this policy, 85 high-tech companies, including Huawei, were formed with the "people-run" ownership status (*minyong qiye*) in 1987.¹³

¹³ Shenzhen Technology Finance Service Center (2014, January 20). *Studies on Shenzhen High-tech Enterprises' Development*. Retrieved from <http://www.szsti.gov.cn/f/services/softscience/69.pdf>. "People-run enterprises" refer to non-state-owned and non-foreign-owned enterprises.

Ren Zhengfei was a representative figure of the Chinese early generation of private entrepreneurs in the reform era. Born into a poor family in the inland Guizhou Province in 1944, Ren attended the Chongqing Institute of Post and Telecommunications in the 1960s. He then joined the People's Liberation Army (PLA) to work as an engineer in the PLA's Information Technology research unit. During the transition period of the defense conversion projects, Ren was demobilized from the PLA in 1982 and then he moved to Shenzhen. Before Ren Zhengfei founded Huawei, he had worked as a manager at an electronics company subordinated to Nanyou Corporation which was one of the largest SOEs in Shenzhen. Like many other emerging private entrepreneurs during the transition period, Ren left his job at the SOE and "plunged into the sea" (*xiahai*) to establish a private business. This fraction of the capitalist class, which was also called "red capitalists", usually found themselves in a uniquely favorable position in market reforms.

Though Huawei was registered as a "technology" company, initially it had nothing to do with advanced technological research and development. Like many other Chinese ICT companies such as Lenovo, Huawei started its business in international trade, primarily engaging in activities of retail trade of varied consumer goods in the first few years. However, Ren Zhengfei later shifted the company's strategic focus to the telecommunication equipment market against the backdrop of the unprecedented telecommunications network buildup in the 1980s. He then chose to become a sales agent of a Hong Kong telecom equipment company—Hung Nien Electronics—to sell its small-sized analog telephone exchange in Mainland China. This deal has become Huawei's first business to step in the telecommunication equipment market.

As Ren correctly anticipated, China's telecommunications market has experienced an exponential rate of growth in the scale of investment and user base since the late 1980s. The fixed-asset investment in telecommunications surged from ¥2.14 billion in

1987 to ¥85.6 billion in 1995 with forty-fold increase, while fixed-line subscribers also increased from 3.9 million to 40.7 million (MEI, 1996). In the early 1990s, the initial installation fees for a fixed-line telephone were as high as ¥3000-5000 and sales prices of telecommunications transmission equipment could reach ¥1000-2000 per port.¹⁴ Massive market demand as well as huge profit returns has turned the telecommunications equipment sector into one of the most commercialized and lucrative industries in the reform era. Benefiting from the booming domestic telecommunications economy, Huawei also prospered quickly in its initial stage of development. Through reselling the imported telecom equipment HAX switch to small enterprises in the Mainland market at high prices, Huawei quickly accumulated primitive capital from such speculative activities in a short time.

However, Huawei had to face the fiercest competition in the domestic telecommunications equipment market at the same time. Apart from hundreds of Chinese domestic competitors that also served as sales agents of varied low-end imported equipment, foreign telecommunications giants completely dominated the high-end market under the state's pro-foreign investment policy. As industrialized countries have already moved from electronic switching to all-digital systems since the early 1970s, foreign telecommunications equipment manufacturers had made steady strides in advanced switching technology. In contrast, Chinese indigenous telecommunications switching technologies had been caught in bottleneck since China invented the country's first crossbar switch in the 1960s. In order to improve telecommunications network capacity in a short time, the Chinese government and telecommunications equipment manufacturers chose to adopt a three-stage policy, including: (a) direct import of equipment; (b) technological transfer and absorbing; and (c) indigenous innovation with

¹⁴ A port is a physical interface through which information transfers in or out. The price of the telecommunication equipment is measured by the cost-per-port.

the hope that the Chinese homegrown firms would eventually catch up with multinational giants (MEI, 1986).

Before Huawei's entry into the essential telecommunications equipment market, the domestic market share had already been dominated by foreign products thanks to the government's policy of "trading market for technology". On November 27 1982, China imported and installed the first digital switch system with capacity of 10,000 ports in Fuzhou, a coastal city of southeastern China, marking a huge leap in Chinese telecommunications network capacity from out-of-date electromechanical networks to digital control. To further lure foreign capital and to boost telecommunications imports, in April 1986 the Chinese government decided to lower tariffs for imported telecommunications equipment and particularly exempted duties for domestic firms that used World Bank or the Asian Development Bank loans to buy foreign equipment. On the other side, foreign governments also sought to offer generous loans to China to assist the opening of markets for their vendors. These loans usually came with conditions that required Chinese operators to buy products from creditor countries (Hong, et al., 2012). For example, in 1988 the Canadian government offered China a 20-year low-interest loan for assisting the exports of Nortel Networks' products to the Chinese booming market. By 1993, the total soft loans used in purchasing foreign digital switch amounted to ¥760 million.¹⁵

The reliance on foreign loans and technologies led to declining production of domestic switch manufacturers on the one hand, and the domination of foreign products in China's networks infrastructure on the other. From the late 1980s to the early 1990s, the Chinese telecommunications equipment market, including both rural and backbone networks, had been occupied by several multinationals such as Japan's NEC and Fujitsu,

¹⁵ Zhong, M. (2002, September 11). The History of China's Digital Switch. *Telecommunications Industry Newspaper*. Retrieved from <http://tech.sina.com.cn/it/t/2002-09-11/1020137952.shtml>.

the American company Lucent, Canada's Nortel, Sweden's Ericsson, Germany's Simenon, Belgium BTM as well as France's Alcatel. This was known as domination by "seven countries and eight product systems" (*qiguobazhi*). These foreign companies not only charged extremely high prices for equipment products and services but also dominated China's telecommunications technology standards. Under this situation, Chinese telecommunications operators could barely adopt unified standards or products due to fragmented markets controlled by different foreign equipment suppliers. As Ren Zhengfei stated, for Huawei as well as other Chinese homegrown telecommunications manufacturers, they had been situated in the most crucial market environment dominated by foreign vendors from the outset, which resembled the era of invasion of the "Eight-nation Alliance" in Qing China. Ren clearly recognized that technological import and adoption were unable to make the country gain independent industrial and innovation capability. Therefore, Huawei, just like the meanings of the company's name referring to "China can", re-articulated the state's nationalistic developmental discourse with the company's growth mission. Ren believed that the rise of the Chinese technological company was closely tied to the revival of the Chinese nation from its past humiliations and a means to break foreign giants' domination. This belief has been further consolidated as the bedrock of Huawei's corporate culture in its future development.

Meanwhile, apart from direct imports, Chinese policymakers have made a substantial effort for technology transfer since the mid-1980s with an attempt to promote the localization of foreign technology. However, foreign telecommunications companies had no interest in transferring their core technologies to China other than through direct sales. To facilitate technology transfer and indigenous manufacturing capability, the Chinese government encouraged foreign companies to set up jointly owned companies. But this approach was implemented with high costs. For example, China's first telecom equipment joint venture—Shanghai Bell—was founded on extremely unfair conditions

with the Belgium telecommunication company BTM: the Chinese partner had to pay BTM with high prices for technological transfer fees and key component purchases as well as the costs of \$280 per port of telecom equipment production (Harwit, 2008). In 1986 China's first production lines of digital switch S1240 were launched by Shanghai Bell. By the 1990s, most of the leading global telecom equipment vendors had established joint ventures in China (Tan, 2002). For the Chinese government, the cooperation of foreign capital and the Chinese SOEs was devised to help domestic players foster indigenous manufacturing capability on the one hand and to enable the state to maintain the ownership control in the pillar industry on the other (Harwit, 2008, p.118). These major joint ventures picked up market shares rapidly and occupied dominant positions in the early 1990s.

Nevertheless, the process of technological localization through joint ventures was slow, as core technologies as well as key components were still controlled by a handful of foreign partners. Especially after 1989 the Coordinating Committee on Export Controls (COCOM)—an organization under the control of the United States and its allies during the Cold War—imposed restrictions on high technology exports from Western countries to China. Though the geopolitical tension impeded the Chinese state's effort of technology transfer from the West, it provided an opportunity for indigenous companies' development. A turning point occurred in 1991 when the first Chinese advanced indigenous digital switch HJD-04 was jointly invented by the PLA Information Engineering University and the state-owned enterprise Post and Telecommunications Industry Corp (PTIC). This technical progress tremendously boosted Chinese homegrown companies' technological capacity as well as their nationalist pride. To further promote the large-scale commercialization of this product, a state-owned conglomerate the Great Dragon Group was founded by grouping eight other SOEs. This state-backed company obtained considerable policy support from the central government with an aim to seize

the market back from foreign rivals.

Compared to foreign telecommunications giants and government-supported companies, Huawei was completely marginalized in the market. In Ren Zhengfei's words, "Huawei had no capital, no technology, and no 'status' (meaning that Huawei was a non-state-owned company lacking the Chinese government's support). How could it be possible for a small Chinese firm to survive in the market and grow quickly?" (Cheng & Liu, 2003, p. 25.) One of the most crucial factors of Huawei's initial success lay in its strategy of exploring alternative markets that had not yet been occupied by transnational corporations and SOEs. China's uneven telecommunications market instead provided Huawei with opportunities for development. As noted by Zhao (2007b), China's unprecedented growth of telecommunications infrastructure in the reform era was compounded by an extremely uneven pattern of network expansion and service provision. Such a disparity inevitably led to the widening urban-rural divide. As of 1993 subscribers of rural residential telephone accounted for only 18 per cent of the country's total telephone subscribers (MEI, 1994). The national rural-urban gap of telephone penetration reached its peak in 1995 (Harwit, 2008, p.163). Underdeveloped provinces faced a financial deficit and a shortage of investment to construct their rural lines because the state excluded rural telephone service from its policy planning and financing (Hong, 2013, p.333).

Apart from the disparity in telecommunications service distribution between rural and urban regions, the single-minded pursuit of modernized technological upgrades also contributed to the unevenness of the domestic market. Due to the disadvantaged status of indigenous manufacturers, the agenda and patterns of China's network expansion and service provision were actually controlled by foreign suppliers. Since the early 1990s major transnational giants have aggressively lobbied the Chinese government to install

optic fiber cable arteries to upgrade national telecommunications infrastructure “in one step”. In order to reap more gains and to obtain “good records” of political performance, coastal provincial governments were eager to revamp existing network equipment with advanced foreign switching technology. But on the other side, the “leapfrogging” plan of systematic networks upgrade brought excessive financial burdens for interior provinces that were unable to afford expensive switching systems offered by foreign suppliers. In turn, this widening gap made telecommunications equipment vendors all concentrate on lucrative urban markets, excluding rural areas from basic infrastructure development and public services provision.

Contrary to foreign competitors’ profit-seeking business strategy, Huawei made a significant strategic decision that had palpable influence on the company’s future development. Inspired by Mao’s military tactic in the guerrilla war, Ren adopted the strategy of “encircle cities from the countryside” to target rural markets as well as small cities and towns in remote provinces multinational giants had neglected. In addition, under the decentralized investment regime, local telecommunications operators and authorities were able to make their own choices on equipment purchases. This gave Huawei opportunities to access potential customers in rural markets. In 1992, the company started the innovation and development of digital switches based on the needs of telecommunications infrastructure built in underdeveloped areas. To meet the demand in China’s unique rural environment, Huawei launched a “two-way” R&D model to study and solve technical problems by gathering feedback and suggestions from local Post and Telecommunications Bureaus (PTBs). In 1994 Huawei launched the HONET integrated access network and the Synchronous Digital Hierarchy (SDH) product line, becoming the first Chinese firm to install long-distance transmission equipment. In the following year the advanced digital switch C&C08 (“C” stands for countryside) was introduced in the domestic market, marking a milestone in the company’s history as well as in China’s

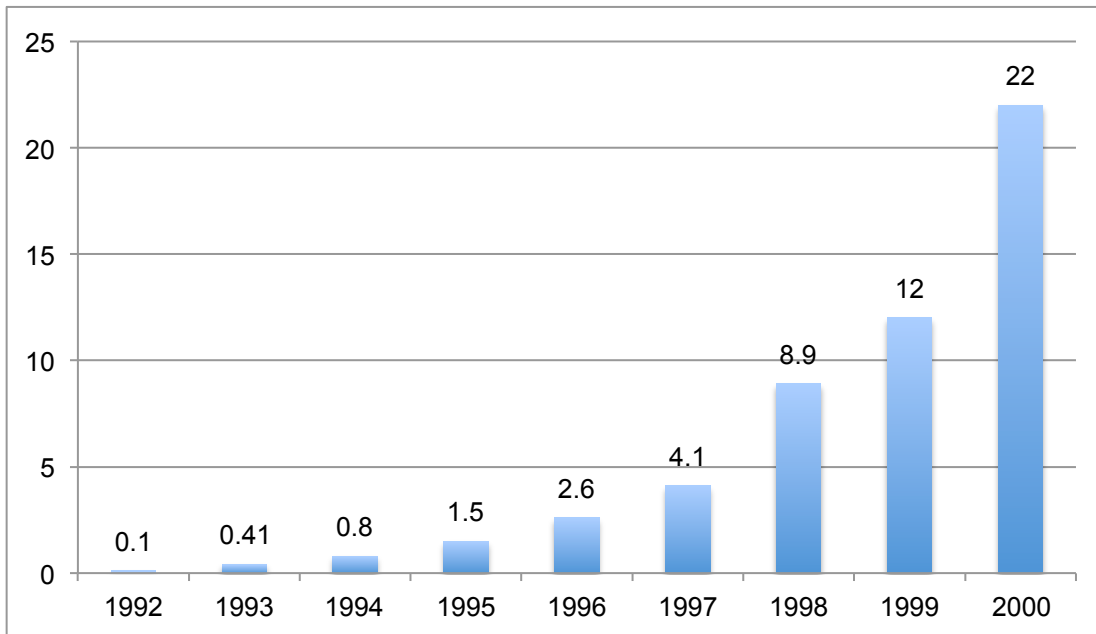
telecommunication technology development.

Huawei's self-developed digital switching technology significantly contributed to the development of Chinese telecommunication system in the 1990s. First it provided lower prices and better-quality products in the domestic telecommunication equipment market. By the end of the 1990s, the cost of Chinese switching products plummeted to \$25 per port from \$500 for foreign products. The low-cost supply of core equipment and technology not only accelerated the expansion of China's network infrastructure, but also made telecommunications services more affordable for users in underdeveloped areas. Second, apart from the large capacity of Huawei's digital switch, Huawei's switching technology was also compatible with the multi-network interoperability, which was easy to upgrade and maintain in multiple operational situations. Contrary to standardized foreign equipment that was primarily suitable in high-end urban networks, Huawei's product possessed strong flexibility and adaptability to multi-level module networking and various service provisions in China's complicated rural environment.

In addition to strong technological capacity, Huawei's considerable success can also be attributed to its unique bottom-up market strategy, or Maoist "mass campaign" strategy. It helped the company carve out a niche market in the midst of soaring competition. As major multinationals already monopolized the supply of mainstream equipment to tier-one telecommunications carriers, Huawei had difficulty in accessing telecom operators. At the beginning Ren had to use personal political connections to obtain contracts from local PTBs. A turning point occurred in 1993 when Huawei successfully deployed its self-developed switch in Yiwu, a small city of Zhejiang province, which helped the company gain reputation and recognition. Subsequently a nationwide market network gradually formed. The company's sales staff and technicians penetrated deep into numerous small counties and townships across China to establish their "rural

bases". For example, Huawei's major foreign rival Ericsson had only three or four employees working on telecom networking systems in Heilongjiang Province. In contrast, Huawei sent over 200 people to live and work in county towns and small cities across the province starting in the early 1990s. This "mass campaign" strategy helped the company build up supply chains quickly. In addition, the company also chose to ally with PTBs and municipal governments to set up joint ventures. In order to gain support from local governments and telecommunications operators, Huawei promised to allocate 33 per cent of sales profit as dividends to local PTBs stakeholders. This bottom-up market strategy, which fundamentally distinguished Huawei from foreign rivals' urban-centric approach, helped it gain a firm foothold in marginalized markets. In addition, under the state's auspices of "telephones to every village" starting in the mid-1990s, Huawei became the largest supplier in China's rural telecommunications equipment market in 1995 with annual sales revenue of ¥1.5 billion. By 1998 Huawei's revenue had increased six-fold to ¥8.9 billion, the majority of which came from rural areas. At the same time, the company managed to obtain almost a quarter of the domestic market share in public switched telephone network, overtaking Shanghai Bell as the largest manufacturer of digital automatic switches in China (Harwit, 2008).

Figure 2.1: Huawei's Annual Sales Revenues, 1992-2000 (RMB billion)



Source: The Yearbook of China's Electronics Industry (1993-2001).

Huawei's rise in the 1990s, among other things, was also closely related to the state's policy shift in the telecommunication equipment sector. The embargo initiated by the West in 1989 not only made the Chinese state realize the strategic importance of commanding core information technologies related to national development, but also further strengthened the state's determination in breeding its own homegrown companies with competitive capabilities. Fueled by techno-nationalistic discourse, Huawei also persistently promoted its corporate image as a source of "national pride" and institutionalized the nationalistic value of "serving the country through industrial development" (*chanyebaoguo*) as well as "rejuvenating the state through science and technology" (*kejiaoxingguo*) as the corporate tenet. It is important to note that Huawei's discourse of nationalism was more than a public relations strategy. Throughout Huawei's early stage of development, Ren kept challenging the post-Mao technological development policies that hinged the hope of technological modernization on the acquisition and indigenization of advanced Western technologies. In Ren's words:

If market was completely lost under “trading market for technology”, which technology was really mastered? It is painful to realize that without our own core technology the independence of our industry would be only an empty slogan. Without an independent national industry would there be no independence of a nation.¹⁶

In 1994 when Jiang Zemin visited Huawei, Ren explicitly advised that, “switching equipment technology was related to national security. And if a nation did not have its own switching equipment, it was like a nation without its own military” (Harwit, 2008, p.128). Ren’s advice was eventually adopted by the central leadership. In 1996 the Chinese government ended preferential import policies for foreign digital switching equipment, and at the same time domestic manufacturers enjoyed discounts on sales-related taxes and priority of government procurement. Under the state’s selective import-substitution policy, a few national telecommunications equipment manufacturers, represented by Great Dragon, Datang, ZTE, and Huawei (the so-called *judazhonghua* according to the first characters of these four companies’ names), have successfully broken the market entrenchment dominated by foreign TNCs. By the end of 1990s, Chinese-made switching equipment had taken 75 per cent domestic market share in the fixed-line transmission sector (Harwit, 2008). Huawei has achieved its tremendous breakthrough in the high-tech market and leaped forward to the next stage of development.

The Second Stage: Developmental Dilemma in the Neoliberal Restructuring

Throughout the 1990s the Chinese ICT manufacturing industry sustained hyper growth with more than 30 per cent annual average growth rates. By the end of the Ninth Five-Year plan (1996-2000), the output of the electronic industry had amounted to ¥1061.4 billion, accounting for the largest share of the national economy (MII, 2001); the

¹⁶ Ren, Z. (1995, December 26). *The Current Situations and Our Tasks*. A speech in Huawei’s marketing department meeting.

fixed-asset investment of the ICT industry had reached ¥97.4 billion; and the growth rate of investment was three times of the rate of GDP growth. With the boom of telecommunications development, the telecom equipment manufacturing sector demonstrated the fastest growth with the output of ¥24.95 billion at the spectacular average growth rate of 73 per cent. Particularly, the output of Chinese-made exchange switch had surpassed 44 million ports, ranking first in the world (MII, 2001).

The telecommunications network expansion was also remarkable as a result of the state's intensified investment. In the first half of the 1990s, China installed more than 73 million phone lines, more than all the rest of developing countries combined (Lu & Wong, 2003, p.4). This has made China one of the largest telecommunications networks in the world. By 2000 the number of telephone subscribers (including fixed-line phone and mobile users) had surpassed 200 million, ranking it second in the world. Switchboard capacity also leaped from 4 million lines prior to 1985 to 179 million in 2000 (ibid). As discussed above, Chinese indigenous telecommunications equipment manufacturers significantly benefited from the state-initiated ICT development and selective import-substitution policy. However, at the turn of the century, the Chinese ICT industry underwent the drastic neoliberal restructuring especially upon China's accession to the WTO. This shift in the policy regime brought tremendous challenges to indigenous companies again and directly changed Huawei's developmental trajectories in its growth model and market expansion.

Starting in 1998 a new round of structural reforms, which was primarily focused on corporatization and deregulation, was launched to escalate the process of liberalization in the telecommunications sector. This dramatically shifted Chinese telecommunications carriers' priority from public service provision to profit-oriented business activities. This change further institutionalized the pervasive urban bias in network buildup and

undermined the carriers' investment incentive in rural telecommunications development. In addition, a discourse advocating a move from the "telephony era" to "post-telephony era" had come to dominate the agenda of the telecom reform. According to this view, the priority of telecommunications development should be given to the provision of more advanced communication services such as mobile communication for enlarging customer bases in the high-end market over simple infrastructure-building for basic telephony. Under this wave of neoliberal restructuring, the uneven pattern of China's telecommunications development was further entrenched. The promise of making "telephone access in every administrative village" in the Ninth Five-Year Plan eventually turned out to be a failure. By the end of 2000, only 82.9 per cent of administrative villages across the country had telephone access, a nearly 20 per cent short of the state's target (MII, 2001). Rural telephone expansion further stagnated in the 2000s with a slow rate of increase at the beginning of the Tenth Five-Year Plan (2001-2005). As a result, demand for network infrastructure equipment in rural areas was largely ignored by telecommunications operators, which further squeezed Huawei's market growth and revenues. Although Huawei's strategy of "encircling cities from the countryside" to some extent incorporated Ren's initiative of serving the goal of communicative equality, market pressures compounded by profit incentive forced Huawei to shift the focus from rural markets to urban areas. Since 1998 Huawei has gradually obtained contracts from first-tier operators in developed regions, generating considerable profits from the surge in urban demand. By 1999 Huawei's profit amounted to ¥1.7 billion, far outperforming other Chinese indigenous ICT companies and ranking top on the list of "China's 100 Strong Electronics Companies" (MII, 2000, p.290).

Though Huawei as well as other Chinese manufacturers had dominated the digital switch market by the end of the 1990s, the profit margin for sales of fixed-line switching was in decline. The growth rate of fixed-line telephone subscribers also slowed

considerably. Meanwhile, as part of the neoliberal reform agenda, the Chinese government made special efforts to reduce the degree of cross-subsidization in telephone service rates with an attempt to promote domestic competition. In 2000, the Ministry of Information Industry (MII) along with the State Development and Planning Council (SDPC) and the Ministry of Finance (MOF) jointly announced cuts of more than 50 per cent to telecom service fees and the elimination of fixed-line telephone installation fees (Lu & Wong, 2003, p.81). The increasingly saturated market along with the speedy decline of profit in the fixed-line telephone segment drove foreign manufacturers to withdraw from the Chinese digital switching equipment market and cultivate new areas for capital accumulation. As noted by Tan (2002), foreign multinational corporations may have strategically chosen to sacrifice the market share of low-end, mature products in exchange for predominated positions in high-end products (p.25).

Meanwhile, China's telecommunications market expansion has also been driven by the unprecedented growth of mobile networks and services. The first generation of Chinese mobile communication services started in 1987 in Guangdong province with an initial 700 subscribers. Since the early 1990s mobile communication has been regarded as "the priority of all priorities" in the national development plan (Zhao, 2000, p.47). As a result of escalated mobile network expansion, Chinese mobile phone subscribers increased from 3.63 million to 84.53 million with more than 80 per cent annual growth rate from 1995 to 2000 (MII, 2001). By July 2001 the number of China's mobile phone users was 120.6 million, surpassing that of the US and constituting the world's largest mobile phone subscriber base. By the end of 2003, Chinese mobile phone users reached 230 million, surpassing fixed-line telephone subscribers for the first time.

Though the explosive market expansion made China an indispensable growth engine of the world's ICT industry, Chinese indigenous telecommunications equipment

vendors had to face head-to-head competition vis-à-vis transnational rivals. As part of the negotiations on its accession to WTO, China agreed to open up the telecommunications sector and liberalize its trade and investment regime. For example, in 1995 the state council approved the catalogue of industries opening up for foreign capital, encouraging foreign direct investment in telecom-related products. Moreover, according to the terms of agreement on WTO Information Technology Agreement (ITA), China promised to eliminate import duties on a large number of ICT products including mobile telecommunication equipment. This rule led to a considerable influx of foreign advanced mobile communication products that neither indigenous companies nor joint ventures had capacity to produce at that time (Tan, 2002). In addition to trade liberalization, China has also gradually lifted foreign ownership control in the telecom manufacturing sector. These liberalization policies directly exposed indigenous firms to international competition.

At the same time, transnational vendors sought to explore the booming Chinese market as a powerful impulse to renew capital accumulation. Leading global manufacturers all increased investment in China through large-scale M&A. For example, in 2000 America's Emerson Network Power acquired Huawei's subsidiary for US\$750 million, making it one of the largest M&A deals in China's ICT industry at that time. In the same year, Alcatel spent US\$312 million to buy a controlling share of Shanghai Bell. Other transnationals such as Ericsson and Motorola also sharply increased their capital and R&D inputs in the Chinese market.¹⁷ The involvement of FDI constituted a dominant force in restructuring Chinese ICT market structure.

China's neoliberal reform became tangled with the market imperative of transnational business power as well as domestic players' struggles. Such political

¹⁷ Liu, X. & An, J. (2001, December 18). International Telecom Giants Struggle to Seize China's Telecom Market. *The Economics Daily*. Retrieved from: <http://www.china.com.cn/chinese/EC-c/87691.htm>

economic dynamics rendered China's telecommunications industry more conflicts in policy-making and market competitions. At the core of these struggles was the deployment of mobile network standards. In 1995 China Unicom and China Telecom respectively announced they would adopt the European-backed GSM standard under the lobbies of leading European equipment manufacturers such as Ericsson, Nokia, Siemens and Alcatel. In tandem with the state's developmental plan for mobile communications, Huawei also started the research and development of GSM equipment in 1995. In 1997 Huawei released China's first independently developed GSM system and initially deployed the commercial network in Inner Mongolia in the following year. To strengthen the technological capability, Huawei teamed up more than 500 scientists, researchers and engineers and spent more than ¥1 billion in the GSM system development. However, foreign vendors that had withdrawn from the fixed-line telephone equipment market came to launch price wars against Huawei to prevent Chinese firms from entering the new lucrative market. As these foreign manufacturers not only had advanced infrastructure building capacity but also dominated the 2G handset market, they were allowed to use extremely high profits from sales of handset products to cross-subsidize the high cost of the network equipment sector. After Huawei released its 2G network products, foreign vendors gradually reduced the price to 900 yuan per line, far lower than Huawei's 1200 yuan per line. Noticeably, after a surge of foreign capital in the mobile equipment manufacturing industry, the cost-competitive advantage Chinese indigenous manufacturers had enjoyed in the fixed-line digital switching market appeared to be irrelevant in the emerging mobile communications market. In 2000, Chinese manufacturers only acquired 3%, 5% and less than 7% of the home market share for GSM transmission towers, mobile switches and handsets respectively.¹⁸

¹⁸ Zhang, L. (2001, July 1). CDMA Development in China. *China Business*. Retrieved from <http://www.people.com.cn/GB/it/49/4695/20010601/479744.html>

To overcome this challenge from leading global vendors, Huawei implemented the strategy of “encircling cities from the countryside” again to explore market opportunities. Specifically, the company invented a GSM scheme called “Edge Network”. This innovative solution had the advantages of “large-scale coverage, low cost and high speed” in comparison with foreign products. It also allowed telecom operators to provide 2G mobile service coverage in vast rural areas and unconnected communities which were perceived as “dead zones of telecommunications networks”. In addition, Huawei’s GSM base stations that were designed for rural areas featured flexibility in onsite installation and deployment. This network solution was widely deployed in Guizhou, Hunan, Sichuan, Liaoning and other underdeveloped regions. Nevertheless, given the extremely high costs of rural communications infrastructure build-up and maintenance as well as low mobile customer base, major telecom operators had no investment imperative for network expansion in these remote areas. This policy bias excluded Huawei from the mainstream mobile equipment market and trapped the company in a long-term period of losses in the domestic wireless sector. By 2005, Huawei as well as other Chinese vendors only accounted for less than 10% market share in the domestic GSM equipment market (Mi & Yin, 2005, as cited in Hong, et al., 2012, p.918).

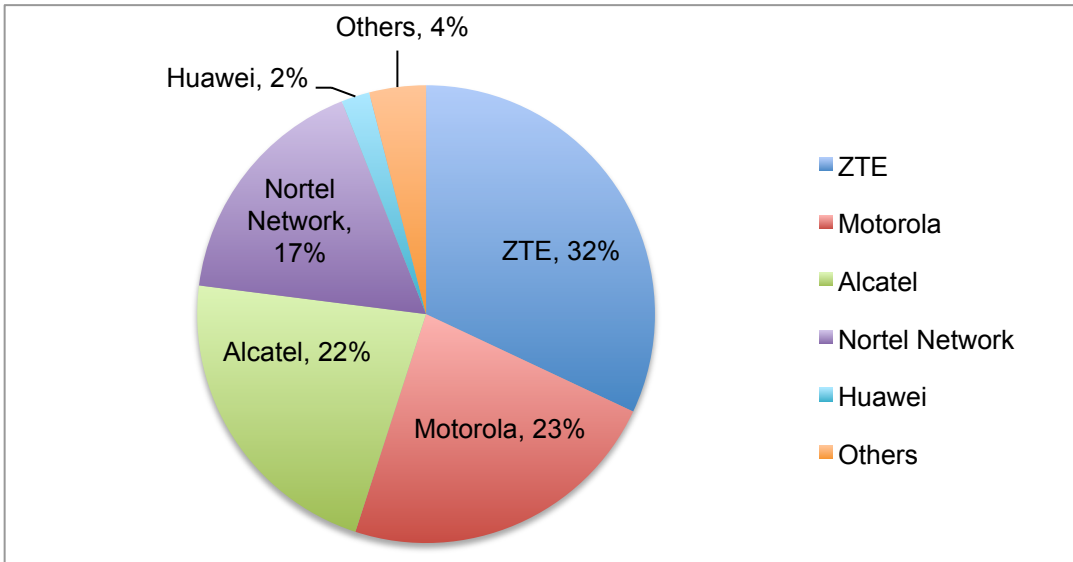
Under pressures of the US government and American telecommunications firms, in 2001 China Unicom officially introduced the US-based CDMA standard for high-end markets with an initial investment of ¥24 billion on network build-out. Different from the open GSM system, CDMA charged equipment manufacturers with excessively high royalties for networks and handset production. As a result, Qualcomm, the owner of the majority of CDMA standard patents, along with other North American-based licensed manufacturers such as Motorola, Lucent and Nortel, dominated China’s CDMA market. As the enclosed CDMA system set a high barrier to new market entrants, the state-backed ZTE was the only Chinese manufacturer that had the capacity to provide a

full range of CDMA equipment and network solutions, including base stations, mobile switches, intelligent networks and mobile phones. Despite foreign domination in the home market, ZTE still won a slice of the China Unicom's CDMA network expansion plan with its patented equipment. Later with the state's policy support, ZTE gradually established a preferable position in CDMA markets along with its global expansion. By the end of the 2000s, ZTE had become one of the largest suppliers in global CDMA markets: it acquired one-third of the Chinese market and topped global CDMA markets with a 30% market share.¹⁹

In contrast, due to the lack of capital and R&D input, Huawei's initial development in CDMA technologies was much slower than its foreign and domestic rivals. By 2007 the company's home market share was less than 2 per cent (Figure 2.2). To pick up the market share in one of this most lucrative communications sectors, Huawei launched bloody street battles with foreign manufacturers and ZTE in the late 2000s when Huawei already achieved considerable success in oversea markets. In 2008, China Telecom spent a huge amount of ¥110 billion acquiring CDMA services from Unicom. In order to occupy an advantaged position in the bidding for China Telecom's CDMA projects, Huawei offered extremely low prices for selling its network equipment, only 1 out of 20 of Alcatel-Lucent's bidding price and 1 out of 10 of ZTE's price. Through the most crucial price wars, Huawei managed to acquire 30 per cent of China Telecom's contracts (Figure 2.3) and the opportunities to enter some strategic cities such as Beijing, Guangzhou, Tianjin, Shanghai, and others.

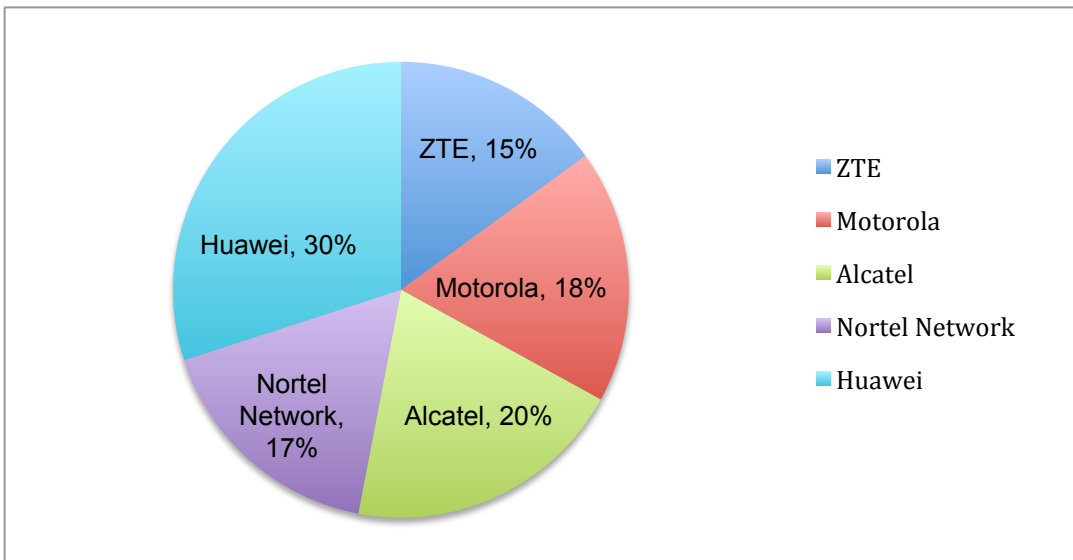
¹⁹ ZTE Company History. Retrieved from http://www.zte.com.cn/pub/en/about/corporate_information/history/

Figure 2.2: 2007 China's CDMA Equipment Market Share



Source: China Telecommunications Website C114. Retrieved from <http://www.c114.net/topic/614.html>

Figure 2.3: 2008 China's CDMA Equipment Market Share



Source: China Telecommunications Website C114. Retrieved from <http://www.c114.net/topic/614.html>

Huawei's move from a manufacturer in low-to-medium-end products to a supplier of China's backbone networks equipment exemplified the dilemma and struggle Chinese indigenous firms faced in the country's structural transformation. Noticeably, China's

overheated telecommunications market expansion during the 2000s not only drove redundant investment in wasteful network resources, but also led to oversupply of telecom equipment capacity. This was a critical juncture for Huawei to adjust its internal accumulation mode amid the crisis of overcapacity to regain its domestic market status.

The Third Stage: Regaining Domestic Market Status in the Post-Crisis Era

In view of the extremely uneven mode of China's ICT development as well as the erosion of the home market by multinationals, Huawei was forced to "escape" from the domestic market and shifted its focus to overseas expansion. Since 2000, Huawei's revenues and profits have been forcefully driven by international demands. By 2005 Huawei's overseas sales reached US\$48 billion, accounting for 58 per cent of total sales.²⁰ Since then Huawei's overseas sales have been far outperforming its domestic sales. Though Huawei's internal accumulation grew steadily, the FDI-dependent policy underpinning China's neoliberal-oriented telecom reform became the greatest challenge to Chinese indigenous firms. Especially the "historical loss of the domestic 2G market" utterly exemplified the failure of China's liberalized industrial policy, which made it more difficult for the country and its domestic players to reverse technological dependence (Hong, et al., 2012, p.919). To overcome such difficulties, Huawei started to make some strategic changes, with an aim to recapture the domestic market power and rebuild its advantages in internal accumulation.

First, instead of remaining entrenched in a downstream position in the telecommunications industry, Huawei strove to climb up the global value chain by establishing itself as a comprehensive "ICT solution provider". While Huawei has gained tremendous manufacturing capability and achieved enormous success in the telecom

²⁰ Huawei 2005 Annual Report.

equipment market, the core of global competition in the ICT industry has changed from manufacturing to networking innovations. This change has made the cost-efficient advantage Huawei gained in the fixed-line and 2G mobile network era less competitive in the ever-changing technological environment. This also gave fuel to Huawei's restructuring for its developmental strategies, moving from a telecommunications equipment manufacturer to a leading ICT solution provider. It means Huawei was no longer constrained in low-end and low value-added mass production, but tended to extend its control over the whole value chain with higher technological sophistication and more comprehensive innovative capacities. The company's strategic change was in accordance with the Chinese state's most recent industrial restructuring that aimed to reach a self-sustaining innovation trajectory. This trend of restructuring was exemplified in China's initiative of developing the homegrown 3G standard TD-SCDMA. This move is better seen as a "delinking strategy" to nurture Chinese indigenous technological standards on the one hand and to further promote domestic firms by fostering a relatively independent domestic market on the other (Hong, et al., 2012). Though Huawei's investment in the TD standard was limited due to its pragmatic attitude toward this questionable technology, there is no doubt that the build-up of "a China-only accumulation regime" (ibid) provided vast opportunities for Huawei along with other Chinese indigenous firms to regain their domestic market share that had been ceded to foreign rivals in the 2G era. In 2010, the three domestic companies ZTE, Huawei and Datang Telecom respectively gained 34.2%, 31.0% and 13.4% market share in China Mobile TD-SCDMA market, creating competitive advantage as well as full-range value chains in the 3G market. In this process of technical standard-setting, Chinese indigenous ICT firms not only acted as equipment suppliers, but also became involved in the activities of standard innovation and infrastructure buildup. This enabled these domestic champions to change their role from a technology follower to a technology

definer. This nationalistic technological program also benefited Huawei in its strategic change to strengthen its role as an “ICT solution provider”.

Second, Huawei tended to diversify its business structure and expand its operations into more ICT-related domains in order to reduce its dependence on the telecommunications network business segment. As analyzed above, the rapid growth of Huawei was attributable to the impetus of China’s telecommunications revolution from the late 1980s onward. The explosive expansion of China’s network construction made the carrier network business the company’s most lucrative segment. However, excessive and blind investment in network upgrade vis-à-vis the increasingly saturated market has inevitably led to the crisis of overcapacity in the carrier network business. Moreover, tensions between national security concerns and the rules of neoliberal competition also exploded into economic and political conflicts in international markets, which led to unilateral protectionist measures in some countries. These factors all posed challenges to Huawei’s steady growth in the field of network business and thereby motivated the company to expand its operations to the segments of enterprise business and consumer devices.

In the area of enterprise business, while Huawei remained far behind its main foreign competitors such as Cisco, the company has claimed strength in most recent years by focusing on high-value industries and the most innovative ICT technologies including cloud computing, big data, Software-defined networking, and the Internet of Things. This rapid growth came about as a result of increased capital spending from the transnational business classes that were clamoring for the build-up and enlargement of “enterprise networks” and an ICT-enabled industry ecosystem. As Schiller (2014) argues, the process of “attaching profit imperatives to connectivity” generated new sites of commodification that formed and stimulated market growth (p.87). This “recomposition”

of network ecosystem on the other hand provided vast market opportunities for ICT companies to assume the role as suppliers of network “plumbing”. Apart from market demands, Huawei’s growth in the domestic enterprise segment was also a result of the Chinese state’s protectionist policy. Especially in the aftermath of Edward Snowden’s revelation, network security has become the key concern for the Chinese state to reshape its ICT-related industrial strategies. There has been a trend toward the government choosing to replace foreign suppliers with domestic firms in strategic sectors such as in the public safety, finance, transportation and energy to ensure the state’s control over backbone networks and information. As a result of this protectionist policy, Huawei has quickly gained local market share at the expense of that of foreign rivals. In 2015, Huawei’s revenue in the domestic market has grown 54.3 per cent, accounting for 42 per cent of the company’s overall revenue.²¹ In contrast, some US multinationals including Cisco, Apple, IBM, and Qualcomm are facing considerable revenue decline in the Chinese market.

Another significant change of Huawei’s accumulation was signified by its strategic focus on the consumer device business segment since 2012. As noted by Schiller (2014), consumer devices had tremendous impacts on the recomposition of network commodity chains. Consumer demand for ubiquitous access to network services generated a new profitable site of capital accumulation. Unlike other leading global brands that built upon a large user base, Huawei only started its handset manufacturing business in 2003. Before Huawei created its own brand of consumer devices, the company primarily played the role as an original equipment manufacturer (OEM) for leading global brands such as Motorola, Siemens, as well as for major telecom operators including Vodafone, PCCW and Emobile. The explosive expansion of mobile communication in China in the early

²¹ Huawei 2015 Annual Report. Retrieved from http://www-file.huawei.com/~media/CORPORATE/PDF/annual-report/AnnualReport2015_en.pdf

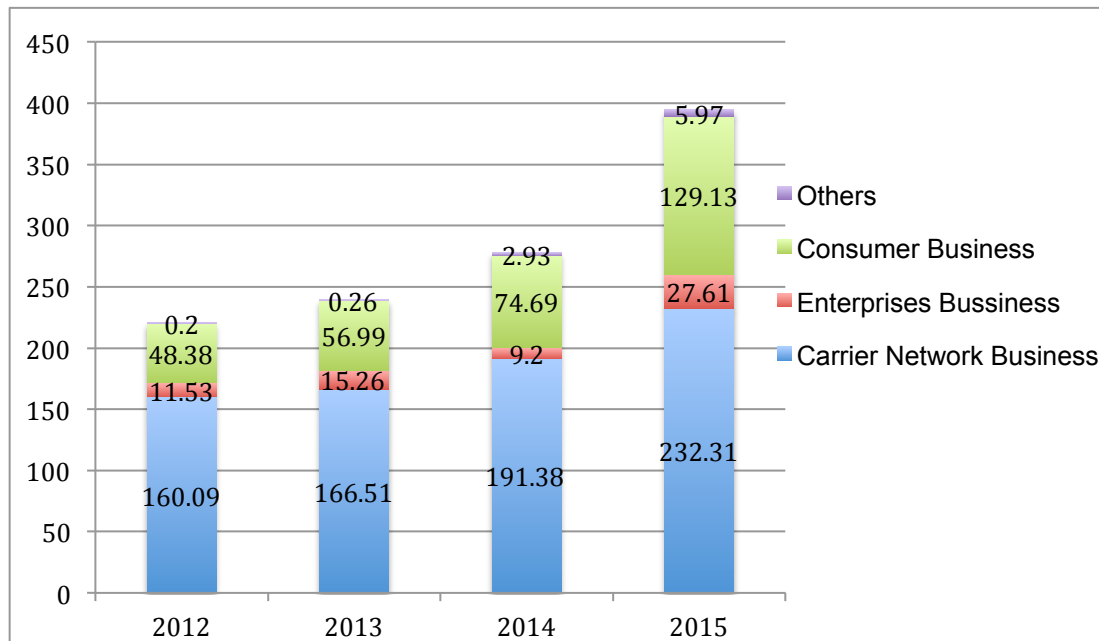
2000s motivated many other Chinese domestic electronics manufacturers such as TCL, Haier and Lenovo to rush into the handset market. However, these domestic manufacturers relied heavily on the practice of importing key components and assembling them into branded final products, which entrenched them in the downstream position of the global supply chain. On the contrary, Huawei fostered a completely different business model from its peer vendors. Since 2012 Huawei has been motivated to develop its own branded consumer devices because of the serious challenge to its carrier network business segment. Along with its advanced hardware manufacturing capabilities, Huawei leveraged its expertise in network technologies as well as innovation in core technologies and design capacity. Instead of providing low margin “cheap” devices, the company determined to renew its focus on the high-end market in most recent years to build up a globally recognized brand. The strong core technological competences combining its strengthening marketing strategies enabled the company to expand rapidly in the consumer device market. From 2012 to 2015, the sales revenue of Huawei’s consumer business segment grew from ¥48.376 billion in 2012 to ¥129.1 billion in 2015, which has become the company’s another major source of revenue and profit.²² By 2013 Huawei was the world’s third largest smartphone maker after Samsung and Apple. The huge demand from China’s domestic market primarily contributed to Huawei’s rapid growth. Benefiting from the state’s “de-linking strategy”, Huawei along with other domestic new comers including OPPO, vivo, and Xiaomi dominated the Chinese smartphone market with more than 56% market share.²³ The changing market dynamics generated more market opportunities for Huawei and other domestic players to catch up and foster competitive advantage. It not only enabled Huawei to set the pace for recomposition around consumer demands, but also reoriented the company’s internal

²² *ibid.*

²³ King, H. & Yan, S. (2016, August 25). These Smartphone Makers Are Beating Apple in China. Retrieved from <http://money.cnn.com/2016/08/25/technology/apple-china-smartphone-rivals/>.

accumulation mode by leveraging the domestic demand-driven growth model.

Figure 2.4: Huawei's Revenue by the Business Segment from 2012 to 2015 (RMB billion)



Sources: Huawei Annual Report (2012-2015)

Conclusion

This chapter places the story of Huawei against the backdrop of China's historical industrial development that was rife with twists and contradictions. To some extent, Huawei's developmental trajectory exemplifies Chinese homegrown ICT firms' endeavors, hopes, and dilemmas in the process of China's ICT-driven development. At the same time, it is worth emphasizing that the paradoxical state policies also created a distinct internal accumulation regime for Chinese corporate players. The entangled relations between the Chinese state, Chinese companies and transnational capital are illustrated in Huawei's development.

The rise of Huawei was deeply rooted in China's digital "leap forward" strategy. It

came to symbolize a continuity of China's nation-centric developmental inspiration and the legacies of self-reliant development on the one hand, and was enmeshed with the country's aspirations of reintegration into transnational informationalized capitalism on the other. The unleashed market imperative coupled with the state's catch-up initiative has created an unprecedented opportunity for the growth of domestic ICT firms. Huawei was clearly the key early beneficiary of the state's market-oriented industrial restructuring and telecommunications revolution starting in the 1980s. But at the same time, the Chinese state's pursuit of the developmental strategy through exchanging market access for technology access has also led to the loss of China's burgeoning markets to foreign companies and stifled fledgling Chinese domestic firms in their initial stage of development. This uneven mode of development has further generated structural dependence on imported technology and foreign capital and has shaped China's ICT industries in a way to "serve as a downstream industrial cluster in the globalized chain of production" (Hong, 2011, p.80). Despite these substantial development dilemmas, Huawei still managed to adopt an alternative mode of development to break away from technological dependence by leveraging its research and development capacities as well as its distinct market strategies. The unevenness in China's domestic market, which was primarily characterized by the concentration of foreign capital in the urban high-end market, motivated Huawei to explore alternative markets in the rural region. It also helped the company gain some maneuvering space and establish a distinct capital logic of internal accumulation. It is important to note that the state's import-substitution policy in the fixed-line equipment sector also contributed to Huawei's growth in this relatively mature market segment. However, the deepening neoliberal reform especially the Chinese state's aggressive initiative to leapfrog into the era of mobile communication since the 1990s has led to the consolidation of foreign giants in the domestic ICT market, which also directly engendered threats to domestic corporate players in rapidly

expanding markets. The eroding market space as well as competitive pressure forced Huawei to explore overseas markets to evade foreign rivals at home and create a new growth engine abroad. To some degree, Huawei's choice of internationalization at the beginning was merely a defensive strategy against transnational capital power rather than a preemptive or aggressive strategy driven by expansionary initiative. This "inside-out" strategy constituted one of the distinct characteristics of Huawei's transnationalization. In the next two chapters, the trajectory of Huawei's expansion into the global South and global North is unfolded in details. The formation of its transnational accumulation regime, expansionary patterns and implications are discussed.

Meanwhile, in parallel with Huawei's success in overseas markets, the company began to give more priorities to the domestic market especially to China's burgeoning enterprise and consumer markets in most recent years. It is important to remind that the Chinese state's efforts in restructuring and realigning its ICT sector after the financial crisis of 2008 has created indispensable conditions for Chinese indigenous firms' rapid growth in their home market. Specifically, the state's project that aimed to foster the domestic demand-driven mode of development to some extent motivated Huawei to shift its strategic focus from international markets to home market, or an "outside-in" trajectory, in the current stage of development. On the other hand, the Chinese state's initiative in regaining "technological sovereignty", in conjunction with domestic corporate players' cooperation, is conferring more market power on a handful of Chinese ICT conglomerates vis-à-vis foreign multinationals' declining influence in the Chinese market. In the post-Snowden era, Huawei might face more opportunities and possibilities in its domestic accumulation along with the Chinese state's ongoing process of industrial restructuring.

Chapter 3.

Going Global: Outward Expansion into the Global South

Huawei's development was fueled by numerous contradictions in its cycle of internal accumulation, which exemplifies domestic firms' follies and dilemmas in their paths of development. The influx of foreign capital and technology squeezed market share and posed a serious threat to the survival of Chinese indigenous ICT firms. In addition, China's ICT market was caught by the crisis of overcapacity, which pushed domestic players to explore alternative spaces for capital accumulation. The "attracting-in" policy merely represented one side of the Chinese state's initiatives for its reintegration into the global economy. The ultimate end was to "go out" by nurturing a number of "national champions" that could compete in international markets with the world's leading transnationals. At the forefront of this policy agenda emerged a number of ICT companies that were conceived as significant forces of China's outward-looking initiatives. The following two chapters focus on the expansion of China's corporate power in the South and the North via an analysis of Huawei. Following an overview of the evolution of China's external economic policies and the formation of the country's "going-out" strategy, this chapter provides a detailed account of the initiatives and patterns of Huawei's outward expansion in the global South.

The Evolution of China's Foreign Trade and International Investment Regime

Chinese TNCs' growing presence in international trade and investment has increasingly grasped the world's attention. However, a large number of existing studies

merely focus on micro-level firm strategies of internationalization, failing to incorporate an analysis of institutional foundations and geo-economic factors that shape the drivers and instruments of Chinese firms' outward expansion (Backaler, 2014; Deng, 2010; Yeung, Xin, Pfoertsch & Liu, 2011). It should be noted that the growth of Chinese enterprises and their transition into TNCs are closely related to China's global strategic balance in the ever-changing international environment and global political economic factors. The firm-state relationship is even more significant when considering the far-reaching influence of the globalization of "corporate China" (Wu, 2005). This section first provides an overview of China's foreign trade and international investment regime in the ICT industry, which laid the institutional framework for Chinese ICT firms' outward expansion.

From Self-sustaining Mode to "Opening-up" Process

As discussed in Chapter 2, Soviet technology imports jumpstarted the initial development of China's electronics and telecommunications industries in the 1950s. Nevertheless, foreign trade played a peripheral role under China's self-sufficient mode of economic development throughout the Mao era. With the moral and political value of "Third World Internationalism" advocated by Mao, 'preinternationalization activities" were established in the form of economic and technical aid to Third World countries (Yang & Stoltenbery, 2008). By the end of the 1970s, China had spent an average of at least US\$350 million a year on foreign aid (Brautigam, 2008, p.203). More importantly, China's involvement in the struggle of Third World countries for their independent development as well as China's political alliance with these countries during the Mao era left tremendous legacies for China's reintegration into the world economy and paved the way for Chinese firms' engagement in these areas.

Since 1978 the opening-up policy has been embraced as one of the fundamental principles of the country's developmental strategy. Nevertheless, over the past several

decades the “attracting-in” policy has actually become a predominant form of China’s external economic policy and a driven engine of Chinese economic development, which not only completely replaced Mao’s “self-reliant” tenet but also paved the way for greater unevenness in the domestic development. Moreover, the pragmatic principle of “win-win” development in foreign policy along with China’s embrace of globalized capitalism came to superimpose over the deep-rooted ideology of Mao’s “Third World internationalism”. Accordingly, the country’s foreign diplomacy strategy has gradually been moved away from “economy serving diplomacy” to “diplomacy serving economy”(Li, 2008, p.22). Under pragmatic foreign policy, the volume of foreign aid to developing countries declined dramatically, while the value of China’s reception of foreign aid from Western countries and institutions significantly increased.

During the 1980s, Chinese firms’ outward economic activities were mainly constrained in foreign trades and project subcontracting, not involving large-scale capital investment. China’s first export of electronics products can be dated back to 1956, but the categories of export products and destination markets were limited. By 1980, the actual amount of electronic goods exports was under US\$10 million (MEI, 1986). Low-tech products such as radios, telephones, and electronic tubes were primarily exported to Hong Kong and Southeast Asian countries. In April 1980, the state-owned China National Electronics Imp & Exp Corp. (CEIE) was established, monopolizing imports and exports of electronics goods and overseas engineering projects. With the state’s support, CEIE has become one of China’s largest electronics trading companies. During the early 1980s, state-owned electronics companies were the primary actors to undertake the country’s foreign trade activities.

FDI-dependent, Export-oriented Foreign Trade Regime

Along with internal industrial restructuring, foreign trade especially export-oriented

trading activity was advocated as one of the most important strategies to promote China's ICT industry. With regard to the relationship between domestic demands and overseas exports, Li Tieying, former Minister of the Electronics Industry, emphasized that China's ICT production had to give priority on "foreign markets first and then domestic" (*xianwaihounet*) (MEI, 1986). In 1993 the then-Minister of the Electronics Industry Hu Qili further addressed that: "China's ICT industry has to be market oriented, to integrate the domestic to international markets, to promote the internal growth through external market, and to accelerate the fast growth of the industry" (MEI, 1994). This "16-word" development strategy has become bedrock principles of China's ICT industry, further consolidating China's market-oriented and export-led development regime.

Under these guiding principles, China's exports of ICT goods witnessed impressive rates of growth for decades. The amount of China's ICT goods exports escalated from US\$10 million in 1980 to US\$59.12 billion in 2010, accounting for 37.5 per cent of China's total exports (MIIT, 2011). In global markets, China overtook Japan and the European Union in 2003 to become the world's second largest exporter, and then surpassed the United State in 2004 to become the largest ICT exporting country. Noticeably, the sector of telecom equipment consisted of the largest share of China's ICT exports. In 2010 China exceeded EU to become the largest exporter of telecom equipment products. China's share in the world exports of telecom equipment reached 38 per cent in 2013.¹

It appears that the ICT sector has become a pillar industry supporting China's export-oriented trade regime and the country's leading role in globalized information economy. However, China is far from becoming a global technology power in light of its extremely uneven ICT trade system. In fact, the growth of China's ICT trade was primarily driven by foreign-invested enterprises (FIEs) including wholly foreign owned enterprises (WFOEs), joint ventures (JVs), and foreign cooperative JVs. Especially after China's

¹ WTO (2014). International Trade Statistics 2014. Retrieved from https://www.wto.org/english/res_e/statis_e/its2014_e/its14_highlights2_e.pdf

accession into WTO, FEIs have accounted for over 80% of the country's ICT exports, nearly all in the forms of export-processing and assembling (MIIT, 2011). Although the involvement of foreign capital and oversea market demands have been reduced considerably since the financial crisis of 2008, WFOEs' share of exports still accounted for over 50 per cent of total values as of the end of 2013 (MIIT, 2014). However, it is important to observe a tendency that China's domestic firms especially private firms have experienced inexorable growth in their exports. In 2013 the export value of domestic firms amounted to US\$19.58 billion, contributing to 27.5 per cent of total exports. Noticeably, the exports by indigenous private firms increased 55.4%, consisting of the strongest force of growth in all sectors of exporters (ibid).

China's emergence as a key player in global ICT production and trading structure has complex implications. First and foremost, China's integration into the global ICT industrial order has increasingly changed the regionalization of the ICT industry value chains and intra-trading relationships. Since the 1970s, Asia has already emerged as a pivotal regional pole of the ICT production and a trading center. Within these regional networks, China has increasingly assumed a role of "nodes" or pivotal points of these networks by overtaking labor-intensive manufacturing activities from other traditional Asian export manufacturers such as Japan and the four Tigers. Meanwhile, Asian markets have also become the top export destinations of Chinese ICT products. Such regionalization of industrial networks led to "a new logic of transnational integration based on geographical specialization and tightly linked international sourcing" (Appelbaum and Gereffi, 1994, p.43).

In addition to Asian markets, China also became the main supplier of American and European ICT consumer markets. As Hung (2009b) describes, China already became the head of a team of "servants" that were engaging in low-cost and labor-intensive ICT production and exports to the West. This asymmetric North-South production and trade

system increased the risk of fragile prosperity for China as well as for its Asian neighbors. Although some leading Chinese indigenous ICT firms including Huawei attempted to counterattack Western high-end markets in most recent years, they have been facing unexpected challenges and difficulties. In order to get rid of such trade dependence, the Chinese state has made massive efforts to alter the composition of the trade structure and to explore alternative export markets. Chinese enterprises' "going-out" into the global South thereby became part of China's outward expansion initiatives.

From Attracting-in to Going-out Strategy: the Institutional Framework for Chinese Firms' Outward Expansion

Under the "attracting-in" strategy, China has become the largest recipient of foreign direct investment. In contrast, China's outward foreign direct investment (OFDI) regime evolved at a slow pace. In 1979 the State Council permitted Chinese companies' OFDI as one of the Fifteen Measures of Economic Reform. In 1984, the Ministry of Foreign Trade and Economic Cooperation (MOFTEC, today's MOC) enacted the first regulations on OFDI. Moreover, the regulations on foreign exchange relating to overseas investment were published in 1989. Since then, the policy and administrative framework of China's OFDI regime has been established.

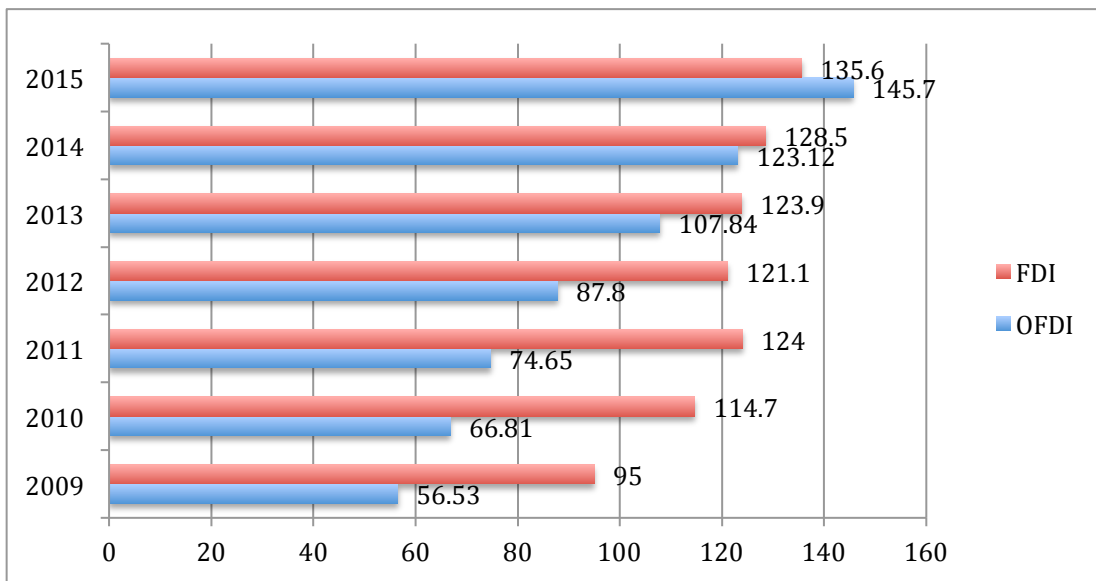
Although President Jiang Zemin first came up with the concept of "going-out" policy in the Fourteenth Chinese Communist National Congress in 1992, the primary task of economic development during this stage was still placed in "attracting-in" activities. It was not until 1997 that Jiang further reiterated the strategic significance of "going-out" policy, claiming that "attracting-in" and "going-out" were two integral components of China's opening up policy and they should be complementary to each other. In 2001, the Chinese government set the "going-out" policy as a national strategy and incorporated it in the Tenth Five-Year Plan (2001-2005) for the first time. Under this strategy, the state

encouraged Chinese companies with “competitive advantages” to invest and set up multinational operations abroad, fully taking advantage of “two resources and two markets” (domestic and foreign resources and markets). China’s ICT sector was promoted as one of these strategic industries to fulfill the state’s “going-out” initiatives. In 2005, the MOC and MII jointly launched a directive to “promote Chinese information industry’s ‘going-out’ projects”, with an aim to change the growth mode of China’s foreign trade and to explore international markets for domestic ICT firms. Chinese leading ICT firms including Huawei, ZTE, and Lenovo were at the forefront of the country’s “going-out” policy in the realm of information industry.

Since the early 2000s, a series of preferential treatments and instruments have been implemented to support Chinese firms’ outward expansion. In late 2005 a special fund for Chinese OFDI was set up by the MOF to provide grants and subsidies for Chinese firms such as medium and long-term loans on preferential terms and investment insurance. Huawei was one of the beneficiaries of this government-supported fund. Moreover, the state also provided Chinese investors with a lower lending rate credit fund on OFDI projects. At the international level, the Chinese state has also been seeking international protection mechanism through setting up bilateral and multilateral investment treaties and regional cooperation systems to create a preferential international environment for Chinese companies’ overseas activities.

As a result of these “going-out” preferential policies, Chinese capital’s outward investment activities were rapidly unfolding. Since 2007 China-based OFDI has increased dramatically with greater growth rates than that of inward FDI. In 2015 OFDI by Chinese enterprises in overseas markets stood at US\$145.67 billion, which made China the world’s second largest outward investor behind US. It was also the first time Chinese outward FDI exceeded its inward FDI, which means China has become “a capital exporting country” in its true sense (MOC, 2015).

Figure 3.1: China's Inflow/Outflow FDI (US\$ billion)



Source: Ministry of Commerce: Report on Development of China's Outward Investment and Economic Cooperation (2009-2015).

The Patterns of Chinese Firms' OFDI

The formation of China's "going-out" regime provided a variety of tools to assist Chinese firms in gaining their international presence and prestige. In turn, the expansion of China-based firms to some extent was also tied to national interests and the state's initiatives and strategic planning on the one hand and was motivated by a variety of business factors on the other. In general, Chinese firms' outbound investment activities can be characterized by the following patterns:

- (1) Natural resource-seeking activities. This initiative has become a leading form for Chinese state-owned giants' outward expansion in resource-rich countries across Africa, Latin America and beyond. In some cases, some Chinese OFDI projects, such as Chinese firms' overseas telecommunications projects, were provided to underdeveloped countries in exchange for natural resource acquisitions. But in most recent years the pattern of China's outward investment has gradually shifted from

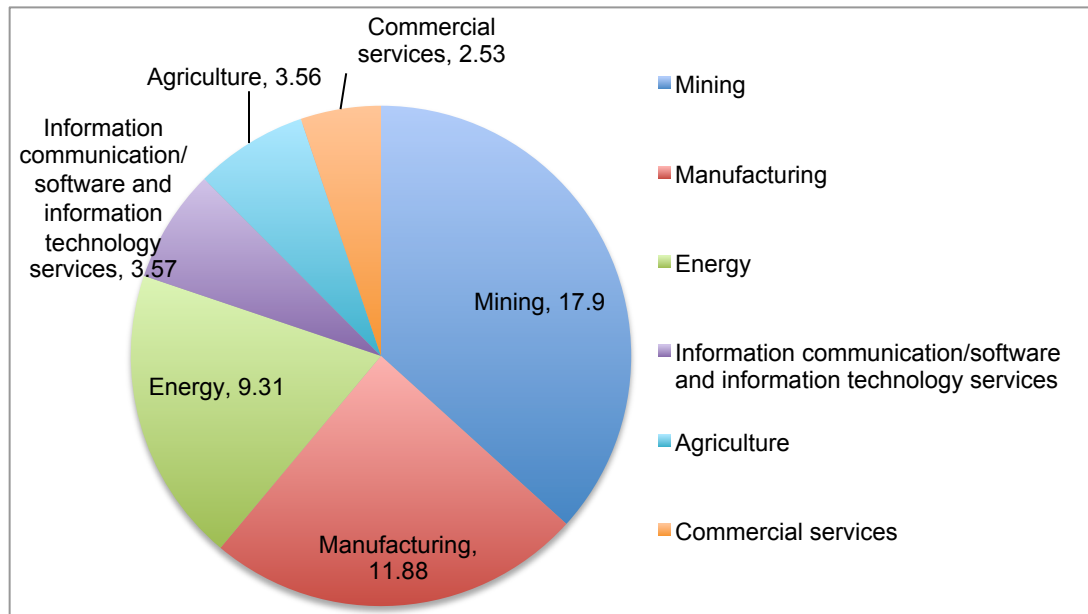
acquisitions in the energy sector to manufacturing and commercial services (including ICT-related services), which constituted a significant new trend of China's OFDI activities (MOC, 2014).

- (2) Market-seeking OFDI through setting up marketing and sales networks abroad. This form of OFDI activities is usually undertaken by Chinese companies to facilitate their exports to larger markets. Therefore, the market-seeking motive underpins much of Chinese TNCs' international investment behavior. However, it is important to note that Chinese TNCs' exploration of overseas markets is not simply driven by a firm's portfolio investments, but rather a response to domestic overcapacity crisis in some industries. As discussed in Chapter 2, the unevenness of China's telecommunications equipment market has become a key motive for indigenous companies such as Huawei and ZTE to seek alternative markets for its export-driven strategy.
- (3) Efficiency-seeking OFDI. Apart from establishing sales networks to promote domestic exports, the Chinese government also encouraged Chinese firms with "competitive advantages" to relocate their operations and productions activities especially their processing and assembly lines to lower cost regions. The government's OFDI report shows that in 2010 28.6 per cent of Chinese enterprises investing abroad were concentrated in manufacturing, accounting for one of the largest categories of Chinese OFDI activities (Lu, 2012, p.227). The MOC confirmed that most of the manufacturing activities were related to ICT enterprises (Ning, 2009, p.114). For example, Huawei has set up large-scale production lines in emerging markets in Brazil, Mexico, and Hungary (MOC, 2014). Some Southeastern Asian countries such as Indonesia, Vietnam, and Thailand have also become the most popular destinations for Chinese firms' outbound investments for manufacturing relocation. In addition, Chinese firms have significantly increased their leverage in Africa. In 2013

China's OFDI stocks of manufacturing in Africa amounted to US\$3.51 billion (MOC, 2013). This implies a new China-centered and -leading "flying geese model" is forming in the restructuring of the globalized production network. However, it should be noted that China's restructuring in the global scale is no longer entrenched in downstream manufacturing activities. Instead, those technology-intensive, knowledge-based firms which already achieved a certain level of competitiveness in such fields as computer, telecommunications equipment and electronic equipment manufacturing also started to engage in value-added activities in international markets.

(4) Strategic asset-seeking motive. Chinese firms' OFDI activities have been increasingly motivated by the search for capabilities and competencies, which primarily directed China-based capital towards developed countries. This type of investment often intends to acquire proprietary assets, including access to knowledge stocks and expertise, branding assets, local distribution system and managerial expertise. This motive has led to a surge of China's outbound M&A activities by Chinese firms. In 2014, the value of Chinese enterprises' M&A amounted to record levels at US\$56.9 billion. Specifically, the M&A value completed in the sector of information-related services achieved a record high with US\$3.57 billion, becoming the fourth largest sector of the country's overseas M&A value (MOC, 2014, p.11). Chinese information-related firms have made a large number of high-profile overseas acquisitions in most recent years. For example, after acquisition of IBM's PC business, Lenovo spent US\$2.3 billion on IBM's low-end sever business and purchased Motorola Mobility from Google for US\$2.91 billion. China Huaxin, a state-backed ICT firm, bought the enterprise network division of Alcatel-Lucent for €202 million. China Mobile, one of the world's largest mobile carriers, invested more than a billion dollars in telecom companies in Pakistan and Thailand.

Figure 3.2: 2014 China's Overseas M&A Sectoral Distribution (US\$ billion)



Source: Ministry of Commerce: Report on Development of China's Outward Investment and Economic Cooperation 2014 (p.8).

(5) Capital raising/investment activities. The liberalization of international capital flows has augmented the pace and scale of Chinese ICT firms' capital investment. Capital raised in volatile global financial markets via highly publicized initial public offerings (IPOs) has gradually become a driving factor for Chinese firms' "going-out" strategies. In the US stock markets, the listings of China-based technology firms have grown at an incredible pace since 2008, which made up nearly 70 per cent of total Chinese stocks.² Apart from capital raising activities, a large number of Chinese ICT firms turned to outbound equity investment as a primary means of OFDI to penetrate into overseas markets. For example, China Mobile has accelerated its outbound investment via enlarged capital investment to participate in some countries' telecommunications operating business. In 2014 the value of the company's outbound investment reached US\$880 million (MOC, 2014). Chinese firms' active

² J.P. Morgan. (2014, June). The Investment landscape for Chinese ADRs. Retrieved from <https://www.jpmorgan.com/jpmpdf/1320676276731.pdf>.

approach to capital investment and integration into the global financial network indicates a significant new trend of China's OFDI pattern—that is the combination of financial and ICT capitals—in Chinese firms' "going-out" initiatives.

In line with China's push to increase OFDI, the Ministry of Industry and Information Technology (MIIT) set up specific strategic goals in relation to Chinese ICT firms' "going-out" strategy—that is "going-out" of Chinese products, technology, standards as well as services—to improve China's position in global production and value chains (MOC, 2014). As a leading force of China's corporate globalization, Chinese telecommunications equipment manufacturers have made impressive achievements in their "going-out" process. According to the MOC reports (2014, 2015), Chinese telecommunications equipment exports have experienced rapid growth with 46 per cent annual growth rate since 2000. In 2014 Chinese enterprises exported telecommunications equipment worth US\$43 billion to more than 140 countries. The OFDI flows in the field of telecommunications reached US\$14.78 billion. More than 650 Chinese ICT firms set up foreign subsidiaries by 2014. Alongside exports and outbound investments, Chinese telecommunications equipment manufacturers also assumed a major role as infrastructure construction contractors throughout much of the world. In 2014 Chinese ICT firms won US\$15.9 billion overseas construction contracts in the field of telecommunications (MOC, 2014).

In some specific areas, Chinese ICT firms have achieved remarkable successes: the output of Chinese communications terminal devices has accounted for 90 per cent of global production; wireless network equipment has taken almost 30 per cent of global market share (MOC, 2014, p.100). By 2015 seven Chinese ICT multinationals including Huawei, Lenovo, Xiaomi, TCL, OPPO, VIVO and ZTE were ranked on the list of top 10 global smartphone vendors.³ However, have Chinese ICT firms really possessed

³ Wu, A. (2016, January 14). *TrendForce Says Huawei Led the Global Rise of Chinese*

technological and market prowess as this evidence indicates? What are the contradictions and ramifications arising from Chinese ICT firms' "going-out" strategy? The complexities of China's corporate globalization may be further illustrated through the example of Huawei's internationalization at the firm level, which may provide distinct experience as well as lessons for Chinese multinationals in the making. More importantly, Huawei's distinct trajectory of internationalization marching from global South to global North is of strategic significance in examining the geopolitical-economic factors that shaped Chinese firms' "going-out" strategies.

The Particularity of Huawei's External Accumulation

Huawei's first step of internationalization started in 1996. In 2005, Huawei's overseas sales outstripped its domestic sales for the first time. From 2004 to 2014, Huawei's global sales revenues have risen from US\$5.58 billion to US\$45.6 billion. The share of its overseas market sales has also increased from 43% to 62%, far exceeding its domestic sales. After two decades of global expansion, Huawei has deployed its products and services in more than 140 countries, serving nearly one third of the global population. As an example of China-based capital's outward expansion, Huawei carried out its outward investment activities in distinct ways, which are less likely to be identical to the way acted by Western TNCs. In exploring the distinctive characters of Huawei's internationalization, the following section examines the company's outward expansion in the global South by focusing on these questions: What are the motivating factors underpinning Huawei's outward investment? What is the peculiarity of Huawei's external capital accumulation? And what are the implications of Chinese capital's presence in developing countries as well as in the restructuring of the global political economic order?

Smartphone Brands in 2015 by Shipping Over 100 Million Units to Take No. 3 Worldwide.
Retrieved from <http://press.trendforce.com/node/view/2265.html>

Nationalistic and Geopolitical Initiatives Underpinning Huawei's Initial Internationalization

In traditional TNC theory, a TNC usually turns to the strategy of internationalization only when it has already established their dominance at home (Krugman, 1979). This model is useful to explain a grown-up TNC, especially those from developed countries in their domestic business cycle. In contrast, most China-based ICT firms chose to launch internationalization in their immature stage of development as a direct reaction to the increasingly competitive domestic market in their country. As analyzed in Chapter 2, Huawei has encountered the most crucial competition from the outset. On the one hand, the domestic high-end urban market has been monopolized by foreign competitors for a long time, which directly threatened domestic firms' survival in the telecommunications equipment market. On the other hand, China's institutionalized policy bias against the vast countryside resulted in a skewed development policy and market activities, which further deprived Chinese ICT firms of growth opportunities in the alternative market. Such structural imbalances in China's ICT industry have become a bottleneck for Huawei's sustained growth in the domestic market and pushed Huawei to initiate its internationalization strategy. When the company came to such a critical juncture of development, Ren Zhengfei suggested that, "If we cannot build an internationalized team in three to five years, we will come to a dead end when China's economy becomes saturated."⁴ In this sense, Huawei's initial attempt of exploring international markets was driven by the proactive strategy to evade the risks of China's structural imbalances instead of an aggressive motive for market expansion.

At the same time, many other Chinese ICT firms that already obtained certain share in the domestic niche market also looked outward for international expansion. As early as 1990, Shanghai Bell became the first Chinese company to export modern telecommunications equipment abroad. A further step was achieved by ZTE in 1997

⁴ Ren, Z. (2001, January 18). *Cross the Pacific Bravely and Proudly*. Retrieved from <http://xinsheng.huawei.com/cn/index.php?app=forum&mod=Detail&act=index&id=1698151>.

when the company defeated other Western TNCs and acquired US\$9.5 million contracts from Pakistani telecom operators, which was also the first international contract obtained by the Chinese ICT firm. In the same year, ZTE invested US\$8 million to set up a local factory for equipment manufacturing and technology transfer in Pakistan. In contrast to these domestic state-owned players that had tremendous policy supports, Huawei's plan of internationalization was launched in relatively disadvantaged conditions. Although Huawei's products and services already received high recognition in China's domestic market, they still had very low global appeal in international markets because of the deep-rooted stereotype concerning the low quality of Chinese products. Chinese manufacturers in the high-tech sector were also discredited for their low manufacturing and innovative capabilities.

To offset such a skewed image, Ren Zhengfei emphasized to strengthen Huawei's voices as well as Chinese indigenous firms' images in international markets. In 1994, Huawei participated in an international telecommunications exhibition in Beijing. This event was symbolic for the company because it was the first time Huawei appeared on the international stage to represent a "Chinese brand" in the high-tech sector, which also raised attention from the Chinese leadership. When Chinese Vice Premier Zou Jiahua visited this exhibition, he commented that "Huawei has made all of Chinese people proud".⁵ Since then Huawei has successfully established itself as a "national brand", aiming to spearhead the cutting-edging innovation and technology development of China's "national industry".

Then in 1995 Huawei's import-export department set up its first overseas subsidiary in Hong Kong, an adjacent market to Huawei's headquarter, mainly taking charge of Huawei's international supply chains and settling foreign exchanges which were still restricted in mainland China at that time. During the same period, many other Hong

⁵ Huawei: The Path of Breakthrough in Core Technologies (2003, July 28). Retrieved from <http://pr.huawei.com/cn/news/media-coverage/hw-091885-news.htm>

Kong-based enterprises had increasingly looked inward to explore the Mainland Chinese market and sought low-cost supply of manufacturers upon Hong Kong's return to China. This linkage provided more opportunities for Chinese firms to link with broader international markets. The Hong Kong market thereby became the most desired international outlet for China-based capital's outward expansion during the late 1990s. Huawei's first overseas contract was benefited from such mutual political economic relationships. In 1996 Huawei acquired a fixed-line equipment contract from Hutchison Telecommunications which was Hong Kong's second largest telecommunication operator owned by billionaire Li Ka-shing. In only three months, Huawei completed Hutchison's fixed-line upgrade projects, much faster than the anticipated time of other European vendors. Yet the price Huawei offered was only half of its competitors' bidding. Huawei's success in bidding was not only due to its low-cost, high quality products. Noticeably, its technology can be scaled to meet the demand of network communications in one of the world's most densely populated areas.

Huawei's entry into the Hong Kong market represents the normal pattern of most Chinese manufacturers' "going-out" process: that is to take a few neighboring and ethnically similar countries as their first step to tap into broader global markets. Huawei's further extraterritorial expansion actually followed a more richly complex and conflicted path in which geopolitical economic conditions have increasingly become pivotal factors for the company's "going-out" activities.

Like in China's domestic market, Huawei's outward expansion had to face head-to-head competition from a handful of leading telecommunications TNCs like Ericsson, Alcatel-Lucent and Nokia, which have already established entrenched positions in developed countries and regions. Under their domination, it was impossible for an unknown Chinese corporation to gain entry opportunity into these areas. To escape from the dilemma existing both in the domestic and foreign markets, Ren reiterated the

strategy of “encircling cities from the countryside”, namely “encircling developed markets from emerging markets”, in the company’s trajectory of internalization. Following Huawei’s entry into Hong Kong, the company’s international business was later extended to Russia in the late 1990s, the process of which was facilitated by the Chinese government’s involvement.

Huawei’s decision to enter the Russian market was closely tied to China’s foreign policy in the post-Cold War era, especially in a larger geopolitical context after the collapse of the Soviet Union. The turmoil of the 1990s in Russia had thrown the country into a decade of a deep recession, which also crippled the country’s network-building capacity. At the same time, Western governments and their military allies also sought to reshape Russia into a capitalist model toward market economy and capitalist democracy. Ren Zhengfei clearly recognized the influence of US dominance in the global political economic order and further elaborated the initiatives of Huawei’s extraterritorial expansion in relation to China’s geopolitical strategy. He commented that:

The US offered Russia the “shock therapy”, which made the Russian economics collapse. They kept baiting you to follow their policies by raising new conditions...The US strategy has never changed, including provoking Japan, suppressing China, supporting Taiwan independence, creating the discourse of “China’s threat”, and provoking China’s neighboring countries’ hostility against China. All of these reflect the American ambition of dominance in the world.⁶

To ward off such a threat from US hegemony, Ren Zhengfei further declared that: “The strategic partnership relationship between China and Russia will be in line with the two countries’ fundamental interests and national security...China’s foreign policy is successful. Huawei’s transnational marketing should follow the path of China’s foreign policy.”⁷ Ren stressed that Huawei’s entry into Russia was not only driven by the

⁶ Ren, Z. (1997, May 8). *Walking Across the Boundary of Asia and Europe*. Retrieved from <http://www.iceo.com.cn/zazhi/2003/1021/187040.shtml>.

⁷ Ibid.

corporate profit-seeking motive, but was also in accordance with the state's geopolitical interests to undercut US hegemony and its client states' influence in Asia-Pacific areas.

Huawei's assertion to align with the Chinese state's foreign policy won the central government's support. In the process of Huawei's initial internationalization, the Chinese government played a critical role in assisting the company's entry into these emerging markets. As early as 1995, the Chinese government introduced a large volume of Huawei-produced C&C08 digital switches to some former Soviet countries through bilaterally diplomatic activities and aid programs. In April 1997, Russia and China signed *a Joint Declaration on a Multipolar World and the Establishment of a New International Order* as a foundation of the Chinese-Russian strategic partnership against US unipolar hegemony. Under this inter-state relationship, Ren accelerated the company's expansion into the Russian market. In the same year, Huawei allied with Russian telecommunications equipment vendor Beto Konzem and Russian Telecom to establish Beto-Huawei Joint Stock Company, which was Huawei's first foreign direct investment. When Chinese State Councilor Wu Yi visited Huawei in July 1998, she claimed that the Ministry of Chinese Foreign Economic and Trade would create all kinds of favorable conditions to help Chinese multinational companies explore overseas markets and engage in global competition and cooperation.⁸ Under the state's policy support, Huawei has quickly gained a rapid market growth in Russia. By 2001, Huawei's sales in the Russian market reached more than US\$100 million. By 2003, Huawei made more than US\$300 million sales revenues in Commonwealth of Independent States (CISs), becoming one of the top multinational telecommunications equipment suppliers in this region (Mao & Wang, 2005, p.243).

Although Huawei's international investment at this stage was motivated by a strong nationalistic drive and highly dependent on inter-state strategic relations, it is undeniable

⁸ State Councilor Wu Yi Visited Huawei (1998, August). *Huawei People*.

that Huawei's extraterritorial investment has also increasingly merged with other fractions of the TCC to create "unified networks of common TCC concerns" (Harris, 2012, p.27). Taking the Russian telecom market reform for example, Huawei as well as other Western multinationals such as Nortel, Alcatel, Siemens, and NEC has engaged in the sweeping privatization of Russian telecommunications enterprises starting in the 1990s to acquire a significant position in the country's telecommunications sector via partnerships or joint ventures. In this sense, despite the proclaimed "nationalistic" initiatives underpinning its outward expansion, the Chinese TNC acted in a similar way to other Western counterparts by forging bonded relationships with the local oligarchic and elite classes. To some degree, Chinese capital played the role of a participant as well as a beneficiary of global neoliberal transformations.

China's foreign diplomatic relationship with Third World countries provided favorable external conditions for Huawei's extraterritorial expansions in the global South. The company began its business ventures in the Middle East, South-East Asia, Africa and Latin America in the late 1990s. In 1998 Huawei entered other Asian countries including Yemen and Laos via international bidding. In 1999 Huawei set up its first office in Brazil, starting businesses projects in Latin America. Beyond these regions, Huawei's expansion into Africa represented significant part of the company's broader global expansion and generated a mixture of outcomes in relation to the presence of China's corporate power in the global South.

"The Enemy Retreats, We Advance": An Aggressive International Expansion In the Early 2000s

Huawei's large-scale international expansion began at the threshold of the new 21st century when the global ICT industry was beset by a deep crisis of overcapacity. From 2000 to 2002, major Western telecom equipment giants all experienced sharp decline in

revenue and profit margin. As a response to this deep crisis, these companies underwent extensive corporate restructuring including withdrawing from low-profit markets, cutting R&D spending and slashing employment.

Thanks to China's relatively independent market mechanism and the state's capacity to support the hyper-growth model of the ICT industry, Chinese telecom equipment companies had less damages than their Western rivals in this wave of global "digital depression" (Schiller, 2014). However, they still faced a confluence of challenges to renew their capital accumulation in China's domestic market. From 2000 forward, the compound annual growth rate of Chinese telecom fixed-asset investment decreased from 24.9% to 2.1%.⁹ In view of sharp declining profits in the telecom market, Ren Zhengfei explicitly warned that Huawei was facing a "chilly winter" in the domestic market.¹⁰ In contrast with strategic downsizing plans adopted by Western rivals, Huawei instead made an aggressive strategy to explore new international markets as a major driver of sales growth and expand spending on the company's R&D activities. This strategy actually drew lessons from Mao's military guerrilla warfare tactic of "the enemy retreats yet we advance" (*dijinwotui*).

Although Western multinationals chose to withdraw from low-profit markets, their presence in these regions still possessed unparalleled leverage, posing an obstacle to Huawei's entry. As Ren Zhengfei analyzed, "All of fertile lands have been occupied by Western companies. Only in those remote, turbulent regions with adverse natural conditions where they entered at a slower pace and had less investment did we have a window of opportunity."¹¹ This insight shaped Huawei's internationalization trajectories: march into less-developed countries prior to venturing into developed markets. Since

⁹ Analysis on Internationalization Strategies of Six Industries (2006, December 16), Released Report from China's Development Research of State Council. Retrieved from <http://fjgyw.fjinfo.gov.cn/DRCNet.Channel.Web/>

¹⁰ Ren, Z. (2001, March). Huawei's Winter. *Huawei People*.

¹¹ Ren, Z. (2006, July). Tiandao Chouqin. *Huawei People*.

2000, Huawei has accelerated its pace of international expansion by entering Southeast Asia, the Middle East and Africa in succession, marking the company's transformation from a China-based vendor into a global player. To advocate for the company's large-scale overseas expansion and to mobilize more employees to work in overseas branches especially in underdeveloped countries with extremely harsh conditions, Ren addressed that:

We have to work hard for our country's prosperity, for our nation's rejuvenation, for Huawei's development and our own happiness...We have to shed tears and sweat on the five continents, for our country's future, and for getting rid of the humiliation caused by the Opium-war and the invasion of the Eight-Nation Alliance one-hundred years ago.¹²

It seems that Huawei's motive of business internationalization was coated with the discourse of nationalism as "both a means of political legitimacy and a corporate PR strategy" (Zhao, 2010, p.278). However, it is important to underscore that Huawei's appeal to nationalism also strengthened Huawei's corporate identity as a Chinese "national champion" in the era of globalization, and distinguished the fraction of the TCC with Chinese nationalist characters from other capitalist blocs. The revolutionary tradition of thrift and hard work (*jiankufendou*) was also evoked as a fundamental work ethos to constitute Huawei's distinct corporate culture. To further gain detailed insights into the particularity of China-based enterprise's capital accumulation and the dynamics of China's "going-out" strategy, the following sections look at Huawei's significant inroads into African and Latin American markets.

Huawei into Africa

Along with the path of Huawei's outward expansion, the company's presence and success in Africa have increasingly obtained global visibility. In 1998 Huawei first entered

¹² Ren, Z. (2001, January 18). Cross the Pacific Bravely and Proudly. Retrieved from <http://xinsheng.huawei.com/cn/index.php?app=forum&mod=Detail&act=index&id=1698151>.

African markets by starting operations in Kenya. After two decades, Huawei has become the largest telecom equipment supplier on the continent. By 2012, Huawei's sales in Africa topped US\$4 billion across more than 40 African countries, establishing strategic partnership with 20 mainstream telecom operators.¹³ In moving from an "unknown" brand to a dominant player on the continent, Huawei's developmental path reflects the peculiarity of Chinese capital's outward expansion and a broader political-economic significance in relation to the global reach of China's corporate power. An analysis of political and strategic reasons underpinning Huawei's entry into African markets, the role of the Chinese government in supporting activities of the Chinese company and the instruments of Chinese capital's expansion allows us to explain the spectacular rise of Chinese multinationals in the global South.

Huawei's entry into Africa since the late-1990s has coincided with sweeping neoliberal transformations across the continent. As a result of the coercive structural adjustment programmes imposed by IMF-World Bank and Western donors, from 1995 to 2000 over 20 African countries introduced market liberalization and opened up their basic telecom service markets for foreign capital. By 2006, over 55% of African countries partially or completely implemented privatization of their telecom sectors (Yan et al., 2009, p.61). The large-scale liberalization led to the influx of transnational telecom operators, most from Europe and the Middle East, into African telecom markets. By 2005, over 30 transnational telecom giants, including Vodafone, French largest mobile operator Orange, Portugal Telecom and Kuwait's Mobile Telecommunications Company (MTC), established cross-border operations and become dominant players in Africa. Among them six mainstream transnational telecom operators including South Africa-based Telkom, Vodafone's subsidiary Vodacom, MTC, Orange, Vodafone and Egypt-based Orascom dominated 65% of African telecom service markets (ibid), leading to the

¹³ Jiang, A. & Yuan, J. (2012, July 27). African Telecom Industry Develops Rapidly amid Cooperation. *People's Daily*. Retrieved from <http://world.people.com.cn/n/2012/0627/c1002-18388021.html>

monopoly of market power by these leading transnationals.

On the side of the telecom equipment market, major traditional Western TNCs such as Ericsson, Alcatel-Lucent, and Nokia-Siemens Networks dominated the market with their well-established “incumbent advantages” which were built upon generations of their engagement with the continent dating back to the colonial period of primitive accumulation. Moreover, their close strategic partnership with Europe-backed telecom operators further consolidated their leading positions in the market. One of my interviewees, a senior Huawei market manager working in Africa, revealed that African telecom operators, especially those backed by Europe-based FDI, were more willing to hand over purchase contracts to European telecom equipment manufacturers (Huawei market manager, personal interview, November 21, 2013). For example, he explained, Luxembourg-based company Millicom International Cellular (MIC), one of the largest mobile operators in Africa, has developed long-term partnership with Ericsson. Under such a domination by “the white old boy club”, Chinese companies as latecomers were completely excluded from the market at the beginning. But for Western telecom equipment companies that sought to pursue maximization of profit, they found underdeveloped African telecom markets less attractive than high-end developed markets, because the telecom infrastructure build-up across the African continent might require huge investment yet end up with low profit return. The lack of European vendors’ market imperatives, on the contrary, provided Chinese companies with an opportunity to enter the market. As the manager recalled, Huawei was awarded a major contract from MIC to deploy a brand new GSM network in the Democratic Republic of Congo in 2006, marking a milestone of Huawei’s expansion in African markets. However, the primary reason behind Huawei’s success was Ericsson’s withdrawal from the bidding due to low profit return of the project. This example is illustrative of the distinct logics of capital accumulation by “varieties of capital” (Lee, 2014). In contrast with Western companies’ profit-making motive, Chinese capital is more interested in long-term returns through

in-depth engagement. For Huawei, the company has been pursuing other types of strategic objectives instead of short-term profit-making activities: that is to open up new markets entrenched by Western multinationals first and further extract surplus value from subsequent network upgrades and services in the long haul.

Comparing with Western giants, another key element of Huawei's "competitive advantage" lay in its pricing strategy. My interviewees revealed that Huawei managed to achieve tremendous margins by offering 10-15 per cent lower prices than that of Western rivals (Huawei sales manager, personal interview, November 17, 2013). For example, in Nigeria, one of the largest telecom markets in Africa, Huawei's products were more than 40 per cent lower than the prices of Ericsson and Alcatel-Lucent. Huawei's pricing advantage can be attributed to the company's low costs of labor input. At the same time, as African telecom development is far behind the rest of the world and its market demands remain at a low level, it allowed Huawei to export outdated, low-cost surplus equipment to those underdeveloped countries and yield high profit to sustain its hyper-growth in Africa. In this sense, Huawei has turned African markets into an outlet of its surplus product exports from China. For example, Huawei had been at a disadvantage in the war over CDMA market since the early 2000s, occupying relatively low share of China's saturated market. But the company adopted the export strategy in international markets and picked up the market share rapidly in Africa. Now Huawei has become the largest CDMA equipment supplier in sub-Saharan African market.¹⁴

Apparently, Huawei's pricing strategy became a key factor for its initial success in Africa. But the market competition also forced rivals to ally and launch "price wars" against Chinese companies. The price gap between Huawei and other Western companies has been reduced in recent years. While Western companies already learnt to cut prices and compress their profit margin to counterattack Chinese companies,

¹⁴ Ma, X. (2007, May 10). The Ten-year Venture of Huawei and ZTE in Africa. *China Business News*. Retrieved from <http://tech.sina.com.cn/t/2007-05-10/03411499435.shtml>

conversely Huawei has started to focus on innovation and comprehensive solutions for the demand of local markets. The company no longer prioritizes the goal of “making it cheaper” but “making it better”, with considerable efforts to change the image of low-cost, low-quality of Chinese-made products. Following this strategy, Huawei has changed its role from a telecom equipment manufacturer to a customized telecom solutions provider. Huawei’s eco-friendly strategy of “going green” solutions, which were provided to African telecommunication operators, can be viewed as an example of such a strategic shift. These solutions actively promoted an energy-saving base stations in Africa, which can use solar or wind energy to replace the consumption of coal and electricity to save more than 47 percent of energy usage compared to regular towers. Moreover, the power of such a base station can cover several villages’ telecom networks, preventing from waste of infrastructure construction. By the end of 2007, Huawei deployed more than 100,000 green base stations in Africa, significantly benefiting local ecosystem.¹⁵

It is important to underscore that Huawei’s expansion into Africa is characterized by multi-layered activities and processes. Beyond firm-specific advantages and corporate initiatives, Huawei’s engagement in Africa incarnated part of China’s geopolitical-economic strategy on the continent. The firm-state nexus is manifest in this process: the globalization of China’s corporate power served to fulfill China’s reposition in the new global political economic order, while in turn the Chinese state also played a key role of vanguard for Chinese companies’ expansion in international markets.

As discussed above, Chinese foreign direct investment concentrated heavily on large-scale projects of infrastructure building and manufacturing, which were seldom pursued by Western companies because of low profit return. Besides construction, energy and mining, telecommunications is one of the strategic pillar sectors underpinning China’s involvement in Africa. The strategic significance of telecommunications and the

¹⁵ Chang, C., et al. (2009). Huawei Technologies: A Chinese Trail Blazer in Africa. Retrieved from <http://www.businesstoday.lk/article.php?article=931>

Chinese government's role in buttressing Chinese companies' penetration into Africa was underlined in 2004 when Deputy Minister of Commerce Chen Jian stated in the symposia Chinese-African Ministers of Telecommunications: "China will further expand telecom cooperation with African countries in line with mutual benefits and common development. Moreover, the Chinese government will support its telecom companies to operate more telecom services in Africa."¹⁶

The government's role in facilitating Chinese ICT corporate expansion is institutionalized through many venues, which can be seen as part of China's "going-out" endeavor. At the policy level, the Forum on China Africa Cooperation (FOCAC) founded in October 2000 was marked as a milestone of China's new political economic engagement with Africa. At the 2006 FOCAC, the Chinese government pledged to "vigorously encourage Chinese companies to participate in the building of infrastructure in African countries, scale up their contracts, and gradually establish multilateral and bilateral mechanisms on contractual projects. Efforts will be made to strengthen technology and management cooperation, focusing on the capacity-building of African nations".¹⁷

Under the arrangement of such a policy framework, a large number of business contracts in the area of telecommunications were reached, with the Chinese government primarily acting as a mediator and a bargainer. In 2000 when the FOCAC was founded, Ren Zhengfei accompanied Foreign Minister Wu Bangguo on a diplomatic tour to a number of African countries, which laid the groundwork for the company's future business expansion in Africa. Benefited by such well-established political links, in 2005 Huawei was awarded a contract worth US\$200 million to build a CDMA network in Nigeria. In

¹⁶ Hao, Y. & Li, J. (2004, December 10). Minister of Commerce: China Will Expand Cooperation with African Countries in the Field of Telecom. *Xinhua News Agency*. Retrieved from <http://www.people.com.cn/GB/shizheng/1027/3047540.html>

¹⁷ *China's African Policy*. (2006, January). Retrieved from http://en.people.cn/200601/12/eng20060112_234894.html

addition, the Beijing Summit of FOCAC in 2006 saw the deals of Huawei and ZTE with Ghana to build the country's national communication backbone infrastructure. In the same year, the Ethiopia government signed contracts with Huawei, ZTE and China International Telecommunication Construction Corporation to undertake three major telecom service expansion projects nationwide. These projects, which were also the largest ICT infrastructure construction projects in Africa (worth US\$1.5 billion), were expected to increase the country's optical fiber deployment, mobile network expansion capacity and rural telecom coverage, and the length of the fixed telephone networks.

In fact, Chinese ICT companies' OFDI on the continent was primarily concentrated in "first-tier countries" such as Algeria, Egypt, Tunisia and South Africa. Besides relatively advanced infrastructure these countries have developed, they also served as springboards for Chinese capital to penetrate into the sub-continent regions. This route of foreign investment was also congruent with the Chinese state's geostrategic considerations on the continent. At the same time, to cooperate with the state's energy-seeking strategy in Africa, Chinese ICT companies were also encouraged to invest in those resource-rich countries such as Nigeria, Angola, Ethiopia, Ghana, and Sudan. A Huawei employee revealed that the company sometimes had to take into account policy signals from the Beijing government because ICT projects in these countries were more likely to acquire the Chinese government's financial support.

In this situation, the Chinese state can be better seen as a financier for Chinese ICT companies' "going-out" activities. The state-backed institutions and financing mechanism provided Chinese companies with cheap finance to invest in capital-intensive ICT projects. One of these most important financing institutions is the China-Africa Development Fund (CADF), which was set up in 2007 as a consensus of the Beijing Summit of the FOCAC. This venture capital fund had amounted to US\$10 billion by 2015, becoming the world's largest private equity fund investing in Africa. According to the

CADF, the financial support for African countries' telecommunications development was one of the key missions of the fund's undertaking. It should be noted that the establishment of such a development fund distinguished itself from China's traditional aids and loans. First, it identified itself as a profit-oriented PE fund. Second, it used a variety of financial tools such as equity investment and investment in stocks and bonds to diversify state-backed financial sources. In turn, the fund was also guided by the state's "going-out" initiatives and served as a quasi-commercial financing institution to support Chinese companies' strategic expansion. Such a financing model that combined market-based financial tools and political functions reflected the new tendency of China's "going-out" patterns. Moreover, beyond the state-backed financing sources, the CADF also cooperated with the pan-African bank EcoBank to facilitate cross-regional flow of capital.

In addition to the development fund, Chinese companies can also access to cheap funding from Chinese policy banks such as China Development Bank (CDB) and Export-Import Bank of China (Exim Bank). These financing institutions allowed Chinese firms to leverage their financing capacity in international bidding by providing their foreign buyers with low-interest loans. For instance, in November 2004, Huawei obtained a US\$10 billion credit line from CDB and US\$600 million from Exim Bank. After the financial crisis of 2008, CDB even declared that it would further support Chinese ICT companies' projects in Africa and extended Huawei's credit to as much as US\$30 billion in 2009.¹⁸ By the end of January 2010, the loan commitment granted to Huawei by CDB had amounted to US\$17.4 billion.¹⁹

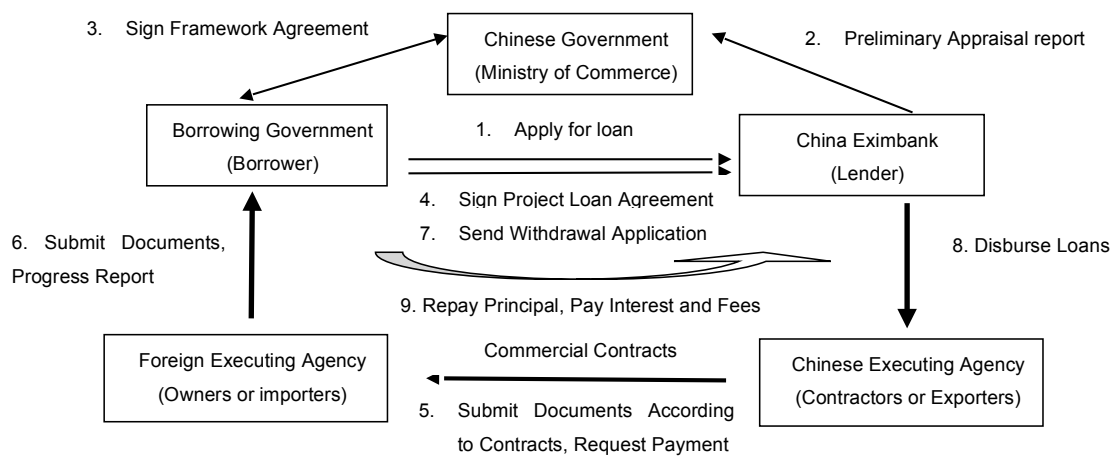
These preferential loans were actually not directly granted to Chinese companies but

¹⁸ Zhao, X. & Tao, J. (2009, September 22). CBD Signs A Strategic Cooperation Agreement Worth US\$30 Billion with Huawei. *Xinhua News Agency*. Retrieved from http://news.xinhuanet.com/fortune/2009-09/22/content_12098823.htm

¹⁹ Tan, S. (2010, December 9). CDB Promotes China Enterprises' "Going abroad. *International Financing*. Retrieved from <http://www.ifmbj.com.cn/meiyuezazhi/jigou--8226-quyu/201012/09-628.html>.

to their foreign clients for which foreign governments acted as guarantors of loans (Figure 3.3). For example, Nigeria received US\$200 million in low-interest loans from CDB to buy Huawei equipment in 2004. Along with preferential loans, Chinese companies were also able to provide host countries with packages of aid for infrastructure constructions. This state-backed financing mode made Chinese companies more appealing than Western investors in African markets.

Figure 3.3: China Eximbank Concessional Loan Cycle



Source: China Eximbank website (as cited in Brautigam, 2009, p.143).

Although the Chinese government asserted “non-conditionality” of these loans, implicit conditions were still applied to guarantee that recipient countries should use the credit to purchase Chinese companies’ equipment and services. Moreover, Chinese policy banks would take lenders’ future capacity into account when making lending decisions to manage debt sustainability (Brautigam, 2009, p.186). This mechanism can largely reduce solvency risk for Chinese firms as the risk is being passed to borrowing foreign governments and corporate lenders. In addition, to offset potential risks of repayment, the debt-equity swap was implemented by Chinese investors to secure their status in the process. For example, ZTE would take certain equity shares from Ethiopian

Telecommunications Corporation as a condition of repayment (ibid, p.187). A Huawei employee also explained that some African countries that had low repayment capability usually signed agreements on resource-backed infrastructure loans with which natural resources were used as guarantee to repay debts.

From product exports to capital exports, the state capital-backed financing model has become one of the key features of Chinese firms' "going-out" strategy. It not only functioned to fund Chinese ICT companies' overseas expansion, but also represented a new "loan-driven growth model" to export China's domestic overcapacity through "exchanging loans for markets" as well as to secure China's access to natural resources. But in comparison with loans offered by Western countries, China's approach of financing is not demanding, which makes China's concessional loans more acceptable than other Western donors in less-developed countries.

Huawei into Latin America

Like its strategy in Africa, Huawei adopted a very similar pattern of entry into Latin America. As Huawei's expansion was complicated by crucial impacts of geopolitical upheaval in this region, an analysis of Huawei's engagement with this region is able to grapple with the specific challenges and impacts of Chinese ICT firms' outward expansion in different situations.

In 1999, Huawei set up its first joint venture in Brazil, starting its business in Latin America. Now the company establishes a corporate presence in 14 Latin American countries, with a total of 4,500 employees in 19 regional offices, 3 research and development centers, and 3 training centers (Ellis, 2014, p.104). However, due to the dominant influence of its major Western rivals such as Ericsson, Nokia, and Alcatel-Lucent in this region, Huawei's presence in Latin American markets was relatively

weak. The company's American division merely contributed the lowest amount to the group's revenue and experienced the lowest growth rate.

However, in view of potential huge profit generating from Latin America's burgeoning markets, Huawei started to accelerate its expansionary strategies in this region. Such corporate efforts were further facilitated by the Chinese government's strategic engagement in Latin America. In 2008, the Chinese government issued its first policy paper on Latin America and the Caribbean, expressing that China would strengthen "practical cooperation" with Latin American and Caribbean countries in information and communications infrastructure development.²⁰ Benefiting from the government's advances in this region's infrastructure construction, Chinese ICT companies, represented by Huawei and ZTE, have made remarkable achievements in these emerging markets. Huawei claims that it is currently "a leader in market share across a range of different technologies and infrastructures in the region, including being the largest provider for IP DSLAM and Next Generation Network applications, and second in market share for optical networks, and routers and LAN switches for the entire region" (Ellis, 2014, p.104). The company also notes that it has provided technology solutions to almost all of major telecom players in the region, including Telefonica, America Movil, Telmex, Millicom, Nextel, TIM, Digicel, CANTV, CNT, and Intel.

In particular, Huawei attempted to focus on large markets such as Brazil as its "strategic focus" to extend the company's presence in the region. Despite its disadvantaged position in 2G and 3G markets, Huawei picked up market share rapidly during the country's telecom network upgrade from 3G to 4G. According to *China Daily's* report, Huawei now won six out of seven 4G mobile network contracts in Brazil.²¹ In July

²⁰ China's Policy Paper on Latin America and the Caribbean. (2008, November 5). Retrieved from http://www.gov.cn/english/official/2008-11/05/content_1140347.htm.

²¹ From Manufacturer to Innovator, Huawei Upgrades Brand Image in Brazil (2015, May 6). *China Daily*. Retrieved from http://www.chinadaily.com.cn/business/tech/2015-05/06/content_20633790.htm.

2012, Huawei was selected by the Brazilian government to build up broadband Internet infrastructure in rural areas in exchange for tax breaks. In addition, Huawei invested US\$350 million to build a new technology center in the state of Sao Paulo, with an attempt to project itself from Brazil more extensively into the markets of neighboring countries such as Venezuela, Bolivia and Columbia (Ellis, 2014). Over the past decade the company managed to take up to 40 per cent of Brazil's network equipment market, with total sales at US\$1.5 billion in 2014.²²

Beyond Brazil, Huawei's most significant advances have come in the ALBA (Bolivarian Alliance for the Peoples of Our America) countries, which were primarily driven by the geostrategic relationship between the ALBA nations and China. For the ALBA countries, expansion of economic ties with China is able to help them fuel an orientation of trade and physical infrastructure away from US. At the same time, growing export revenues, loans and foreign direct investments from China, especially its financial support linked to the provision of Chinese products and services have also allowed these countries to finance and sustain their "Bolivarian Socialist" projects in the region to some degree (Ellis, 2014). For example, Venezuela received China's credit loans to purchase 3 million Chinese electronics appliances to support the state's social programme "*Mi Casa Bien Equipada*" (*My Well-Equipped Home*), through which consumer electronic products were distributed to lower-income households at heavily discounted prices. In the strategically high-value-added ICT sector, the Chinese telecommunications firms Huawei and ZTE have come to occupy a major role in serving these ALBA nations' public service programmes with local governments' support. In 2007, Huawei was awarded multiple large contracts by Venezuela's state-owned telecom enterprise CANTV to extend the national fiber-optic network to remote rural areas of the country. The company has also worked with Digitel, which was awarded a license to develop rural telecommunications infrastructure in the central region of Venezuela, to deploy 3G and 4G networks in the

²² *ibid.*

country. In Bolivia, Huawei acquired the contract from the Bolivian national telecommunications firms Entel in 2011 to build wireless infrastructure in underdeveloped areas. In addition, Huawei has also made important advances in Ecuador. According to a report by local media *El Comercio*, Huawei won 61.4 per cent of contracts from the National Telecommunications Corporations of Ecuador (Ellis, 2014, p.109), becoming a primary provider of the country's 3G and 4G infrastructure services.

As Evan Ellis (2011) argues, beyond commercial interests, the position of the PRC in Latin America has been publicly trumpeted as a “geopolitical alternative” to the US by the new generation of Latin American populist leaders (p.88). Although the presence of Chinese telecommunications firms in Latin American markets is still relatively weak in comparison with traditional Western players at the current stage, there is no doubt that the expanding engagement of China's corporate power in this region's strategic ICT sector will increasingly play an important role in reshaping these countries' economic policies and political projects.

Beyond Unified Capitalist Interests: The Varieties of Chinese Capital

The analysis above touches on the peculiarity of the Chinese ICT firm's outward expansion patterns in comparison with foreign vendors, which is mainly characterized by the logic of “encompassing accumulation” (Lee, 2014) and the strategic relationship between the Chinese state and firms. Nevertheless, extant discussions concerning the rise of “Chinese capital” tend to commit to a misunderstanding that sees outbound Chinese investors implement the same logic of capital accumulation. As sociologist Ching Kwan Lee (2014) argues, the generic term “Chinese capital” is not a unified concept. It actually “masks a hierarchy of capitals of varying status, resourcefulness and connection to the Beijing government” (Lee, 2014, p.34). Likewise, Huawei's patterns of outward expansion and its logic of capital accumulation are not identical to other Chinese firms.

According to Lee's definition, at the top of the pecking order are those state-owned or state-controlled companies. Below these are private companies of varying sizes (Lee, 2014, p.34-35). Such "hierarchical" differences are illustrated in the story of Huawei and ZTE. During my interviews, all Huawei employees commented that Huawei's business model was far different from ZTE due to their different ownership status. One former Huawei sales manager working in Kenya and Tanzania said, the state-controlled shareholding company ZTE generally had more policy supports from the Chinese government than that of Huawei. For example, there were some cases that the Chinese government directly helped ZTE introduce new foreign clients and negotiate for their contracts. Inter-government cooperative projects were more likely granted to ZTE instead of Huawei. The interviewee further explained that the "advanced" status ZTE enjoyed was also reflected in their chances of acquiring state-backed funding. It was said that ZTE had more opportunities to access to large amounts of financing packages from the central government and policy banks than Huawei. For example, based on Chinese-Ethiopian governments' bilateral agreements, ZTE became the exclusive telecom equipment supplier for Ethiopian Telecom in 2006 with the US\$1.5 billion financial support provided by CDB. In the interviewee's words:

ZTE has fostered a privileged relationship with the Chinese government because of its state-backed status. Of course this also determined that ZTE's business activities had to assume certain political tasks. In contrast, Huawei's identity is more complicated. Its relationship with the government was not as close as that of ZTE but it was still promoted as a 'brand' of China representing Chinese identity in the eyes of foreign clients (Huawei sales manager, personal interview, November 17, 2013).

In comparison with ZTE which focused more on public relations with foreign governments, Huawei's business activities were client-oriented. Instead of complete dependence on the government's grants for foreign contracts, Huawei's sales teams directly targeted on potential clients—mostly telecom operators—to make sure that the company was able to enter the short list of suppliers and then form a long-term strategic

relations with local telecom carriers. When the company acquired contracts, Huawei sales would persuade buyers to apply for Chinese concessional loans. Then the company's PR teams in Beijing would propose the projects to the MOC and policy banks to appraise and approve the request-based loans. One of my interviewees commented that Huawei's bottom-up, client-centered business model strikingly contrasted with ZTE's top-down model, but it was also this pattern of investment that made the company's overseas contracts and revenue less secure and stable than ZTE.

Although Huawei and ZTE both represent the rise of "Chinese ICT multinationals", the expansion of their corporate power does not necessarily serve unified Chinese capitalist interests. The emergence of these two Chinese leading telecom equipment firms did not lead to the cluster and synergic effects in their business expansion. Rather, they were always in direct competition with each other in multiple business areas and markets. According to an interview conducted with a ZTE employee, the company always sees Huawei as the top adversary. In some cases these two firms have even tried every means to undercut the other's prices to win contracts. A Huawei employee claimed that wherever there was presence of Huawei's business there was competition from ZTE and that the real threat for Huawei came primarily from its "fellow" Chinese firm ZTE. The tensions arising from two China-based TNCs fully illustrate that a homogenized image of the nation-state framework or "unified national interests" is unable to grasp the complex transnational character of the emerging global corporate powers as well as their distinct logics of capital accumulation. As Robinson (2014) argues, in the age of globalization, competition actually takes on new forms with divisions of capitalist interests: "transnational capital is heterogeneous and internally divided and has no unambiguous boundaries demarcating it as a specific fraction" (p.28). The domicile of TNCs in the same "home country" does not necessarily mean the formation of unified class interests or identical business patterns.

However, it is important to note that the formation of competitive blocs of transnational corporations does not prevent fractions of the TCC from utilizing state apparatuses to achieve their class interests, nor from formation of a particular national identity embedded in their cross-border capital expansion. In turn, the Chinese state also made an effort to strengthen the solidarity of “Chinese capital” in their “going-out” process to advance China’s political agenda. For example, the Chinese ambassador to Nigeria has mediated in the vicious competition between Huawei and ZTE and persuaded them not to launch price wars against each other but to unite and resist against foreign rivals together. In this sense, the Chinese state not only served to ease the tensions and conflicts existing in the segments of Chinese capitalist groups but also played an important role to organize and mediate varieties of Chinese capital for advancing China’s nation-state interests.

The hierarchical structure and varieties of “Chinese capital” is also reflected in the supply chain of ICT products and services. At the top of the chain are Chinese ICT TNCs like Huawei that can directly acquire contracts from telecom operators and obtain huge profits from delivering products and service solutions. Otherwise, those construction companies, which undertake the most difficult tasks of network infrastructure building, are situated at the bottom of the supply chain. As most telecom operators in less-developed countries are not equipped with capability of network building, they generally required equipment providers to undertake the whole supply chain ranging from construction of base stations to supply of consumer-end products. To fulfill such a form of “package” deals and reduce costs, Chinese ICT companies usually subcontracted construction and engineering projects to other Chinese capital-backed companies. The majority of these subcontracting companies are provincial state-owned telecom engineering companies affiliated to national backbone construction enterprises. Many of them were originally sent by the Chinese government in the 1990s to build foreign-aid telecom projects. With the Chinese state’s acceleration of its “going-out” strategy in the field of ICT, these

construction companies were encouraged to become involved in commercial projects by cooperating with Chinese telecom equipment providers. Specifically, these subcontractors are primarily responsible for telecom networks construction projects, base station construction, signal testing, networks maintenance and other after-sale technical services. Thousands of skilled engineering workers are dispatched from China to accomplish hard work in extremely harsh conditions. These construction and engineering workers account for a large proportion of Huawei's labor force as outsourced labor. On the Huawei side, the company sets up the department of project management to take charge of subcontracting bids and supervises subcontractors' projects. To force down the price, Huawei usually called for bids every once in a while to choose subcontractors that can offer competitive prices under fixed-term contracts. This measure indirectly squeezed subcontractors' profit margin. Despite large profit return of telecom infrastructure projects, the lion's share of profit was actually taken by contractors, with subcontractors only keeping a skinny share of profit. This unequal relation further enforces the hierarchies of "Chinese capital" along the supply chain.

Conclusion

Huawei's case provides a rich context for the discussion of the nature and implications of China's corporate globalization. In most recent years, Chinese firms' salient presence in the global South has raised heated debate at home and abroad. On the one hand, China's official rhetoric portrays the country's role among developing countries as an egalitarian partner based on the "win-win" development model, seeking to legitimize the penetration of China's economic power into these regions and to ease the tensions between China and host countries. On the other hand, a view calling for China's greater power projection is emerging inside China's policy-making circles (Jiang, 2008, p.62). Especially China's most recent "Belt and Road" strategy, which was proposed in late 2014, reflected the country's ambition in restructuring the global geopolitical

economic order. At the core of this strategy was the goal to enlarge Chinese outward investment on the requisite infrastructure development, including telecommunications infrastructure, in developing countries in the forms of OFDI or portfolio capital loans. In addition to capital expansion, people upholding this perspective also called for strengthening the state capacity and military forces to protect Chinese capital abroad to consolidate China's influence in the South. However, Chinese firms' extensive global expansion also raised criticism from the West, which condemned the rise of "global corporate China" as a new force of neo-imperialism (Frynas & Paulo, 2007; Lumumba-Kasongo, 2011; Zweig & Bi, 2005).

These arguments and controversies actually concentrated on a pivotal question in regard to the implications of China's corporate globalization: Has China played a role as a colonizing power or an egalitarian partner of globalization? This question should be assessed in relation to who benefited from and what was at stake in the transnationalization of Chinese capital. It is important to bear in mind that neither biased nor idealist rhetoric is adequate to grasp the nature of Chinese capital's outward expansion. As Barry Sautman and Yan Hairong (2007) note, China's role in the global South should not be reduced to either "China is the best" or "China is just like the rest" (p.78). The complexity of "Chinese capital" should be understood in terms of its peculiar logic and practices.

The way Chinese capital behaves abroad, more or less, mirrors the "externalization of China's domestic developmental difficulties, challenges, and problems" (Jiang, 2009, p.61), such as severe exploitation of labor forces, devastating ecological and environmental conditions, and crucial market competition. In the process of external capital accumulation, Chinese firms to some extent behaved in a similar way to their Western counterparts such as extracting natural resource, displacing local industries and markets, and establishing oppressive labor regimes. These particular patterns of capital

accumulation represented the destructive logic of capitalist growth and revealing contradictions of Chinese capital's expansion.

But, Chinese firms also distinguished themselves from Western investors in their business patterns. As Lee (2014) argues, Chinese capital actually followed the pattern of “encompassing accumulation”, which means the motive of Chinese capital's accumulation was not taken purely on grounds of profitability. In contrast, the outward expansion of Chinese firms to some extent conveyed a compelling political aim—that is to compete with the West for China's global geopolitics strategy. As Huawei asserts, the company's “going-out” strategy was to assist the country to regain its political and economic influence in the new era of globalization. Such an initiative was in line with China's strategic goal to shape the country into a responsible stakeholder of the global system. Serving as an “arm” of China's global reach, Chinese capital as such is highly “politicized” with strong nationalistic identity.

In response to the Western discourse of “China's threat”, I would like to argue that China's state-led “going-out” approach is not developing toward colonialism or imperialism. On the contrary, China's strategic partnership with Third World countries and their economic cooperation were actually built upon their shared experiences and legacy of anti-imperialism, anti-colonialism, and anti-hegemony. China's commitment to mutual benefit, equality and respect for sovereignty also laid a durable foundation for its in-depth cooperation with these countries. Therefore, the presence of Chinese corporate power in Third World countries is not a “zero-sum” game. In addition, China's historical experience and development model resonated powerfully with Third World counterparts, which made China's distinct approach more appealing to them. Many developing countries were eager to translate the “Chinese model” into their own process of development, in hopes that their engagement with China would be more practical than their past experiences with the West. This factor made Chinese firms more acceptable in Third World countries.

Unlike other conditional FDI from the West, Chinese FDI often comes in a package of aid, including debt cancellation, soft loans, technological aid, and investment in public infrastructure construction (Brautigam, 2008, 2009). Besides financial support, other innovative forms of cooperation, such as human resources training, education resource input, and technological transfer, were implemented to promote Third World countries' development. The combination of foreign aid and business investment in underdeveloped countries provided an alternative model of South-South cooperation, which was based on the principle of co-development with local communities. This principle was also articulated in Huawei's official corporate discourse particularly in its *Corporate Social Responsibility* statement which highlights the goal of "building an equitable, sustainable and balanced model of information society" with local stakeholders.²³ Since the early 2000s, Huawei has established over five technical training centers in Africa, aiming to train 10,000 ICT professionals for Africa and to facilitate ICT technological transfer in local communities. To implement the Chinese government's foreign aid policy and the ITU strategy of "Connecting Africa" programme, Huawei not only committed to basic telecom service in major cities but also made significant effort to improve telecom network capabilities in rural areas and to bridge regional and international ICT gaps on the continent. Taking Ethiopian telecom services for example, the country had the second most expensive broadband services in the world before the Chinese companies entered the market. With the participation of Chinese telecom equipment vendors in the country's broadband programme, the country's rates of the Internet cost has been reduced considerably accompanying with increasing penetration rates of Internet access.²⁴ There is no doubt that the presence of Chinese ICT capital plays a significant role in building Third-world countries' ICT capabilities and improving local ICT services.

²³ Huawei 2014 Sustainability Report. Retrieved from <http://www-file.huawei.com/~media/CORPORATE/PDF/Press-Center/media-kit/2014Huaweisustainabilityreporten.pdf>.

²⁴ Jian, L. (2014, January 14). *The Development Issues in Ethiop And the Role of Chinese Telecommunication equipment Vendors*. Retrieved from http://www.guancha.cn/JianLian/2014_01_14_199665.shtml

However, Huawei's expansion into Third World countries was not free of frictions or contradictions. Ongoing labor protests against Chinese investors were on the rise within some host countries. Inter-state competition within the Southern bloc also generated obstacles to Chinese companies' cross-border operations. Huawei's experience in India was illustrative of the frictions Chinese outward capitals faced in their process of expansion into the global South. Huawei has become a long-established supplier for all major India's telecom operators since 1999. The availability of Chinese cost-effective equipment allowed major Indian telecom operators to expand their regional backbones and network access at relatively low costs. Despite the shared economic interest between the Chinese ICT vendors and local business players, the inter-state rivalry deriving from geopolitical tensions and ideological differences between these two countries prompted the Indian government's ban on the Chinese firms. The profound division within the Third World bloc might pose a serious challenge to the presence of Chinese capital in Southern nations.

The implication of Chinese ICT firms' presence in the global South is complex. The case of Huawei illustrated a peculiar logic, pattern and ramification of Chinese capital's outward expansion. We can hardly say it provided an alternative mode of transnational capital accumulation to the neoliberal logic or merely acted as an agent of the Chinese state's imperialist power. Nevertheless, it is for sure that Huawei, which has emerged on the world stage as a major player on a par with the world's leading firms and an equal partner in local communities, represents an important symbol of "the globalization of corporate China".

Chapter 4.

March into the Global North

As a result of the strategy of “circling cities from the countryside”, Huawei has gained a firm foothold in emerging markets since the early 2000s. However, the company has still sought vast opportunities in developed countries where telecommunications markets were larger and more lucrative. The company’s penetration in the South can be viewed as a springboard for its further plan of expansion into developed countries, which prepared the company to foster competitive edge in international markets. But in contrast with the company’s massive success in the South, Huawei’s march into the global North was faced with numerous difficulties and challenges. This Chapter looks at Huawei’s presence in two different regions—European and U.S markets—to examine the dynamics and limitations of Chinese capital’s expansion in the global North. The conflicts and contradictions arising from the Chinese ICT firm’s counter-flow into developed countries underscore inter-state and inter-capitalist competition and the potential for Chinese capital to challenge the US-led global capitalist order in the centers of the capitalist system.

With the advancing of neoliberal telecom reforms since the 1990s, the agenda of deregulation and liberalization of national telecommunications markets has dominated mainstream discourses of policy frameworks across the world. As Schiller (2014) argues, the imperative of network market liberalization undoubtedly “required wrenching changes and engendered attractive investment opportunities” (p.86). Driven by neoliberal market forces, the telecom equipment market underwent a wave of mergers and acquisitions during this time, resulting in massive concentration of the industry. Traditional Europe-based transnational companies undertook mergers, cross-border investments,

joint ventures and alliances with extra-regional TNCs to consolidate their domination in the market. Contrary to Europe-based giants' massive expansion, the North American companies had faced a downturn in their business operations.

Over the last decade major global telecom equipment giants have experienced several dramatic changes of restructuring. In April 2006 the French-based Alcatel merged with US-based Lucent, which paved a way for Alcatel's expansion into the American telecoms market. In the same year, Finland's Nokia and Germany's Siemens merged their network telecoms equipment businesses in a joint venture. But this merger did not last until Nokia bought out the shares of the joint venture from its German partner in 2013. For a long time Nokia has been saddled with many uncompetitive businesses. This forced the company to sell its mobile businesses, which had been the company's most profitable business unit, to Microsoft in 2014. To strengthen its "core businesses" in the telecom network market especially in reaction to heightened competition from new market players such as Huawei, Nokia announced its acquisition of Alcatel-Lucent in April 2015. Such a "mega-merger" changed the market structure and dynamics dramatically, which stimulated a new wave of industrial restructuring. In November 2015, Ericsson and Cisco, two tech giants in the telecommunications sector, decided to establish a strategic partnership to merge the services of telecom networks and data communications as a response to rising competitions from Huawei and the merged Nokia-Alcatel-Lucent conglomerate. This unprecedented alliance not only exemplifies the new trend of ICT convergence of telecom infrastructure and internet data sector thanks to the increasing leverage of big corporate business users in global informationalized capitalism, but also indicates the formation of "webs of transnational capital" via massive cross-border capital activities in the monopolized market (Robinson, 2014). Nevertheless, it should be noted that restructuring through convergence and deconvergence is primarily a corporate response to market failure and a scheme of battles for position in the industry rather than a solution to the systematic crisis. Moreover, such a pattern of capitalist restructuring is

primarily driven by the long-established transnational powers which tend to sustain their dominance in the face of new market comers. To the greatest extent, the scene of global restructuring in the telecom industry has set the backdrop for Huawei's march into developed countries.

Although Chinese ICT corporations have displayed considerable appetite to participate in transnational capitalist markets, they encounter numerous conflicts and setbacks created by capitalist rivals and states. In this sense, Chinese capital's integration into global capitalist networks is not as smooth as their counterparts in the West. The following sections provide the stories of Huawei's entry into European and US markets, revealing the twists and turns of Chinese capital's counterattack against its Western rivals. Some key questions remain to be answered in this chapter: How did Huawei open up mainstream markets dominated by traditional Western ICT giants? Is Huawei's entry mode different from its practices in the global South? Why did Huawei encounter completely different outcomes in European and US markets? Has the rise of Chinese ICT corporations changed the geopolitical economic dynamics in the global North?

Turning Europe into a “Second Home Market”

As discussed in Chapter 3, Huawei's internationalization started from Russia in the late 1990s, which considerably benefited from China-Russia strategic diplomatic relationships. By taking a firm foothold in the Russian market, Huawei planned to enter advanced Western European countries via peripheral markets. Huawei's strategic interests in the European market were based on several considerations:

First, driven by ongoing technological upgrades and supply demands, the European ICT market has undergone qualitative growth for decades, constituting one of the most important growth engines in the global ICT industry. This region had the most

sophisticated ICT infrastructure and networks in the world, spearheading the development of the global ICT industry for a long time. For example, it not only took a lead in 2G mobile communications technologies with a decade of domination by its GSM standard, but also stayed far ahead of the US in 3G services. In the field of Internet services, broadband development has also become a priority of the *Europe 2020* strategy. Despite a decade's stagnation, Europe has still managed to sustain most advanced research and development in the ICT sector. The strategic significance of the European market for Huawei not only lay in their profitable market potential but also in its sophisticated R&D capacities and resources.

Second, Huawei's decision to enter into the European market could be also symbolic, signifying the company's leapfrog from a Chinese low-end, low-quality telecom equipment provider to a transnational firm that is able to have a place in global high-end mainstream markets. But on the other hand, Europe is also the home turf of incumbent telecoms manufacturing giants, including Ericsson, Alcatel, Nokia and Siemens. They have taken competitive advantages in respective key areas. For example, Alcatel is strong in the fixed network business; Ericson has strong performance in the mobile sector, and Siemens in the optical networking sector.¹ The predomination of these telecom giants set a high entry barrier and posed numerous challenges to outside players, constituting an enclosure in high-end markets.

Entry Mode

The process of Huawei's expansion in the European market has unfolded with the recession and restructuring of the European economy since the 2000s, a backdrop which granted Huawei unprecedented opportunities to step into mainstream markets at an

¹ Optical networking is a means of communication that is capable of achieving extremely high bandwidth through light transmission. It has been widely applied in today's Internet communication and the communication networks at different levels.

especially propitious moment. Toward the end of the twentieth century, some key European telecom operators started to invest heavily in advanced wireless technology, but the burst of the Internet bubble in 2001 led to large-scale recession across Europe. From 2001 to 2004, the European telecom industry was trapped in a severe debt crisis. By the end of 2002, the asset-liability of key European telecom operators in Germany, Britain, France, Netherland and elsewhere had climbed to 120%-210%, while aggregate liability had amounted to €251 billion.² Incumbent operators beset by the debt crisis were compelled to cut costs on equipment procurement, while Huawei's low-cost yet high-quality products and services meet such a demand during the crisis.

Although the structural crisis provided Huawei with an opportunity of entry, the path toward acceptance and recognition in developed markets was difficult. Therefore, the company's entry mode in Europe was carried out in a different way from its practices in developing countries where state-backed financing and diplomatic activities played important roles. In Western markets, Huawei's state-supported background, on the contrary, generated persistent criticism because of the company's alleged relationship with the Chinese government.

In the initial stage, Huawei actively looked for local vendors to found joint venture companies and form cooperative relations to break into local markets. To obtain opportunities of cooperation, Huawei intended to serve as an original equipment manufacturer, trade agent, and low-end supplier for European firms that were already entrenched in the upscale market. Among these incumbent European vendors only Siemens, which had well-established relationship with the Chinese government, was willing to cooperate with Huawei. As early as 2003, Huawei and Siemens signed a cooperative contract with which Huawei franchised Siemens as the sole agent to sell Huawei's Quidway routers and switches in global markets; in return, Siemens had to

² Xie, J. (2002, April 8). Global Telecom Industry Was Stranded. *International Financing*. Retrieved from <http://www.people.com.cn/GB/it/50/145/20020408/704353.html>

assist Huawei in selling the latter's data communication products such as routers and other enterprises telecom equipment in the European market through Siemens' sales networks. To increase the company's presence in high-end markets, Huawei also participated in several eye-catching telecom exhibitions to display the company's innovative products and solutions, which to large extent changed the "low-quality" image of a Chinese brand and raised mainstream operators' attention (Cao & Li, 2014). The company also invested intensely in its PR activities to lobby local customers for creating brand recognition.

Huawei's encroachment into the European market was incremental especially when facing the full force of competition from its European rivals. Starting as a role of low-end OEM and supplier, the company eventually achieved a breakthrough in 2004. In April of that year, Sweden-based Banverket Telenät selected Huawei from among 14 bidders to deploy Ethernet and broadband services for its rail sector across Sweden where one of the largest telecom equipment vendors Ericsson is headquartered. Though it was only a small-scale contract in a marginal field, it was the first time a Chinese telecom equipment manufacturer managed to break into the Nordic telecom market. In December 2004, Huawei acquired a WCDMA 3G contract from the Dutch mobile operator Telfort to build a nationwide 3G network that can be managed to migrate with its existing network built by Ericsson. This deal marked a substantial milestone in Huawei's expansion in developed countries, indicating a Chinese company's breakthrough in the mainstream market where the dominant 3G standard originated.

In-depth Engagement in the Upgrade of European Telecom Networks

When Huawei achieved its initial breakthrough in Europe, the company yet encountered a setback in the US at the same time. In 2003 Huawei was blocked out of the US market because the company was sued by Cisco for the violation of intellectual

property. This setback became a watershed for Huawei's strategy of outward expansion. Since then Huawei has shifted the strategic focus of internationalization from the US to the European market, launching a turf war against global giants in this region. In 2004 Huawei set up a European headquarter in UK, which was later developed into the company's largest overseas branch.

At such a turning point, the European telecom market has also experienced a new wave of industrial restructuring, which posed challenges to as well as opportunities for Huawei's development in this region. Since 2005, the European telecom market has gradually recovered from the Internet bubble, but key operators still faced considerable strain from the profit-making imperative. From 2007 to 2009, most large network operators witnessed negative growth, while their costs of marketing, management and administration continued to grow at a fast rate (Schiller, 2014). Moreover, with the saturation of the fixed-line market, most countries planned to escalate the network services upgrades, migrating fixed-line networks to wireless networks. Meanwhile, key operators' initiatives of technological upgrades had gained staunch support from the EU. The blueprint *Europe 2020*, which was launched in 2010 by European Commission, further called for investment in the construction of the "Future Internet" as a priority of the European long-term ICT development. For example, the UK telecommunications company BT Group, which is also one of the largest telecom operators in the world, launched the nationwide 21st Century Network (21CN) programme to initiate the process of network convergence. It intended to transfer BT's fixed-line telephone networks to an Internet Protocol (IP) system, combining data, voice, video, and web services over one converged network. More importantly, this scheme of network convergence also enabled telecom operators to provide more integrated solutions for TNCs' interconnected multi-site operations. As observed by Schiller (2014), "by integrating forward into internet service and backward into backbone networks... the largest network operators staved off threats to their core business of connectivity and elbowed their way toward the center of

the new network architecture”(p.87). However, the conflict between declining profits and the imperative of network expansion has become a primary obstacle to further industrial restructuring. One of the biggest challenges of Europe’s broadband development lay in the large-scale replacement of outdated network infrastructure with cutting-edge broadband applications. For example, under the plan of Next Generation Networks (NGN), traditional circuit switched telecommunications networks and services had to be gradually upgraded to Internet Protocol (IP) enabled networks. To accommodate the ongoing reconfiguration of networking technology and the pressure of heavy investment, the demand for flexible technological upgrades and cost reduction became a priority for European mainstream operators to achieve migration plans.

The demand for the large-scale network upgrades posed a substantial challenge to Huawei’s innovative capability to catch up with the new technological trend. In order to respond to this market demand, Huawei developed a set of “brand-new overall fixed network solutions” based on its cutting-edge fixed network experience to construct new converged networks. In 2005, Huawei launched a campaign of “New Fixed Network” in 13 European countries to promote its innovative solutions for the NGN project. In the same year, Huawei was selected as one of the eight preferred telecom equipment vendors by BT to provide access and optical transport equipment for the 21CN rollout project worth US\$19 billion. This deal was groundbreaking for Huawei’s expansionary strategy in Europe. In 2008 Huawei topped the global broadband equipment IP DSLAM market with 32.9% global market share, while the European market contributed to one of the largest proportions of Huawei’s market share.³ Now Huawei has become the key supplier of the NGN backbone projects for operators around Europe.

Grasp the “Tier One” Operators

³ Huawei Topped the Global IP Access Market with Continuous Growth in DSL Market Share (2008, January 11). Retrieved from <http://pr.huawei.com/cn/news/hw-089939-news.htm>.

In the mobile network field, as China's 3G licenses had not been issued until 2009, Huawei had to explore 3G overseas markets to grasp the fast-growing opportunity ahead of its domestic agenda. Europe, which spearheaded global 3G network development was perceived as the most attractive market for expansion. The primary goal of Huawei's business strategy in the European 3G market was set to acquire contracts from the European Tier One operators, with an attempt to get access to these operators' controlled markets and to further achieve global reach in other areas.

With the trend of business consolidation, a few Pan-European operators such as Vodafone, Orange, Telefonica, and T-Mobile dominated over 90% of European markets. By appropriating Mao's revolutionary tactic, Ren Zhengfei suggested that Huawei should grasp "the principal contradiction and the principal aspect of a contradiction"⁴ in its internationalization by targeting these Tier One operators.⁵ To obtain the entry opportunity, Huawei chose to serve the role as the low value-added equipment supplier for these giant operators at the beginning. In November 2005, Huawei signed a strategic partnership agreement with Vodafone, which marked a milestone of Huawei's advance in the tier one markets. As one of the world's largest mobile operators, Vodafone has established a series of criteria for selecting its core suppliers. After two years' strict assessment on Huawei's capability of manufacturing, R&D, marketing, management, finance and information security, Vodafone eventually chose Huawei as one of the preferred global suppliers of its "Short List" on which only Ericsson, Nokia, Siemens, and Lucent were included. However, Vodafone's endorsement did not necessarily lead to Huawei's establishment in the core 3G equipment market. The role Huawei served as an OEM actually constrained the company's autonomy in developing its own business capacities and entrenched the company in the low-end supply chain. In February 2006,

⁴ Mao applied the philosophy of dialectical materialism to interpret contradiction in his essay *On Contradiction*. Mao suggests that the principal contradiction is what primarily defines the thing and the principal aspect of a contradiction is the nature of a particular contradiction.

⁵ Ren, Z. (2007, July 13). A released public speech when Ren visited the UK office. Retrieved from <http://xinsheng.huawei.com/cn/index.php?app=forum&mod=Detail&act=index&id=2874429>

Huawei obtained a strategic 3G handset contract from Vodafone. Under the agreement, Huawei served as an ODM (original design manufacturer) to provide Vodafone-branded consumer 3G handsets across 21 countries. This contract can be seen as a purchasing strategy by Vodafone that used Huawei's presence to put pressure on other European suppliers to meet Huawei's low prices.⁶ The ODM model not only enabled Vodafone to avoid "co-branded" fees paid to European vendors but also strengthened its control over the whole telecom market chain from backbone infrastructure to device provisions. For Huawei, it was the first time the company's consumer devices entered the European market. However, this entry mode was at the expense of Huawei's own brand in the market, and the company's profit-making space has also been tremendously squeezed by local carriers.

Huawei's strategic advance in the European 3G market was further made in those peripheral countries controlled by the "Tier One" operators, which allowed the company to climb up the supply chain from a low-end handset supplier to a key equipment and solution provider in core business areas. As these operators set high barriers to non-European firms in core countries, Huawei had to "detour" its expansionary trajectory by "circling core countries from peripheral ones". Due to the uneven growth within European fragmented markets, 3G services in peripheral countries were at a relatively low technological level and in a small business scale. Such discrepancies, on the contrary, generated opportunities for Huawei to break into the European 3G equipment market. In 2006 Huawei passed Vodafone's testing on its 3G network equipment and gained Vodafone Spain's contract to deploy the High Speed Packet Access networks. In the next year, Huawei was awarded the contract to build 70% of Vodafone Spain's 3G network. Under Huawei's deployment, the performance of Vodafone Spain's mobile

⁶ Vodafone's Approval Should Help Huawei in More Markets (2005, November 28). Retrieved from <https://www.gartner.com/doc/487094/vodafones-approval-help-huawei-markets>.

network was enhanced by 30 per cent.⁷ Following the large-scale network expansion in Spain, Huawei was awarded the contracts by Vodafone to deploy other sub-networks in Greece, Romania, Iceland and Hungary. Huawei's success in these marginal markets paved the way for its expansion into core countries. In 2007 Huawei won the bid from O2 Germany to upgrade the previous supplier's equipment by using Huawei's innovative 2G/3G dual-mode base stations which were capable to meet the need of co-existence of 2G/3G networks. This deal was significant for Huawei, because by then the company had successfully established partnership with all of the European tier one operators.

Huawei's rapid growth in market share was a clear indication of its strong presence in Europe. Even during the economic recession Huawei still managed to speed up its penetration into European markets and sustained strong growth. In 2008, Huawei's sales in Europe increased 42%. In the same year, the company acquired US\$3 billion worth of contract sales in this region, accounting for 10% of European contract sales.⁸

In the post-crisis era, major European operators have substantially increased spending in network migration from 3G to 4G with the intention to create new demand out of previously mature and saturated markets. Huawei launched an aggressive 4G roll-out plan across Europe to catch up with this wave of restructuring, which was warmly welcomed by European operators. The company even took a lead in 5G research by developing core technological components of the 5G infrastructure. The company thereby became one of the key contributors of the EU 5G Infrastructure public-private partnership programme (5GPPP). Huawei's entry into the lucrative, cutting-edge market will definitely intensify the fray with other European rivals and lead to the fast-eroding dominance of these European companies in the telecom equipment market.

⁷ Changing the Pattern of Global Mobile Market. Retrieved from <http://www.huawei.com/es/about-huawei/newsroom/media-coverage/hw-090789-news.htm>.

⁸ Huawei Claims that the European Market Share Increased to 10% (2009, August 24). Retrieved from <http://www.cww.net.cn/manufacture/html/2009/8/24/2009824115443009.htm>

R&D Investment and Asset-seeking Activities

As Robinson (2004) argues, the process of corporate transnationalization often went through different phases, including exporting products, establishing overseas manufacturing for local markets, and linking sales, manufacturing, sourcing and R&D processes in an integrated circuit of global production and capital accumulation. Huawei's international expansion has primarily followed such patterns and trajectories. Evolving from a junior manufacturing partner to a key ICT equipment provider, Huawei's presence in Europe is no longer confined in the provision of low-cost equipment products but has extended to various value-added business initiatives such as the acquisition of R&D capability and strategic assets.

Along with Huawei's market expansion in Europe, the company has increasingly placed more strategic focus on knowledge-intensive market activities to pursue technology exploration and knowledge learning in Europe, which has also become one of the major motives for Huawei's extensive expansion in this region. Since its entry into Europe in 2000, Huawei has been seeking to establish large R&D networks on the continent, fully taking advantage of the EU resources in science and technology development. Since 2007 Huawei has considerably increased its investment in European R&D operations with 24% annual growth rate.⁹ In 2012, Huawei's European subsidiaries invested more than € 3.6 billion on R&D, and more than € 14.5 billion in total over the past decade.¹⁰ Headquartered in Munich, Huawei's European Research Center (ERC) runs 13 R&D branches in Germany, Sweden, Italy, France, Belgium, UK, Ireland and Finland. These research institutes took advantage of local R&D capabilities and performed basic and applied research in different specialized fields. To some extent Huawei's Europe-based R&D facilities have become a backbone of the company's global

⁹ Huawei's Place in the EU's Research and Innovation Landscape (2013, February). Retrieved from https://www.huawei.eu/sites/default/files/huawei_rd_brochure_en_feb2012_0.pdf.

¹⁰ *ibid.*

technological research networks and a “test field” for the most advanced ICT technologies. In addition, Huawei also set up 18 collaborative innovation centers with local mainstream operators across the EU, cooperating with partners in some national or EU-backed research projects. Huawei’s increasing investment in European R&D facilities indicates that the company has gradually fit into the local innovation system and acted as a knowledge contributor, establishing itself as a key player within the “bedrock of the science and technology landscape in Europe”¹¹.

At the same time, Huawei’s foreign direct investment in Europe has also undergone a dramatic increase. Especially after the European debt crisis, Chinese investors seized opportunities to buy into cash-strapped European industrials and assets. The increasing flow of Chinese investment into the ICT sector coincided with the EU endeavor to rebuild its high-tech industry. In the framework of *Europe 2020 Digital Agenda*, for instance, ICT was given unprecedented priorities. As part of this agenda, the project of *The Connecting Europe Facility*, which was designed to contribute to the competitiveness of the European economy and interconnection of pan-European networks, set aside € 9.2 billion to support the investment of EU ICT development. Huawei’s huge direct investment has been channeled into such endeavors to support the priorities of the ICT-led restructuring. To some extent Huawei scrambled to leverage its roles in this process of Europe’s ICT development and constituted itself as “a legitimate contributor to the policy-making process”.¹² The escalation of the company’s investment scale and scope, on the other hand, also fully exemplified the heightened degree of Huawei’s transnationalization and the “deep integration” of Chinese capital in the regional and global economic systems.

As Chinese ICT firms have increasingly served an important role in the restructuring of the European economy in the post-crisis era, Europe has provided a much friendlier place for Chinese TNCs to expand and penetrate. Compared with the US market,

¹¹ *ibid.*

¹² *ibid.*

European countries in general are much more open to Chinese high-tech capital. Chinese telecom equipment firms have reportedly spent more than three times as much in Europe as in US.¹³ In 2012, Huawei announced a further investment of US\$2 billion and that it would double its current workforce to 14,000 employees in Europe to serve its explosive rate of expansion. Now Huawei has become the second biggest Chinese investor in Europe, just behind Zhejiang Geely which owned the Swedish carmaker Volvo, and the biggest employer among all Chinese TNCs operated in the region.¹⁴ As a Huawei executive claimed, Huawei intends to turn Europe into the company's "second home market" and a stable engine of profit growth.¹⁵

Challenges and Tensions

In spite of the significant success Huawei has achieved on the continent, the company's expansion has also encountered immense challenges and tensions. One big challenge was the prevailing concern about the company's "Chinese identity" and its relationship with the Chinese government and the military. To consolidate the company's position in the global North, Huawei has attempted to weaken its nationalistic discourse that had been advocated in the company's initial expansion into developing countries. The company has attempted to blur its Chinese identity in its activities of transnationalization and conformed to the more universal market norms advocated by Western countries. Ren Zhengfei has even claimed that Huawei aims to be viewed as a "European company" in an effort to receive recognition and trust from the West.¹⁶ Along

¹³ China Invests More in Europe than in US. (2013, February 26). *Xinhua News Agency*. Retrieved from http://www.china.org.cn/business/2013-02/26/content_28058590.htm

¹⁴ Pfanner, E. (2012, October 10). Chinese Telecom Firm Finds Warmer Welcome in Europe. *The New York Times*. Retrieved from <http://www.nytimes.com/2012/10/12/business/global/huawei-chinese-telecom-company-finds-warmer-welcome-in-europe.html>.

¹⁵ Preuschat, A. (2015, July 17). Huawei Says Europe is 'Like a Second Home Market'. *The Wall Street Journal*. Retrieved from <http://blogs.wsj.com/digits/2015/07/17/huawei-says-europe-is-like-a-second-home-market/>

¹⁶ Schechner, S. (2014, May 2). Huawei Founder: Company Aims to Be viewed as "European". *The Wall Street Journal*. Retrieved from

with Huawei's deeper integration in Western markets, Ren has further suggested that the company must reject "parochial nationalism" for the sake of internationalization. This change of corporate discourse is in striking contrast with Huawei's expression of nationalism in its early stage of international expansion. It also underscores the company's intention of acquiring a legitimate status in global markets, and that acquiring recognition from the West is seen as the prerequisite to achieve this objective.

Although Huawei received "warm welcome" in Europe, the company's growing presence and rapid expansion has still raised considerable tensions and disputes within the EU. In 2012, the EU trade commission launched an anti-dumping and anti-subsidy investigation into Huawei and ZTE. It alleged that the Chinese vendors were being subsidized by the Chinese government through its preferential cheap loans which enabled the Chinese companies to undercut the European champions' prices and created a "distorted playing field" for Chinese TNCs in their overseas expansion. The EU trade commission even sent a warning letter to Chinese president Xi Jinping, urging the Chinese state and corporations to change their practices and threatening that the EU would take action to levy trade tariffs against Huawei and ZTE. The EU executive further required that the Chinese vendors had to increase 29% of their products' prices and urged the Chinese government to guarantee 30% market shares for European companies in the Chinese market.¹⁷ This anti-dumping action against Huawei and ZTE aimed to shield the European "strategic" sector from the rush of Chinese rivals and bring Chinese players in line with "international market rules".

Despite the prevailing concern about the expansionary power of Chinese capital, the division also emerged within the EU member states and different capitalist blocs, reflecting varied interest groups' diverse appeals. Some states, such as Germany,

<http://www.wsj.com/articles/SB10001424052702303678404579537603276498142>

¹⁷ Liu, L. (2013, January 31). The EU Required ZTE and Huawei to Increase Export Products' Prices by 29. *The Beijing News*. Retrieved from http://epaper.bjnews.com.cn/html/2013-01/31/content_407518.htm?div=-1

France and Italy, linked Huawei's business expansion in Europe with the security issue. Nevertheless, others such as Britain and the Netherlands showed positive attitude toward Huawei's direct investment in their countries, expecting to utilize Chinese capital to promote local economic recovery. On the other hand, those Europe-headquartered vendors such as Ericsson, Alcatel-Lucent SA and Nokia Siemens Networks feared that the anti-subsidy action would cause the Chinese government's retaliation on their business in China, which might make them lose more opportunities in China's lucrative market. The arising tensions between the EU and Chinese capital, as well as the division existing within the EU, exemplified the entangled interests and conflicts among different power blocs, including states, supranational powers, and fractions of transnational capitalists.

In spite of the rapid integration of Chinese ICT capital in the regional restructuring and the globalized capitalist system, the territorial logic still plays an important role in restraining the expansionary nature of globalized capital and in reshaping the modes of capital accumulation. The following section provides a description of Huawei's expansion in the US, a case which exemplifies how the interplay of geopolitical pressures and inter-capitalist rivalry has influenced uneven capitalist development and the struggle of neoliberal capitalist blocs.

Insurmountable Obstacles in the US

The US enjoys the world's largest ICT market, containing massive ICT investment and user base. Its ICT funding has far exceeded that of China, Japan, the UK and Russia combined (Schiller, 2014, p.153). The large market size became a compelling motive for Chinese firms' expansion into the US. On the other hand, US-based TNCs giants have preemptively occupied leading positions and established longstanding strength across numerous transnational markets such as corporate data communication, semiconductor,

mobile equipment, software, and cloud computing, which posed a barrier to foreign rivals' entry into their home market. Moreover, the US state-corporate alliance also scrambles to suppress any "hostile", non-US-based capital by wielding the powerful state apparatus, which can be viewed as part of the US imperialist efforts to maintain its leadership in the global capitalist system. Huawei's encountering of a series of setbacks in the US is evident to shed light on such tensions between the US imperialist power and the newly emerging-market corporate power.

Aggressive Entry Mode: Inter-capitalist Competition and Alliance

Huawei's engagement in the US can be traced back to the early 1990s. As early as 1993, Huawei established a subsidiary called Ranboss in the US. This subsidiary, which has been renamed "FutureWay", has been developed into one of Huawei's most important R&D centers in its overseas markets. Before Huawei started its large-scale internationalization, this subsidiary primarily served to procure advanced ICT products in the US market. During the Clinton administration, Huawei reportedly spent \$685,700 purchasing high-performance computers from Digital Equipment Corporation, \$300,000 from IBM, \$71,000 from HP and \$38,200 from Sun Microsystems. In addition, Huawei also bought \$500,000 worth of telecom equipment from its major rival Qualcomm.¹⁸ In 2001, Huawei established its North American headquarters in Plano, Texas, indicating the company's strategic move to explore the world's most advanced ICT market.

Although Huawei has marked footprints in emerging markets and in Europe since the early 2000s, the US remained the last untapped market for the company. As the US government set insurmountable barriers in the domestic network infrastructure market to foreign vendors, Huawei instead chose the burgeoning field—the enterprise business such as corporate routers, switches, Internet access points and corporate networks—as

¹⁸ Motz, K. & Richie, J. (2001, March 19). Techno Two-Timing. *The Asian Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/SB984950042398710644>.

a beachhead into the US market. This meant Huawei had to launch head-to-head competition with Cisco--the world's largest supplier of business network equipment--at its home market. Before Huawei entered the US, the two companies had already competed in China's booming market. In spite of its role as a market latecomer, by 2002 Huawei already took up 25.4% market share of China's router markets, next to Cisco's 51.8%; in China's low-end market, Huawei's market share even reached 35.1%, with a narrowing gap with Cisco's 46.4%.¹⁹ To some extent, Huawei has posed a direct threat to Cisco.

After gaining a firm foothold in China's market, Huawei was ambitious to expand its enterprise business in the US. It adopted a low pricing strategy again, offering a price 30% lower than that of Cisco and other Western rivals. In addition, the company launched an aggressive advertisement campaign across the US in the early 2000s to build the corporate image. The advertisement features Huawei products against the background of the Golden Gate Bridge in San Francisco, a reference to the Cisco system. The text reads, "*The only difference between us and them is price*". The underlying meaning of Huawei's advertisement indicated the company's competitive advantage in its cost-effective products and solutions. However, Huawei's aggressive market strategy raised persistent counteraction from the rival. Cisco's first reaction was to negotiate with Huawei by promising to provide Huawei with OEM subcontracts for its low-end product manufacturing, but the condition was to force Huawei to give up its high-end products under Huawei's brand and withdraw from the US market (Sun, 2009). This request was refused by Huawei.

To expel the Chinese competitor from its home market, Cisco then launched another war against Huawei by suing Huawei for infringement of intellectual property in 2003. Cisco claimed that Huawei infringed on its patents and stole its source code in Huawei-produced routers and other networking equipment. The company also lobbied

¹⁹ The Lawsuit between Cisco and Huawei (2004, August 10). *Telecom World*. Retrieved from <http://it.sohu.com/20040810/n221455688.shtml>.

the US government to enact more intrusive policies over property protection to guarantee and privilege US-based companies' interests. In reaction to Cisco's unresolved lawsuit, Huawei chose to cooperate with another US-based enterprise network supplier, 3Com,²⁰ which had been a viable player in the enterprise networking market, to establish a joint venture. The alliance helped Huawei reshape its market strategy in North America on the one hand, and allowed both vendors to compete effectively with their common rival—Cisco—on the other. Despite the different origins of these two firms, their shared interest in capital accumulation served to bond different national blocs of capital together and to contest with other fractions of capital in the market. In this case, the involvement of 3Com in the disputes actually helped Huawei increase its bargaining power in settling the lawsuit (Sun, 2009). In July 2003 Cisco and Huawei finally reached an agreement: Cisco agreed to drop the lawsuit, but Huawei was forced to remove almost all of its router products from the US market.

The conflicts with Cisco frustrated Huawei's expansionary initiatives in the US. As a result, Huawei had to change its aggressive entry mode in the US, turning to other US companies for cooperation. This strategy compelled Huawei to give up its own brand in North America and adopt the forms of OEM and joint venture to reroute the path toward the enclosed market. In 2006, Huawei collaborated with Motorola on 3G technologies, undertaking the manufacturing subcontracts for Motorola's 3G wireless equipment. But such an alliance was shallow and unstable when conflicts occurred among different fractions of capitalists. In 2010 Huawei and Nokia-Siemens competed to acquire Motorola's telecom network equipment business, but the European giant eventually won the deal for US\$1.2 billion. This acquisition directly led to the termination of Motorola's collaboration with Huawei. In addition, after the announcement of this acquisition, Motorola immediately launched a lawsuit against Huawei for alleged theft of trade secrets,

²⁰ 3Com Corporation is a US-based global enterprise networking products and solutions provider. It is one of the key rivals of Cisco in the enterprise networking market.

with an attempt to attack one of the biggest potential rivals in North America for its new partners.

Obstacles Erected by the US State Apparatus

In addition to inter-capitalist competition, Huawei also faced formidable obstacles erected by interlocked US state apparatuses that tended to articulate the presence of Chinese capital with the threat of national security. In line with the government's policy, the US mainstream media took advantage of their discursive power to distort Huawei's corporate image, linking the expansion of Chinese ICT capital with the discourse of the "China's threat". The US mainstream media kept accusing Huawei of links to China's military. This prevailing rhetoric is representative among US military elites and its ruling class. On the one hand, it reflected fears about the modernization of China's military forces enabled by the advanced ICT technology, which might directly pose a challenge to the US national security. But on the other hand the ruling class also had concern that the increasing involvement of Chinese capital in the lucrative military industry would substantially threaten their immense business profits and margins in the market created by escalating "networked militarization" (Schiller, 2014). In addition, the US media also expressed concern about Huawei's engagement in some "hostile" countries. For example, on October 27 2011, *The Wall Street Journal* made a charge against Huawei's business operations in Iran, claiming that Huawei aided Iran's government in surveillance and censorship.²¹ Under immense public pressure from the US mainstream media, in December Huawei announced it would scale back its business in Iran, promising not to seek new customer contracts and to limit commercial activities with existing customers. Along with the pull-back from Iran, Huawei's operations in Cuba, Syria, Libya and other "politically sensitive countries" have also been disrupted. According to a Huawei

²¹ Stecklow, S., Fassihi, F. & Chao, L. (2011, October 27). Chinese Tech Giant Aids Iran. *The Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/SB10001424052970204644504576651503577823210>

employee who had worked in the Middle East, Huawei's operations in these "hostile" countries had to be carried out in a "covert" manner in order to avoid unreasonable accusation from the West especially from the US.

As Ren complained, "For years some of the American and media have persistently distorted facts and attacked us".²² The media rhetoric that resonates the discourse of the US extraterritorial network policy primarily serves to consolidate US political control and economic strategic interests when facing the threat of foreign capital. As a significant constituent of American hegemony, the US mainstream media's discursive power not only plays a crucial role in defining "rules of law", but also creates "a world after its own image" to sustain its supremacy in the global political economic order (Panitch & Gindin, 2012, p.275).

It should be noted that the difficulties Huawei faced were more than pure competition with its peer rivals and media distortions. Under the US government's direct intervention, Huawei underwent a series of setbacks in the American market. In 2008 Huawei was forced to drop a bid for purchasing a controlling stake in 3Com. The US government claimed that this deal would give China access to the anti-hacking technology used by the US Defense Department. Eventually the American firm Hewlett-Packard won the bid for acquisition of 3Com, while Huawei lost its most important partner in the US market. Likewise, in 2011 Huawei's purchase of US server company 3Leaf's assets was also blocked. The Committee on Foreign Investment in the United States (CFIUS) declined the transaction due to the "concerns of national security". In the telecom infrastructure segment, Huawei remained confined to the periphery of telecom businesses. For decades the company has been completely excluded from purchase lists of US top-tier carriers including AT&T, Sprint, T-Mobile and Verizon. In 2010 there was an opportunity

²² Ren, Z. (2010, August 26). To Achieve Win-win Result by focusing on Clients, Investment in Platform and Cooperation. A Speech at Huawei's Conference. Retrieved from <http://forum.huawei.com/portal.php?mod=view&aid=61>.

for Huawei to win the bid from Sprint Nextel--America's third-largest mobile operator--as Huawei's solutions for Sprint's wireless network upgrade projects could help the carrier save more than US\$800 million in costs. But an interviewee who worked at Huawei's North American branch revealed that the deal suddenly came to a deadlock because of the US government's intervention. And the operator eventually opted for another homegrown vendor. The deal also raised strong opposition from US politicians who saw this as a conflict with America's national interests and launched a campaign to block Huawei's bid to sell equipment in the US.

In response to the American government's unfair treatment, in 2011 Huawei's deputy chairman Hu Houkun released a lengthy open letter to rebut the groundless allegations against Huawei, calling for a formal investigation on Huawei's operations in order to dispel the US concerns about Huawei's threat to the US national security. As a direct result of this open letter, the US House Intelligence Committee launched a yearlong investigation on Huawei and ZTE. However, on the contrary to Huawei's expectation, the investigative report not only insisted on the allegations against Huawei in terms of its "potential threat", but also further urged the US government system and private-sector entities to shun these two Chinese companies out of the US market.²³

In fact, the US discourse of national security is grounded in several concerns. First, it underlies the domestic realist concern that takes telecommunications architecture and cyberspace as new frontiers of inter-state wars and as "nationally bounded territory in need of defense" (Brush, 2004, p.232). US military elites had specific concern about foreign suppliers' unauthorized access to US public and private network systems (Schiller, 2014). This has become the key excuse for the US government to block foreign ICT

²³ US House of Representative, 112th Congress (2012, October 8). Investigative Report on the US National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE. Retrieved from [https://intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20\(final\).pdf](https://intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20(final).pdf)

capital from the supply chain of domestic critical infrastructure. The setbacks Huawei has been encountering in the US high-tech market can be seen as a result of US defensive operations in managing potential threats of network security. Nevertheless, US network policy initiatives in the most recent decade have not only focused purely on defensive strategies, but also tended to foster more offensive actions to maintain US dominance in cyberspace. One of these crucial measures was to ramp up the range and depth of surveillance through big-data processing capabilities. The big data strategy was even promoted as a new national core capacity by the Obama Administration. Moreover, US unilateral dominance in the extraterritorial cyberspace hardens US offensive efforts to build a global invasive network of surveillance. Its unscrupulous surveillance operations have gone far beyond the rationale of “anti-terrorism” and penetrated into other countries’ critical infrastructure networks as well as foreign firms’ corporate networks. The US authorities and media have charged that Huawei-made telecom equipment was devised to allow unauthorized access by the Chinese government and the military. Ironically, it is the US National Security Agency (NSA) that has reportedly launched major cyber attacks against Huawei since 2009. In early 2009 the US spying program hacked into servers of Huawei’s central office in Shenzhen, which allowed the NSA to gain access to Huawei’s email archives and information of the company’s major customers. The NSA also obtained the individual source code of Huawei-made products, which made US officials get easy access to any network using Huawei’s equipment. This espionage scandal reveals the US “double standards” in defining “national security”. As William B. Plummer, Huawei’s vice president of external affairs, condemned : “The irony is that exactly what they are doing to us is what they have always charged that the Chinese are doing through us.”²⁴

²⁴ Sanger, D. & Perloth, N. (2014, March 22). N.S.A. Breached Chinese Servers Seen as Security Threat. *The New York Times*. Retrieved from https://www.nytimes.com/2014/03/23/world/asia/nsa-breached-chinese-servers-seen-as-spy-peril.html?_r=0

Following US operations, other Western countries including Australia and Canada also invoked protectionist policy to exclude Huawei from their networks construction plans due to “security concerns”. As Schiller (2011a) argues, the US in fact has the ability to project power into the domestic space of other countries and to affect their decision-making process (p.98). As a rule maker, the US has applied its hegemonic power at the national and international levels to pursue its “double standards”: to promote liberalized expansion for its home-based capital abroad and to launch protectionism to exclude rivalries at home (Hills, 2007, p.5). Therefore, the simple-minded rhetoric of “national security” is limited to capture inter-state conflicts and the new forms of imperialism in the network age. In network capitalism, cyberspace has become an important conflict zone for the struggle of state geopolitical interests and one of the fundamental elements of “network sovereignty”. The US effort to sustain its leadership in network capitalism is illustrated in its coercive actions against rivalry capitals and states, which can be viewed as an extension of the US imperialist power in the network age. As a Huawei executive commented that Huawei has become a “negotiating pawn” between the United States and China. The US government’s ban on Chinese ICT capital under the logic of “national security” is nothing more than a means to restrain the rise of China’s “national comprehensive strength”.²⁵

Apart from the realist concern in relation to the nation-state interests, the discourse of “national security” also intertwines with a tension of inter-capitalist rivalry. As the rise of Chinese firms in the high-end value chain has posed a direct challenge to the leadership of US-based companies in the traditional US-led global economic order, Chinese companies with core technologies and strong innovation capabilities such as Huawei and ZTE have been posited as major competitors and “real threats” to US capitalists.

²⁵ Olson, P. (2012, October 10). Interview: Huawei’s Cyber Security Chief Slams “Protectionism”. *Forbes*. Retrieved from <http://www.forbes.com/sites/parmyolson/2012/10/10/interview-huaweis-cyber-security-chief-decries-protectionism/#2d8cc012661d>

However, for those Chinese manufacturing companies entrenched in low-end value chain, the US government was more positive and tolerant towards their entry. For example, Chinese PC producer Lenovo encountered fewer obstacles and oppositions than Huawei when acquiring IBM PC business unit and Motorola handset division. This is largely because the US ICT manufacturing business has been facing shrinking margin in the last decade and many American high-tech companies were eager to seek restructuring strategy by getting rid of low value-added business and shifting to high-end Internet-based applications. Chinese companies' acquisition of American companies' "outdated" business was actually congruent with the benefit of the US industrial restructuring.

The alliance of the US government and companies has been formed based on shared interests. The state's regulatory bodies are used as an institutionalized tool for market protectionism to shield indigenous capitalists from external competition. And the US-based transnational ICT capitalists' unrivaled access to the state power also served to consolidate the bulwark against foreign capital. According to the US media reports, Huawei's main US rivals including Cisco have lobbied the government to increase scrutiny of Huawei. Before the Congress's investigation on Huawei and ZTE, Cisco particularly launched an anti-Huawei campaign by raising national security concerns in the domestic telecommunications industry.²⁶ In addition to these lobbying groups, Cisco has also shared direct financial interests with US politicians. At least 73 Congressmen reportedly had significant financial stakes in Cisco. Among them, one of the largest shareholders was said to own shares worth between \$600,000 and \$1.3 million.²⁷ The

²⁶ Kang, C. (2012, October, 10). Huawei's US Competitors Among Those Pushing for Scrutiny of Chinese Tech Firm. *The Washington Post*. Retrieved from https://www.washingtonpost.com/business/technology/huaweis-us-competitors-among-those-pushing-for-scrutiny-of-chinese-tech-firm/2012/10/10/b84d8d16-1256-11e2-a16b-2c110031514a_story.html?utm_term=.d08f26552343.

²⁷ The 10 Top Stocks Owned by Congress. Retrieved from <http://money.msn.com/top-stocks/post.aspx?post=bee0873a-5fa3-432c-9c05-f0f784af32d5&ucsort=4>

close ties of corporate and political forces empowered Cisco to gain the upper hand over its external competitors on the home turf.

Localization and Business Strategic Adjustment

In response to coercive actions from the US government-corporation power complex, Huawei has sought changes in terms of the corporate structure and market strategies to conform to US policy requirements and economic interests. After the US congress published the investigative report against Huawei, the company released a *Cyber Security White Paper* in September 2012 to respond to the US government's accusation, promising to improve the company's cyber security operations and calling for consensus of international standards based on broader, collaborative and rationally-informed dialogue. This report on the one hand clarified Huawei's connection with the Chinese government and relevant agencies, and implicitly challenged US-dominated standards on the cyber security on the other. To concretize the company's effort on the protection of cyber security, Huawei also promised to publish original codes of all of its equipment to the US government. In addition, Huawei sought to localize the American branch's operations to act like an "American company" and to engage closely with US political institutions, with an attempt to gain recognition from the public and private sectors. For example, Huawei kept emphasizing its contribution to US economic growth by strengthening strategic collaborations with US-based partner companies. In 2012 Huawei announced it awarded three-year procurement contracts worth US\$6 billion to three US semiconductor companies: Qualcomm, Broadcom and Avago. This procurement agreement was expected to create over tens of thousands of job opportunities for the US ICT industry. A Huawei employee working at the North American branch revealed in an interview that since US released the report against Huawei the company has called back a large number of Chinese employees from the US-based branches and substantially extended the number of local employees to fulfill its commitment to the creation of local

employment opportunities. Meanwhile, Huawei has tended to recruit more American executives who had former working experience in other Western TNCs or US government institutions in order to transnationalize its managerial strata. In addition, the company also hired an army of outside and in-house lobbyists including key former politicians in the US government and considerably expanded its large spending on lobbying in Washington.

However, Huawei's transnationalized efforts in the US have sometimes appeared futile. The company's sales in the segment of the infrastructure business and enterprise networks business sharply declined in the US market after the 2012 congressional report. Huawei's revenue in the region of North America accounted for the lowest share of the company's overall revenue. To eschew the controversy of "national security" concerns and revive the market strategy in the US, Huawei entered the consumer business with a focus on lower-margin sales of its branded mobile devices using Google's Android operating system after 2012. By shifting the role from a critical infrastructure equipment supplier to a consumer device maker, Huawei intended to enter the less sensitive market segment with less intervention by the US government. In addition, as the software operating system is still mastered by the American company, Huawei's expansion in the consumer market seems to pose less threat to US firms and to American network security. However, Huawei's efforts were further hampered. Despite dramatic growth of Huawei smartphone sales globally, its sales in the American market made up only a small proportion of the company's annual revenue and its market share was far behind other smartphone giants such as Apple, Samsung, LG, Motorola, and HTC. In the US market, Huawei has remained far from a household name. Besides lack of awareness of the brand among consumers, Huawei's brand also faced difficulties with US carriers because of the market ban.

In view of the insurmountable obstacles and unfair treatments in the US, Ren Zhengfei announced that “Huawei is exiting the US market” in an interview in 2013. He explained that “it is difficult if Huawei gets in the middle of US-China relations”, and “it is not worth it if [Huawei’s involvement] causes problem for US-China diplomatic relations”.²⁸ As Schiller (2011b) observes, China is not playing an antagonistic role to the US at the current stage. In this sense, Ren’s decision of retreat from the world’s largest telecom market can be seen as a compromise to the US protectionist policy. However, for the Chinese government, the central leadership still made efforts to intervene in and ease the tensions between Chinese ICT companies and the US government. As part of these efforts, in 2015 Chinese President Xi Jinping began his first visit to the US by organizing a China-US tech summit in Seattle, with an attempt to seek out an ally with the US tech giants and to quell or contain the US government’s sanctions on Chinese high-tech firms. Although US Internet companies such as Facebook, Google, and Twitter were also clamoring for improving access to China’s huge digital markets, the deep-seated conflicts over a range of issues—from trade disputes to cyber-commercial espionage—continued to constitute some insurmountable barriers for Chinese corporate players in the US market.

The US restrictions on Chinese ICT capital were not only confined in the sensitive segment of the telecom equipment but also extended to broader fields of the ICT industry. For instance, the Chinese e-commerce giant Alibaba was put on the “Notorious Markets” blacklist by the US office of the Trade Representative for alleged “violations of intellectual property” in 2016. However, unlike Huawei’s decision to exit the US market, Alibaba otherwise strove to forge connections and shared economic interests with US business elites to overcome the US protectionist policy. As Alibaba Executive Chairman Jack Ma promised to US President Donald Trump in their 2017 meeting, Alibaba would bring one

²⁸ Kerr, D. (2013, December 3). Huawei Reportedly Decides to Abandon the US market. Retrieved from <https://www.cnet.com/au/news/huawei-reportedly-decides-to-abandon-the-us-market/>.

million small US businesses onto its e-commerce platform to sell their goods to Chinese consumers and create at least one million jobs in the US over the next five years. Rather than expanding its e-commerce services in the US market, Alibaba leveraged the huge Chinese consumer market which is primarily comprised of China's vast and growing middle class to create lucrative opportunities for US firms. This initiative is congruent with the Trump Administration's economic restructuring plans and US capitalists' interests. The symbiotic relationship between China-based Internet capitalists and the US ruling class might forge a new form of the so-called "Chimerica" order (Ferguson & Schularick, 2007; Zhao, 2014) even under Trump's protectionist economic policy. In a striking contrast with Alibaba's initiative, Huawei opted for a strategy of "delinkage" with the US market. This significant decision might reduce the company's investment in the US market and adjust its strategic focus to accommodate China's thriving market. China's reorientation toward a "domestic growth-driven model" actually "granted some maneuvering room to Chinese capital" (Hong, 2017; Schiller, 2014, p.236). The Chinese state's capacity in reserving and cultivating its national market might enable Huawei to adjust its trajectory of development from "going out" to "going back" to its rapidly growing home market.

Conclusion

The outward expansion of Chinese capital, following the trajectory from peripheral countries to core countries, is consistent with the Chinese state's initiatives of pushing for deeper integration into global capitalism. The penetration of Chinese ICT capital into traditional core countries, to some extent, is posited as an essential step to enhance China's position in the global order. It is important to point out that the process of such a "counter capital flow" is not friction-free; rather, it is rife with inter-state and inter-capitalist tensions. As Robinson (2014) emphasizes, the conjunction of geopolitical and structural analyses must be informed to understand the growing conflicts between traditional core

countries and rising powers in the global South. First, Huawei's case illustrates that the interstate geopolitical-economic struggle over the control of network infrastructure and information sovereignty has been intensified. Underlying this struggle is the new form of "territorial logic" in the age of digital capitalism: that is to secure the commanding height of information and cyberspace warfare to ward off threats and to ensure greater security. China's proliferating effort of nurturing globally competitive ICT firms and pursuing their extraterritorial expansion can be viewed as part of such a logic to secure greater political and economic power in the global capitalist system.

Second, besides the tensions of the "territorial logic", the contradictions embedded in Huawei's expansion also demonstrated inter-capitalist competition and rivalry. As noted by Robinson (2014):

What appear as international struggles for global hegemony or struggles of the South against the North are better seen as struggles by emerging transnational capitalists and elites outside of the original transatlantic and trilateral core to break into the ranks of the global elite...(p.38).

In this sense, the conflict between the emerging corporate power from China and the traditional core powers can be seen as a form of competition between capitalists for reposition in the ranks of the transnational capitalist class. The dilemma of Huawei's expansion in the West, therefore, demonstrated the conflicts of the "capitalist logic" underlying the transnationalization of the capital circuit.

In light of the multifaceted and complicated nature of Chinese capital, it is still too early to predict that the rise of Chinese ICT corporate power would pose any real threat to the West at the current stage. Although Huawei has successfully broken into Western mainstream markets and possessed competitive advantage in global production, the scale and scope of Chinese TNCs in the ICT sector "remained below par" with giant Western competitors (Schiller, 2014, p.236). Moreover, despite Huawei's "delinkage" strategy in the US, fractions of Chinese capitalist groups such as the newly emerging

Internet capitalists still tend to forge ties with the US for their expansionary ambitions and converge on a shared agenda of capital accumulation or policy goal. Therefore, it would be mistaken to posit the rise of China's corporate power as a coherent force to challenge the existing US-led political economic order.

Chapter 5.

From Path-dependent to Path-breaking? Huawei's Technological Capability Development

Apart from Huawei's competence in market expansion, the company's success can be attributable to its self-reliant research and development-oriented strategy. Its impressive efforts to nurture cutting-edge technological and innovation capabilities occurred within China's industrial restructuring that strove to move from technological dependence to "indigenous innovation". The company's pursuit of progress "on the technological front" is congruent with China's national strategy to strike the "global strategic balance" (Feigenbaum, 2003). However, the techno-nationalistic initiative is not the sole driving force for Huawei's R&D strategy. Huawei's keen interests in seeking cooperative, transnationalized R&D networks along with its "going-out" process constitute a transnational character of its R&D strategy. This path not only contrasts with the state-centered, nationalistic approach, but also gives rise to new forms of competition, conflict, and synergy among multiple technological actors within a transnationalized context. In this sense, the tension between the state's techno-nationalistic initiative of pursuing technological leadership and the growing transnational nature of capitalist accumulation has become one of the most prominent themes that define much of China's recent struggle in its developmental trajectory in the network age (Zhao, 2010). This chapter focuses on such underlying contradictions and paradoxical dynamics by looking into Huawei's strategy in technology development and innovation.

As the evolution of China's approach to technological development—from Mao's militarization to market-oriented approach and then to current inspiration of cultivating indigenous innovation—is shaping local firms' trajectory of technological development,

this chapter first provides a historical review of China's evolving technology strategy to understand how the changing policy framework set the scene for the development of Huawei's R&D capability. Then a detailed account of Huawei's R&D strategies, specifically exemplified in its development in the fields of digital switching technology, telecom standards, semiconductor technology, and patent-oriented strategy, is provided to understand the incentives and patterns of Huawei's technological and innovative development as well as its dynamic interaction with multiple technological actors.

China's Distinct Trajectory of Technological Development

There has been ongoing theoretical debate on the role of technology in Third World countries' social development within the post-war literature. For example, the mainstream modernization theorists view technology progress as the driving force of social transformation and believe that Third World countries' development primarily depends on the importation and diffusion of technology from developed countries (Inkeles & Smith, 1974; Lerner, 1958; Rogers, 2010; Schramm 1964). Modernization theories have been under attack from many scholars (Frank, 1967; Sen, 2001; Tipps, 1973; Wallerstein, 1979). The most eminent critique came from a wide range of critical writers who developed the Dependency School (Frank, 1967; Rodney, 1972; Vernengo, 2006). From the perspective of the dependency theory, less developed countries' (LDCs) dependence on the importation of advanced technology from core countries would lead to structural underdevelopment and long-term systematic dependency in the periphery. Some radical neo-imperialist writers went further to question the nature of capitalist technology development. As Samir Amin (1977) has argued, "borrowing a technology from the capitalist world is never 'innocent' because this technology supports class relations of production" (p.176-177). He further noted that:

(T)his technology is excessively costly not only because of its capitalist intensive nature, but because of the wasteful consumption patterns it brings with it, the excessive exploitation of natural resources that it implies

etc. In other words, this technology presupposes imperialism, i.e. the excessive exploitation of labor in the periphery (Amin, 1977, p.173).

In contrast with modernization theorists, neo-imperialist writers tend to explore such a critical question: development for whom? This essential question brings the issue of power relations to the discussion of the nature of technology. It rejects the idea of technology neutrality and takes into account broader social, political and economic factors that shape the politics of technology-led development.

At the same time, the empirical experience from newly industrialized countries complements this theoretical debate, demonstrating these countries' different patterns of technological progress in comparison with the earlier industrialization of Western countries (Amsden, 1989). East Asian firms generally build up their technical competency through technological learning and acquisition in the globalized production network, moving from simple original equipment manufacturing (OEM) to own-design manufacturing (ODM) and to own-brand manufacturing (OBM). However, it should be noted that these countries' technological achievements were primarily built on their linkage with foreign transnational capital. As scholar of economic geography Yu Zhou (2007) points out, the rise of Asian "dragons" de facto "benefited from relatively unhindered access to US markets and technology" during their takeoff period (p.18). The mode of export-led economies in East Asian industrialized countries "acted as a focusing device for technology investments" (Hobday, 1995, p.195). Although China's market reform followed a similar export-oriented path of development, the Chinese state's effort to cultivate domestically accumulated expertise by drawing on self-reliant R&D activities constituted a distinct approach of technology development.

The trajectory of China's technological development has experienced complex policy struggles along with China's political economic transformation. As Smythe (1994) underscored, the political and ideological nature of technique and technology determined

the viability of China's search for an alternative to capitalist technological development. For Smythe, the distinct characteristic of China's socialist technological development lay in the country's ability to reject the Western capitalist model of technological innovation and economic production relations.

Beyond the simple dichotomy of "socialism" versus "capitalism", China's search for its own path of technological development was a more complex process (Zhao, 2007a). Political scientist Evan A. Feigenbaum (2003) highlights the legacy of China's militarization from the 1950s to 1970s in the evolution of China's technology and science development. Under the external Cold War pressure of that time, "techno-nationalism with Chinese characteristics" was embraced as the overarching developmental doctrine in the planning of the national economy. The significance of technologies in the Cold War context had a broader scope, impinging much on "industrial competitiveness, international standing, and economic power" (Feigenbaum, 2003, p.29). In this regard, technologies can be redefined as an intrinsically strategic power struggling for the relative position of the state in international relations (ibid, p.39). Directed by the idea of military-led techno-nationalism, priorities of investment were placed more on strategic military-related technologies and strategic weapon programs. The development of critical technical infrastructure led to "spin-off" of high technologies from military to civilian industries and "trickle-down" from strategic technology sectors to a wider industrial base, which laid a solid foundation for China's technical progress in the reform era (ibid, p.14). As discussed in Chapter 2, Chinese major breakthroughs in the fields of electronics and telecommunications technologies were primarily fulfilled by military-related research institutes and third-front enterprises under the nationwide programs of militarization.

In terms of the organizational style of technology development during the Mao era, the state played a crucial and direct role in mobilizing R&D resource and developing critical technology sectors under the central planning system. However, China's

technology development was not confined under the rubric of the state-led militarization, but also incorporated proletariat class politics (Wang, 2014). As Wang (2014) documents, a mass-based technology campaign in the domain of electronic industry, which was based on the principles of decentralization and local “self-reliance”, had been spread during the Mao era. In contrast with the Western elite model, China’s socialist pattern of technological development and innovation articulated workers’ participation and experience in the manufacturing process. The technology education during this period gave more emphasis on workers’ knowledge production and technical innovation in working practices. By overcoming fragmented, vertically bureaucratic hierarchies and technocrat politics, ordinary workers who had formed the political identity of “the master of technology” were able to participate in the design of products and determine how products and technologies were created. Apart from workers’ participation in the design-and-production process, such a democratic organizational style presupposed a two-way collaboration and interaction between professional scientists, technicians and industrial workers. In this context, technical progress to the greatest extent reflected working class’s subjectivities and identity politics in the combination of production and technological development. This distinct experience of socialist technological development has also partially been translated into Huawei’s R&D practices.

The legacies of military developmentalism and proletariat politics not only laid down a strong base of industrial skills and technology capabilities, but also explored an alternative to the Western model of technology modernization. The path hinging on a domestically accumulated, self-reliant technology and R&D system constituted the essential experience of China’s technological development.

However, with the trend of depoliticization in the post-Mao era, the dialectic relation between technology and politics has been overridden by the market mechanism in China’s technology policy. Contrary to Smythe’s wish, the value orientation of China’s

technological effort in the reform era has been transformed to serve the state's reintegration into global capitalism and the establishment of capitalist consumption relations (Zhao, 2007a). Although the idea of "informatization" was embraced as a national consensus for achieving China's post-Mao developmentalism, a paradoxical path of China's ICT technology development has been contested with heightened uncertainty.

Starting in the early 1980s, the central government set "dual-track" development as a guiding principle of China's ICT technological development. This mode of development involved four essential steps: first, importing and acquiring advanced foreign technology products; second, absorbing this know-how from technology transfer; third, exploring indigenized technology; and forth, nurturing innovative capacity at the state and firm levels (MEI, 1986). In regard to the relationship between technology transfer and indigenization, former Minister of the Electronics Industry Li Tieying emphasized:

Importing and indigenization are the two sides of the same coin... Importing is to fully utilize the achievements of international technology to promote indigenization. And indigenization is to obtain new development and better economic benefits based on new technical level (MEI, 1986).

Despite the state's incentive of promoting indigenous innovation and technology capabilities, foreign technology importation and transfer seemed to be the quickest route to build up the basic infrastructure at the beginning of China's opening. With the policy of "trading market for technology", foreign MNCs were rewarded with privileged access to China's market. The wholesale import of foreign standardized products provided Chinese firms with the least access to advanced technology competences. China's first telecoms joint venture Shanghai Bell was a typical case of "trading market for technology". According to the state-facilitated negotiation, the Belgium Bell Telephone Manufacturing Company (BTM) agreed to transfer partial technologies of System-12, one of the most advanced digital switching systems, to China's Posts and Telecommunications Industrial

Corporation (PTIC). However, the “transferred” technology was primarily confined in manufacturing, engineering and installation technology through a “highly formalized and carefully planned process”(Shen, 1999, p.147). The so-called “technology transfer” often includes “know-how” (production engineering) but not “know-why”(basic design, research and development).

Due to the Chinese government’s restrictions on foreign ownership in the strategic sector, foreign MNCs chose local firms especially non-state-owned firms as their sales partners to penetrate into the Chinese market. For local technology firms, they were keen to import proven foreign technologies and products directly to obtain profits in the burgeoning domestic market rather than investments in in-house R&D efforts. Instead of focusing on domestically accumulated R&D capabilities, most Chinese indigenous technology firms chose to engage in international trade to create linkages to transnational capital and fulfill the circuit of initial capital accumulation. For example, Lenovo, China’s PC manufacturing giant, followed a typical *mao gong ji* (trade to manufacturing and then to technology) trajectory. With the influx of foreign capital into China’s ICT sector in the 1990s, Chinese indigenous firms were further entrenched in labor-intensive, export-oriented production, lacking incentive in indigenous technological innovations.

Parallel to the outward-looking mode of technological development, the Chinese government strove to revive the national R&D and innovation system via the market mechanism. The 863 Plan, a massive military and industrial development plan, was initiated in 1986 to focus on seven strategic sectors ranging from information technology to space technology. As a following policy strategy, the so-called Torch Plan was launched in 1988 to promote commercialization and marketization of China’s strategic high-technologies. These plans sought to “yoke technological achievements to strategic goals of the state” on the one hand, and to finally achieve “long-range economic competitiveness” on the other (Feigenbaum, 2003, p.165). With this market-oriented

mode of high-tech development, commercial incentive has become a driving force as well as an organizing principle of research and development.

The market-oriented mode of high-tech development also moved from the state-centered approach to the involvement of multiple technological actors consisting of state, multinational corporations, local firms, and universities and research institutes. The R&D activity by indigenous firms, in particular, was embraced as a priority within the national innovation system. In 1997 the National Conference on Technological Innovation promoted the role of enterprises as a key force in national R&D activities. In 1999, the government further required that Chinese high-tech firms had to spend at least five per cent of their annual sales on R&D. In 2000, enterprises spending accounted for 60 per cent of China's R&D spending, implying that enterprises have become a major player in research and innovation. However, R&D spending by Chinese indigenous enterprises remained at a relatively low level. In 2006, the top 100 domestic electronics and information enterprises spent an average about 3.9 per cent of annual sales revenue on R&D, far below the goal set by the state government.¹

Over the past decade, China has accelerated its technological input in high-tech sectors. In 2013 China overtook Japan in R&D spending and became the second largest R&D spender in the world, just behind the United States.² The country's R&D spending to GDP ratio reached 2.1 per cent by 2015, the highest among developing countries. Despite rapid growth of national technological spending, it is important to note that China's R&D resources are still unequally distributed. With China's integration into the globalized R&D network, foreign MNCs have increasingly played an important role in China's R&D activities by setting global R&D centers and appropriating R&D talents in

¹ China's Top100 Electronics Enterprises' R&D Spending Accounts for 3.9% of Sales Revenue (2007, June 7). *Xinhua News Agency*. Retrieved from <http://it.sohu.com/20070607/n250446798.shtml>

² Accelerate Technological Innovation with Prominent Innovation-Driven Effects (2016, March 9). National Bureau of Statistics of the PRC. Retrieved from http://www.stats.gov.cn/tjsj%20/sjjd/201603/t20160309_1328568.html

China. In addition, state-owned enterprises (SOEs) also possessed advantage in their access to national R&D resources relative to domestic private enterprises. For example, SOEs have privilege to obtain national R&D funding and projects. Despite the full force of competition, Huawei managed to carve out a distinct path toward technological capability development in the high-tech sector. How can a private firm that started from a sales agent grow into a technological giant in its own right? Huawei's distinct experience might provide special lessons for other Chinese indigenous firms.

Huawei's Technological And Innovative Capability Development

The analysis of China's technological development strategies at the macro level offers a perspective to examine the role of the state and industry policy in shaping a firm's innovation strategies and capabilities. In turn, a close investigation of innovation models and R&D practices at the firm level is useful to understand the role of the Chinese indigenous firm in driving China's technological upgrading and the development of indigenous innovation.

The source of innovation at the firm level may come from internal efforts such as in-house R&D activities, or externally from the acquisition of technology (Fu, 2015, p.5). For some high-tech companies, the acquisition of other firms' technological assets including patents, new technologies and innovation capacity might be the most efficient way to accumulate technological capabilities. For example, Lenovo's purchase of the world-renowned brands including IBM's PC business and Motorola Mobility can be seen as a particular approach to technological acquisition. Even technological giant Cisco also utilized the acquisition strategy as an important way to strengthen its technological capacity. Starting in 1993, Cisco has accelerated the process of acquisition in numerous market segments—ranging from Internet hardware and software to switches and routers—in which Cisco intended to become a market leader. Such a model of “growth by

acquisition” not only enabled MNCs to acquire technological assets in a “shortcut”, but also allowed them to concentrate on market expansion and consolidate their monopoly over core proprietary technology. On the contrary to this approach of technological development, Huawei opted to build up its own “self-reliant technology” to sustain the company’s long-term development from scratch.

Due to lack of core proprietary technologies, Huawei started its business as a sales agent to accumulate primitive capital from the “telecommunications fever” of the late 1980s like many other Chinese indigenous high-tech firms. However, Huawei quickly realized the importance of building its own proprietary technology in the market. It then established a series of in-house R&D strategies and committed to indigenous innovation efforts. For decades, Huawei has maintained its massive investments on R&D, devoting more than 10 per cent of its sales revenue to R&D activities annually. From 2005 to 2015, Huawei R&D spending had amounted to US\$37 billion in total.³ Its annual expense has far exceeded Lenovo’s 10-year aggregated R&D investment.⁴ Noticeably, Huawei’s R&D spending paralleled or even outpaced that of the most influential high-tech giants including Apple, Oracle, Facebook, IBM and Ericsson.

Table 5.1: Tech Companies 2015 R&D Spending and as a Percentage of Revenue

Company	2015 R&D Spending (US billion)	As % of revenue
Samsung	13.7	7.4%
Amazon	12.54	11.6%
Google	12.28	16.5%
Intel	12.1	21.8%
Microsoft	12	13%

³ Huawei 2015 Annual Report. Retrieved from <http://www.huawei.com/cn/about-huawei/annual-report/2015>

⁴ According to Lenovo’s annual reports, Lenovo’s aggregated 10-year R&D spending amounts to US\$4.4billion, lower than Huawei’s 2015 R&D spending at US\$9.2 billion.

Huawei	9.2	15%
Apple	8.1	3.5%
Oracle	5.5	14%
Facebook	4.8	26.8%
IBM	4.6	6%
Ericsson	3.8	14.1%

Sources: Tech companies' 2015 annual reports.

Huawei's transnationalization at the current stage not only aimed for market access but also for building impressive and genuine technological capabilities. With Huawei's internationalization of R&D, the company has set up 16 major R&D centers located in India, the United States, Germany, Sweden, Russia, Japan, and Canada, in addition to those in Beijing, Shanghai, Nanjing, Shenzhen, Hangzhou and Chengdu in China. Different research centers are devoted to specialized R&D activities by taking advantage of local resources. Indeed, there are no other Chinese ICT firms that are compatible with Huawei's extensive innovation network in the global scale.

From a technology follower to a global leader, Huawei's path toward technological progress was faced with numerous setbacks and difficulties. To gain insights into the dynamics of Huawei's R&D patterns as well as its interaction with other multiple technological actors, the following section looks into Huawei's specific R&D strategies and innovation activities in the different domains including its core strength in switching technology, its contradictory role in developing China's indigenous telecom standards, the catch-up strategy in semiconductor technology, and its patents and intellectual property strategies.

Breakthrough in Digital Switching Technology

As early as the late 1980s, Huawei already decided to step into indigenous switching technology innovation. However, Huawei's first "self-branded" product BH01 switch was actually an assembly product, the components of which were bought from a state-owned enterprise affiliated with the MPT. In 1990 Huawei launched its first R&D project whose primary task was to develop an independent product based on the imitation of the BH01 technology. The R&D team only comprised six engineers at that time. The developers had to take full responsibility for both hardware and software production, including activities in researching, developing, producing and testing.

A critical turning point of Huawei's technological development occurred in the early 1990s. Although Huawei had successfully gained a small slice of market share in low-end markets by selling small private branch exchanges (PBX) to small businesses, its switching technology was constrained in small capacity applications. When facing critical challenges from technological innovations, a Huawei production worker Cao Yian proposed the company to shift the R&D focus to digital switch with large capacity, which can be used in large-scale telecommunications transmission by telecom operators. Huawei's leaders adopted Cao's advice and then turned to R&D in digital switching technology. This decision was significant for Huawei as it indicated the company's advance in its R&D endeavor moving away from low-end exchange technology to innovations in core telecom technologies. Cao was later promoted to the position of the manager of Huawei's digital switch project from an ordinary worker. This example fully illustrated Huawei's bottom-up approach in decision-making that contrasted with the elite and professional-oriented R&D model.

When Huawei decided to tap into switching technology, China's indigenous digital switching technology had gained a breakthrough by a military research institute—the Center for Information Technology (CIT) in Zhengzhou Institute of Information Engineering of the People's Liberation Army. During the Maoist era of militarization, the

CIT had already deeply engaged in the R&D of China's large capacity computers—a national defense project endorsed by Zhou Enlai in 1968. Under the force of marketization in the reform era, the research institute shifted the focus of technology innovation from military-related computing technology to the booming telecommunications industry by launching the project of the first Chinese self-innovated digital switch HJD-04 system. During this process, Professor Wu Jiangxing, who had been a senior engineer in the PLA and later the head of CIT, played a decisive role in the R&D and architecture design of the HJD-04 project. Professor Wu had participated in the research of China's first integrated circuit computer in 1970 and the distributed computer system GP300 during the early 1980s. Based on the advanced computing technology deriving from the legacy of military-related technology, in 1991 Wu Jiangxing and his research team successfully produced the HJD-04 system the capacity of which can parallel that of advanced digital switching technology in Western countries. This innovative system was quickly converted into mass production and commercialization. Meanwhile, the Luoyang Telephone Equipment Factory (LTEF) of MPT, previously a three-front telecom manufacturing enterprise, assumed the role as a manufacturer as well as a technical assistant to the CIT in the project.

It should be recognized that the breakthrough of China's digital switching technology largely benefited from the "mixed legacy" of the country's self-reliant technological development in the past. This technological breakthrough also had trickle-down effect on Chinese indigenous firms such as Huawei in their own R&D efforts. As Huawei technicians did not have any experience of developing advanced digital switching technologies before, they mainly depended on the approach of "learning-by-doing" from scratch. The process of technological learning was like "crossing the river by touching the stone". Based on studies on the HJD-04 system, Huawei managed to develop its own digital switch C&C08 in 1994, which was also China's second self-innovated digital switch with high capacity.

Huawei's R&D activities were not confined to the laboratory. The technologies they developed fully took into account the reality of China's telecommunication conditions and local network requirements based on technicians' surveys and practical experience in different areas. Apart from the three international gateways, Chinese public telecommunications networks actually varied at five different levels: there were eight level-one (C1) transit switching centers in different districts; level-two (C2) transit switching centers were located in the capital cities of provinces for provincial transit; level-three (C3) network was used for transit within each province; level-four (C4) switches were located at the county level; and level-five (C5) network was comprised of terminal switches including town and village rural telephone lines (Shen, 1999, p.135). Standardized foreign systems were barely able to meet specific requirements at the local level especially at the county level. Moreover, as transmission lines for China's public telecommunications services were intensive because of the high usage of lines in the early 1990s (ibid, p.134), many foreign systems had run into problems under this circumstance. Huawei's R&D otherwise sought to solve such complicated conditions with an aim to overcome the huge gaps between cities and rural networks. To this end, Huawei R&D teams organized several technical seminars with local PTB officers (C5 level) to learn the demand from rural areas. Apart from the low-cost requirement, China's rural telecom networks also required flexible equipment systems that were suitable for network upgrades and complicated geographical features. Based on such a "two-way" R&D model of information flow, Huawei researchers and technicians successfully incorporated all of these requirements into the development of the C&C08 switch. This product had a flexible modular design that allowed exchanges to be supplied in the remote region and was easy to expand as transmission demands grew. The small telephone stations it built can also be widely dispersed and easily maintained in the countryside. As Dieter Ernst and Barry Naughton (2007) argue, Huawei's innovation change was to provide "a judicious combination on incremental and architectural

innovations that provide integrated solutions throughout the life cycle of communications systems” (p.53). This foremost innovation accommodating China’s local conditions made Huawei successfully seize the domestic switching market by the late 1990s.

It should be reminded that Huawei’s success in indigenizing switching technologies was partly due to the standardization and maturation of switching technologies. Huawei’s switch products actually were not new technologies in the strictest sense. China started its own public digital switching technology in the late 1980s, a decade later than Western countries’ investment (Shen, 1999, p.132). Therefore, Huawei merely acted as a follower of incumbent technological players without going through some of the pioneering developmental stages. However, there is no doubt that Huawei’s R&D activities still represent Chinese ICT firms’ distinct technical and innovative capability. Their creative effort not only rested on the modular and architecture designs that were more compatible with local technological, economic and political requirements, but also explored some alternative approaches to self-reliant technological development.

From Standard-adopter to Standard-definer

Huawei’s major breakthrough in switching technologies enabled the company to be on par with foreign competitors in the equipment manufacturing capability. But at the same time, the company moved to climb up the value chain by turning itself from an equipment manufacturer to a technology standard definer. This goal was congruent with the Chinese state’s pursuit of “the mastery and proprietary control of core technologies” (Zhao, 2010). This initiative was especially illustrative of China’s strategy of developing its own wireless telecom standards. The role Huawei played in this state-led initiative was contradictory, which underscored the contradictions between the techno-nationalistic impulse and the logic of capital accumulation underlying the firm’s R&D activity.

It should be noted that technological standards policy matters not only because it is highly related to the building of a country's national indigenous innovation capacity but also because it involves inter-state and inter-firm competitions for technological supremacy in the world. As standardization activities have been mainly centered on three regions—US/ North America, Europe, and Japan, China merely played the role of standard-adopter in the past. However, due to China's increasing leverage in "standard wars", the country's initiative in challenging the West-dominated regime of standardization has become a pivotal issue in the geopolitics of global technological development. Apart from inter-state tensions, the struggle over China's standardization policy also involved inter-capitalist competing interests. Although the state primarily played a patronage role in national standards setting, R&D activities and intellectual property of particular standards were still controlled by certain firms. The ability of establishing one or more attributes of a product as a standard can convey competitive advantages to the owner or controller of the technology (Tasse, 2000). This means firms' involvement in new technological standard setting can not only produce high profits but also ensure their monopolistic position in the market. Therefore, the standard-setting strategy has become a key to a firm's success in the fierce ICT market competition. But on the other hand, it should be emphasized that a firm's strategies of standard-setting can hardly be sustained without the state's support. Technology standard development in the case of China's wireless telecom standards can be better seen as a co-evolution process between the firm strategy and the government policy and a hybrid of struggles between techno-nationalism and techno-globalism.

The role of Huawei in the struggle over China's standard-setting activities was complex. On the one hand, Huawei claimed to collaborate with the Chinese state in its national standard strategy in line with particular interests of China's ICT industry and the Chinese state. On the other hand, investing in immature Chinese standards also means substantial risks for Huawei if limited commercialization of indigenous standards

eventually threatens the company's survival. The conflict between the nationalistic commitment and the capital accumulation imperative has become a foremost challenge for Chinese indigenous firms like Huawei. The company's ambiguous attitude toward China's 3G homegrown standard TD-SCDMA and its interaction with multi-actors in this process demonstrates such a tension.

Before China embarked on the project of its own 3G wireless communication standard, China's mobile telecommunication industry was caught in long-term dependence on foreign technologies. In 1987 China started to launch the analogue mobile service (1G) by using the Ericsson's TACS standard. Since then China's analogue mobile systems had completely relied on direct import from foreign vendors. When China moved to the 2G era, the European GSM and US-backed CDMA became two dominant mobile communication standards in China. In the late 1990s Chinese indigenous telecommunication equipment vendors including Huawei, ZTE, Datang and Putian started to enter the 2G market by adopting the path-following strategy to catch up leading MNCs that already dominated China's mobile market. However, domestic vendors were in a disadvantaged position in the market as core technologies of 2G standards were completely controlled by foreign giants. In addition, Chinese indigenous companies had to pay tremendously high patent fees to foreign intellectual property owners. In the 1G era Chinese firms had paid about ¥250 billion (US\$31 billion) for royalty fees and about ¥500 billion (US\$62 billion) in the 2G era.⁵

The technical inferiority and commercial burdens, along with the state's strategic concern about national security, became driving factors for China's standard-setting endeavors. The earliest R&D phase of Chinese standards development started in 1993 when CDMAone technology was first introduced to China. This R&D project, which was sponsored by the "863 Program", primarily focused on digesting imported standard. In

⁵ Li, L. (2006, October 17). Datang Only Accounts for 14% of 3G TD Core Patents. Retrieved from <http://tech.qq.com/a/20061017/000333.htm>.

1995 under the support of the MPT, a Sino-US joint venture Xinwei Telecommunications was established. The new firm then partnered with Datang to develop the SCDMA technology which later became a core part of TD-SCDMA. This project was also incorporated as one of the key R&D programs of the Ninth Five-Year Plan (1996-2000). At the same time, Datang chose to collaborate with Siemens to incorporate TDD and SCDMA systems, which later became the base of China's alternative 3G standard TD-SCDMA.

In May 2000 the ITU approved China's TD-SCDMA as the third 3G standard in the world along with WCDMA and CDMA2000. However, the development of TD-SCDMA generated massive disputes and divisions among policy makers, standard developers, equipment manufacturers and telecommunication operators. Before the large-scale industrialization of China's 3G standard, Huawei was reluctant to deploy R&D spending on the TD-SCDMA system. The uncertain future of China's indigenous standard restrained the firm's incentive for promoting "national interests" in the market competition. In addition, Huawei has already placed much emphasis on overseas markets where products built on the well-established foreign standards have created stable income for the company. The company's ambitions for outward expansion clashed with the state's techno-nationalistic overtones, compelling Huawei to adopt a pragmatic approach toward greater techno-globalism. Therefore, the company had more interests in developing systems based on foreign standards to seize mainstream markets than investments in China's homegrown standard. In particular, Huawei invested heavily in the Europe-backed WCDMA system that had the largest user base across the world. The commercial interests transcended its nationalistic commitment, which drove the company to suspend its R&D project on the TD-SCDMA system.

Huawei's pragmatic strategy was echoed with Chinese policy makers' hesitant attitude toward TD-SCDMA. Wu Jichuan, the Minister of the Information Industry of that

time, insisted on the market-oriented, technology-neutral position on the development of China's mobile standard. He expressed that "although TD-SCDMA was set to be an international standard, it does not mean it can become the basis for China's 3G network in the future... The deployment of TD-SCDMA has to be determined by market demands and applications".⁶ The overarching market logic became a doctrine that determined the state and firms' strategies on the standard development. The dispute not only delayed the overall agenda of China's TD-SCDMA development but also undermined Chinese firms' incentive to promote China's indigenous standards.

To promote the industrialization process, the government then took a lead in establishing a domestic industry alliance the founding members of which included Datang, Huawei, ZTE, Putian and other four domestic firms. Moreover, in July 2003, the Chinese government provided indigenous firms with ¥708 million (US\$85.4 million) as a special funding to support the industrialization of TD-SCDMA. Since 2005 the Chinese government has extended its support to promote China's homegrown standard by mobilizing relevant technological actors including state-owned telecom operators as well as domestic equipment vendors. The leadership tended to favor the whole TD-SCDMA industry rather than a specific firm like Datang. In January 2006, the standard was listed as one of China's biggest indigenous technological achievements for the Tenth Five-Year Plan (2001-2005) at the National Scientific Conference. Two months later, TD-SCDMA was officially designated as China's national 3G standard. The Chinese government also deliberately delayed the issuing of 3G licenses until 2009, with an attempt to allow the immature homegrown standard to enjoy adequate time for R&D and commercialization.

The decision to elevate China's homegrown standards as a matter of national development incarnated the Chinese state's import-substitution policy to nurture China's

⁶ Lin, Q. (2014, December 25). Is It Worth to Invest ¥200 Billion in TD? *The Beijing News*. Retrieved from http://epaper.bjnews.com.cn/html/2014-12/25/content_553852.htm?div=1

heavyweight ICT firms in the emerging 3G market. As deputy Minister of the State Development and Reform Commission Zhang Guobao said, “China’s mobile telecom market will no longer be a playground for overseas companies in the upcoming 3G age”.⁷ The role of the state in nurturing China’s sizeable 3G market for indigenous firms was beyond question. As TD-SCDMA has increasingly acquired considerable policy importance as well as commercial imperative, Huawei started to strengthen its R&D investments on the system. However, the company did not completely draw on its own R&D resource but chose to collaborate with Siemens to form a joint venture Dingqiao Telecommunications to focus on the commercialization of TD-SCDMA. Collaboration with major global players like Ericsson, Alcatel and Nortel Networks to establish strategic alliances became a key approach to commercializing TD-SCDMA in the Chinese market.

Some critics had doubts about Chinese firms’ capability to develop self-reliant R&D, especially when foreign players have become important forces in the national standardization strategy. It is true that Chinese indigenous firms continued to wrestle with the contradiction between techno-nationalism and techno-globalism. However, it is important to note that “self-reliance” should not necessarily be conflated with autarky. As Feigenbaum (2003) argues, the road to self-reliant high technology R&D system would have to follow a series of preliminary stages involving partnerships, licenses, and coproduction arrangements (p.201). In this sense, Chinese indigenous firms’ strategic collaboration with foreign partners can be better seen as a means to the end to achieving China’s inspirations at promoting globally competitive national standards.

Under the state’s standard-setting initiatives, the market share of Chinese indigenous firms including Huawei, ZTE and Datang has increased from less than 20 per cent in the 2G era to more than 70 per cent in the 3G era (Hong, et al, 2012). The massive investments in TD-SCDMA laid a technological foundation for China to

⁷ Hou, M. (2002, October 31). Domestic 3G Standard Favored. *China Daily*.

implement a smooth evolution to 4G TD-LTE system. Although FDD-LTE that is based on the Europe-developed FDD standard still dominated most operators' construction plans for 4G deployment, TD-LTE technology has gained more attention from relevant actors. As China has taken a major stake in TD-LTE patents, the promotion of the TD-LTE standard would improve China's bargaining position in international markets. In contrast with its hesitant attitude toward the TD-SCDMA system, Huawei set TD-LTE as a priority investment and established an independent R&D team in its own right, with more than 4,000 engineers involved in research of TD-LTE. The core competence of Huawei's TD-LTE technology lay in its compatibility with any mobile commercial network, which enabled network operators to converge different modalities and to maximize integration performance. In addition, Huawei provided a complete lineup of TD-LTE terminals, ranging from chipsets to smartphones. Thanks to Huawei's full participation in the TD-LTE technological ecosystem, the company has become a dominant infrastructure and device vendor in the TD-LTE market. Moreover, driven by China's thriving 4G market, Huawei also took a lead in the overall LTE markets. By 2013, Huawei had accounted for 40 per cent of LTE network contracts with Ericsson following at 34 per cent.⁸

However, in some areas of core technologies, foreign giants still occupied dominant positions. For example, Qualcomm has the highest market share for LTE baseband processor in handsets,⁹ far exceeding Huawei's shipments in the market. In the 4G era, China's domestic telecom operators were more eager to attract global stakeholders and to promote convergence of various standards to change the enclosed ecosystem of TD-SCDMA. Therefore, domestic vendors had to face head-on competition from foreign suppliers in China's 4G market. Furthermore, it should point out that China's patents in the TD-LTE standard were mostly concentrated in peripheral areas of applications, while

⁸ Goldstein, P. (2013, August 13). Report: Huawei, Ericsson Lead LTE Market amid Growing Deployments. Retrieved from <http://www.fiercewireless.com/wireless/report-huawei-ericsson-lead-lte-market-amid-growing-deployments>.

⁹ A LTE baseband processor enables smartphone to connect with the Internet.

US and EU firms still played the dominant roles in setting core technology standards. To overcome these market and technical constraints, Huawei strove to move from a standard-adopter to standard-definer by taking a proactive R&D strategy in 5G technologies. One milestone was made in November 2016 when the International Wireless Standards Institute 3GPP RAN1 chose Huawei-proposed Polar codes as the control channel encoding scheme for the application of 5G, which can be seen as an overwhelming victory over the US-backed LDPC program and France-backed Turbo2.0 program. This was also the first time China's telecom technology was adopted as the key standard of the world's next generation of wireless communications systems in the telecom encoding area which was seen as a "jewel in the crown of wireless communications technologies". More importantly, this victory was more than a technical breakthrough; rather, it may generate far-reaching political economic implications for China's reposition in the global technological system. In contrast with domestic actors' divisions in the deployment of TD-SCDMA, Huawei's innovations in the 5G standards have acquired unified support from Chinese operators and equipment vendors. The China-based IMT-2020 5G Promotion Group, which was founded by the Chinese government in 2013 and comprised of more than 50 Chinese homegrown firms and institutions, has become the most important advocator for Huawei's technological proposal. This alliance not only helped Huawei gain ground in global standard wars, but also enhanced China's position in the arena of global technological governance vis-à-vis the US and EU blocs.

Huawei's success in its standard strategy can be largely attributed to the Chinese state's capacity in creating a "China-only accumulation regime" (Hong et al, 2012). More importantly, its increasing leverage in the global standard battleground also showed an opportunity for domestic firms to alter the path-dependent approach in technological development and to realize the "going-out" strategy of China's homegrown standards and indigenous innovations.

Catch-up Strategy in Semiconductor Technology

Apart from the achievement in standard setting, Huawei also strove to strengthen its self-dependent innovations in hardware technology. Its major breakthrough in integrated circuit (IC) technology—another arena of core technologies China has been pursuing—allowed the company to establish a full industrial chain ranging from chipsets to terminal devices, which significantly reduced its technological dependence on foreign suppliers.

For a long time China's ICT technology development has been beset by a bottleneck in the field of high-end IC design, leading to the lack of core competitive advantages in electronics hardware production. In light of the strategic significance of the IC sector in high-tech industries and especially in national security, China's national technology policy has given considerable emphasis on the development of IC technology by listing it as one of the pillar industries in national high-tech programmes since the late 1980s. However, after several decades China's chip industry still heavily relied on excessive importation. According to a report, China imported about 80 per cent of its chips, spending more than US\$200 billion on imported chips annually.¹⁰ Only few Chinese indigenous firms had the ability to produce advanced chipsets that can satisfy the demand of the ICT industry. Even for China's own standard TD-SCDMA system, most manufacturers still use the chip design from foreign TNCs such as Samsung, Philips, and Texas Instruments.

The lack of core technological capability made domestic ICT equipment manufacturers vulnerable to foreign control. Western governments and MNCs often impose technology embargos to restrain exports of core technologies to China under the terms of the Wassenaar Agreement (Siam-Heng, 2008). For example, in 2016 the US Commerce Department announced export restrictions on ZTE, banning US companies

¹⁰ Liu, G. et al. (2014, June 9). Our Chipset Industry Spent \$200 Billion Annually on Importation. *Economic Information Daily*. Retrieved from <http://finance.sina.com.cn/chanjing/cyxw/20140609/011919348474.shtml>.

on supplying ZTE with an array of restricted goods including semiconductor devices because of ZTE's "alleged violation of US export controls on Iran".¹¹ This ban has become the largest trade dispute between the US and China in most recent years, which severely hurt ZTE's ability in ICT production due to the company's high dependency on foreign key components.

Although semiconductor technology is a highly capital-intensive field containing numerous business risks, Huawei has recognized the importance of mastering essential proprietary technology from scratch. The company attributed such a heightened R&D model as the strategy of "innovation at the pinpoint". According to Ren Zhengfei:

Huawei is not strong enough to catch up in all areas. We have to focus on some key technologies. We put all the eggs in one basket—to invest all the resources in a specific technology and product—hoping that high investment intensity will lead to breakthrough in the targeted area (Gao & Li, 2014, p.126).

Ren further claimed that only through such R&D intensity in the field of sophisticated technology can Huawei get the chance to surpass US companies.

This R&D strategy proved to be very effective in establishing Huawei's independent technological capability. As early as 1991, Huawei already set up an R&D and design center for the Application Specific Integrated Circuit (ASIC), becoming one of the few Chinese domestic companies pioneering the independent innovation of IC technology. In 1993 Huawei successfully developed the first digital ASIC. In fact, the majority of China's IC products at that time were primarily restricted to specific-application, commodity memory chips and other low-end products (Siam-Heng, 2008, p.179), while Huawei already started to focus on high-end applications in telecommunication infrastructure and advanced products. For the following decade, Huawei has made significant technological

¹¹ Osawa, J. & Dou, E. (2016, March 7). U.S. to Place Trade Restrictions on China's ZTE. *The Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/u-s-plans-to-place-restrictions-on-zte-1457337207>

breakthroughs in developing advanced chips with high capacity. In October 2004 Huawei established a subsidiary called HiSilicon which specifically focused on the research and production of high-end chipset products. Along with Huawei's increasing investments in its own smartphone products, in 2006 HiSilicon started to launch independent R&D on the cellular microprocessor for its own system, directly challenging US technological giant Qualcomm. Since then HiSilicon has released a series of Kirin chipsets in the market. The architecture and performance of its latest flagship mobile chipset Kirin 950 were on a par with and even outperformed that of its competitors including Qualcomm, Samsung, and Media Tek. Huawei has become one of the very few smartphone manufacturers that had the capability to make its own chipsets for its mobile devices along with Samsung and Apple. Although Huawei's cellular chipsets at the current stage are primarily used by its own handsets, other Chinese domestic ICT manufacturers such as Meizu have gradually turned to and adopted Huawei's IC technology.

To date, HiSilicon has completed more than 120 chip designs and shipped 150 million chips, which were widely used in Huawei's own products including mobile devices, routers, and data cards.¹² It has also become the largest indigenous semiconductor company in the Chinese market by revenue. Huawei's strategy in developing its own IC technology closely cooperated with the state's endeavor at revitalizing China's IC industry. In 2014 the Chinese government issued the *National IC Development Guideline* and set up a ¥120 billion national IC fund in the form of equity stake ownership to promote the development of Chinese domestic firms. However, a large portion of this fund was invested in state-owned enterprises such as Datang, Spreadtrum, and SMI. To accumulate core technology assets in a short term, these companies used state capital as a source of OFDI to acquire foreign companies through overseas M&A. In stark

¹² Merritt, R. (2011, May 18). *Inside Huawei's Hisilicon*. Retrieved from http://www.eetimes.com/document.asp?doc_id=1259554.

contrast, Huawei insisted on its independent innovation model and technological development processes including R&D, module design and testing, and manufacturing.

In addition to the financial support, the Chinese government also created a favorable market environment for domestic firms through a series of protectionist policies. In November 2013, China's National Development and Reform Commission launched the investigation into Qualcomm for its anti-competitive practices in China. The investigation ended up with a fine of US\$975 million on Qualcomm, which was the largest in China's corporate history. In addition, the regulator also required Qualcomm to lower its royalty rates on patents used in China. This incident exemplifies Chinese policy-makers' significant change from a pro-FDI to protectionist policy framework in the strategic ICT sector. Indeed, Chinese newly emerging chipmakers directly benefited from the government's intervention in the domestic market, which allowed them to pick up the market share in segmented markets. For example, thanks to the establishment of the TD accumulation regime, Huawei along with other Chinese indigenous firms such as Spreadtrum has gradually taken a lead in the TD-SCDMA chipset market.¹³

As a crucial reminder, it is still too early to predict that Huawei's chipset technology has fully achieved independent innovation capability. In general Huawei has still followed the same technological road as Samsung in chipset manufacturing. Its CPU core is designed based on the ARM architecture platform, and the operating software is running on Google's Android system. This so-called "AA system" constitutes a cornerstone of Huawei's IC design. Therefore, Huawei's design route and applications are still determined by owners of these core technologies. Huawei has recognized such limitations in achieving the real "independent innovation". Its R&D projects on developing its own core processor and mobile operating system named KirinOS were already underway. In addition, Huawei possesses a competitive advantage in its

¹³ Chinese-made Chipsets Will Account for 70% of China's TD Chipset market. Retrieved from http://ydhl.cena.com.cn/2014-01/09/content_208961.htm.

telecommunication infrastructure technology in comparison with other competitors. Huawei is one of the few chipmakers that can develop baseband processor technology in the world, which is also an essential core technology in the chipset manufacturing to support high-speed wireless communication. Moreover, Huawei also enjoys a cost advantage compared with other global giants. As semiconductor is a highly profitable industry, the profit margin for TNCs in this field usually is 40 per cent or more, which constituted the largest share of ICT manufacturing profit margin. The presence of Huawei in this monopolized market, on the other hand, would significantly change the market structure as well as the profit-making model in this field. However, it is important to note that the economic scale of Huawei's chipset manufacturing is still far behind that of Qualcomm and many other US and EU firms. In most recent years, Huawei has been intensifying its investments in Hisilicon and promoting the transnationalization of R&D network in the global scale to expand its supply chain. In the long term, an independent ecosystem and a full value chain might be realized in China's ICT industry when Chinese suppliers achieve self-sufficiency in the supply of key components and core technologies.

Challenges to the West-dominated Intellectual Property Rights Regime

In the era of informationalized capitalism, a major route to profitability is to achieve capital accumulation through private appropriation of technology. This also drives owners of technology, usually TNCs, to seek legal protection for intellectual property and to exclude other competitors from using proprietary technologies in the same way. In order to integrate into the global IPRs regime, Huawei, as a latecomer, has also been striving to pursue the patent-oriented technological development along with the company's transnationalization. This process has been accompanied by deep-seated conflicts with other TNCs powers as well as inter-state struggles for China's rising status in global technological governance.

Global high-tech giants often invest heavily in patent-based technologies in an attempt to transform intangible techniques and innovations into assets and obtain higher return from licensing royalties. The neoliberal logic further facilitated the process of “accumulation by dispossession” through expropriation of nonproprietary information (Schiller, 2007). Since the early 1980s, IP protection has come to matter to the ICT industry especially to giant technology companies. During the 1980s IBM led a global campaign pushing for the proprietary control over technology and knowledge. The company underwent a dramatic change of policy in developing their software knowledge and techniques by turning open source codes into copyright work. Microsoft also followed such a pattern to establish a monopoly on standards on which most PC manufacturers depended (Drahos, 2002, p.171-173). This model undoubtedly led to “information enclosure” which further consolidated the TNC’s control over technology and knowledge (ibid). At the same time, the emphasis on IP protection also changed the evolution of ICT business models. As telecommunications is a highly standardized industry, owning property rights in specific technology not only enables the company to create a benchmark in the industry but also generate massive potential profits. For example, Qualcomm does not manufacture ICT equipment by itself but primarily relies on the licensing business model. The company transformed algorithms into specific patents and offered separate licenses for certain patents. This strategy ensured the sources of licensing revenue the company can extract from its huge patent portfolio. Based on this patent-driven business model, Qualcomm reportedly gained about two-thirds of its profit from licensing wireless patents.¹⁴ More importantly, Qualcomm’s business model has gained the US government’s outright support. With the US government’s intervention, the Qualcomm-backed CDMA system was promoted as a global telecommunications standard, rendering Qualcomm the biggest beneficiary in standard wars. By the early

¹⁴ Clark, D. & Armental, M. (2015, April 22). Qualcomm Profit Drops 46% on Antitrust Fine in China. *The Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/qualcomm-sees-profit-decline-on-antitrust-fine-in-china-1429735814>

2000s, Qualcomm already had more than 3000 CDMA-related patents in its portfolio and occupied 90-95 per cent of global CDMA chipset markets.¹⁵ China's market, in particular, accounted for more than half of Qualcomm's annual revenue and about US\$13 billion in licensing revenue.¹⁶ One of my interviewees, Huawei's patent attorney, confirmed that almost no Chinese handset manufacturers in the industry could bypass Qualcomm in technology patents. For instance, Qualcomm charged Huawei and ZTE about 2.5 per cent of a device's retail price and higher rates for smaller handset makers.¹⁷ The interviewee explained that almost over 80 per cent of Huawei's licensing fees were paid to Qualcomm before the company made a breakthrough in its self-innovated chipset technology. This profit-extracting model based on the monopoly over technology rents inevitably led to a deeper disparity between patents owners and the rest of companies.

The issue of intellectual property rights has also become one of the most important agenda in global economic policy-making since the late 1980s. Established corporate powers in alliance with Western governments, in particular with the US government pressed for new thinking about the international regulation of intellectual property in the global scale. Under this effort, intellectual property protection was no longer a legal issue but tied to international economic and trade policies. Key strategic ideas relating to intellectual property protection have been further institutionalized by international governance bodies such as General Agreement on Tariffs and Trade and its successor the WTO. The corporation-state alliance constituted the cornerstone of the global IPRs regime within which the United States and other rich industrialized nations hold dominant positions. In 1985 the Chinese government passed the first Patent Law, which was

¹⁵ Yan, L. (2002, December 7). US Qualcomm's CDMA Chipsets Sales Is Expected to Increase. *Xinhua News Agency*. Retrieved from <http://www.people.com.cn/GB/it/50/145/20021208/883475.html>.

¹⁶ Tanner, P. (2016, March 16). Qualcomm: Its Challenges, Its Strategy, Its Future. Retrieved from <http://marketrealist.com/2016/03/qualcomms-biggest-challenges-china/>

¹⁷ Qin, M. (2014, March 24). Chinese Smartphone makers, Qualcomm in Battle Royale over Patent Payments. *Caixin Magazine*. Retrieved from <http://english.caixin.com/2014-03-24/100655912.html>.

deployed as a means to promote innovation activity. From the 1990s onward, China has further altered the domestic law and strengthened IPR law enforcement to meet the requirements of WTO's agreement on Trade Related Intellectual Property Rights (TRIPS) under external pressure from its trading partners. Apparently, China's ICT industry was one of the key domains that were subject to the control of the IPR regime. It should be noted that at the core of the global IPR regime was a deep disparity between leaders and latecomers. The globalized principles of IP regulations to the large extent only benefit those who are at the top of an international hierarchy of the IPR regime and who control the largest intellectual property portfolios (Drahos, 2002). As Schiller (2007) argues, the formation of such a "comparative advantage" the US and other industrialized countries enjoy "must be seen as a systematic political-economic achievement" (p.47).

The mechanism of the global IPR regime has been used as a strategic tool to sustain the political economic order of neoliberal globalization by dominant powers. This was illustrated in Huawei's first setback in the US market where the company was caught in Cisco's lawsuit for the so-called IP infringement. As discussed in Chapter 4, the primary motive of this lawsuit was due to Cisco's market strategy that aimed to drive Huawei out of the US market. To enforce its "comparative advantage" in the patent system, Cisco further lobbied the US government to enact more intrusive policies over property rights protection to guarantee and privilege U.S. corporate interests. As Schiller (2007) points out, big business usually turns to IPRs to "constitute not defensive but preemptive claims" (p.46). Such a mechanism not only ensures corporate players' massive commercial interests, but also turns the encompassing capitalist logic into part of imperialist rules. As Huawei's patent attorney commented in the interview, "Huawei's disadvantage in Western markets had nothing to do with technological or skill levels. It is all about politics and market competition" (Huawei patent attorney, personal interview, October 20, 2013).

The capitalist proprietary relationship and US-dominated imperialist rules not only subject developing nations to a disadvantaged position in the global IPR regime, but also generate massive monopoly rents which are mainly reflected in the form of licensing fees. For example, Huawei paid Western companies US\$222 million in licensing fees in 2010, with US\$175 million of that amount paid to American firms. In particular, it has paid Qualcomm more than US\$600 million in their intellectual property fees.¹⁸ As Huawei's deputy chairman Guo Ping stated, these licensing fees were "money paid to bandits for passage" (*mailuqian*) to enter the "international club". But Guo also emphasized that these rules of the "international club" should be rebuilt toward the principle of equality and mutual benefit.¹⁹ It means the global IPR regime can also be transformed into a battleground for ongoing struggles by multiple actors.

In the initial stage of internationalization, Huawei already recognized the importance of IPRs in the business strategy. In 1995, Huawei established its own IP department. At the beginning, the company came to promote the pragmatic approach of "open innovation" by drawing on the R&D experience of well-established technologies. A software developer working at Huawei explained that the company's early R&D process mainly focused on the technique of "reverse engineering". This R&D approach was used to break down their rivals' products into specific components to learn how it was built and then further to rebuild their own compatible products. In this way key techniques and designs can be reproduced by reducing development time and have less chance of market failure in the intensely competitive global market. This approach made Huawei accumulate patents in a cost-effective way in its initial stage of development. However, Huawei at this stage was primarily occupied in low-end IP activities such as modification

¹⁸ Huawei Open Letter (2011, February 25). Retrieved from <http://www.huawei.com/en/about-huawei/newsroom/press-release/hw-092875-huaweiopenletter.htm>

¹⁹ Tian, B. & Wu, C. (2012). *Will Huawei collapse next time? Ren Zhengfei's philosophies of enterprise management and logics of Huawei's rise and fall*. Zhongxin Press.

and improvement of some particular product performance and features, possessing far less independent IPs and benchmarking innovations in core technologies than their foreign rivals. This follower-and-imitation patent strategy raised rivals' accusation of Huawei's "piracy" activity. Huawei's patent attorney responded in the interview that they had to do adequate research on existing patents conducted by rivals and had to be particularly careful in formulating statements of patent filing to avoid duplication.

Cisco's lawsuit can be seen as a turning point for Huawei's IP management. Frustration in the IP domain compelled Huawei to strengthen its own systematic patent strategy and move away from the reverse engineering approach to high-end robust IP activities to improve qualities of patents. In 2004 the pre-research Standards & Patents Departments were set up in all business units to strengthen patent analysis and focus more on international invention patents, aiming at seizing the commanding heights of cutting-edge technology. Huawei's IPR strategy was specifically formulated in such a statement: "protect and utilize autonomous IPRs, respect others' IPRs, improve corporate core competence, and strongly support global product strategy."²⁰

Instead of passive compliance with Western-dominated IPR rules, Huawei also started to challenge its competitors in the West. In 2011, Huawei sued Motorola Solutions over intellectual property infringement, attempting to prevent Motorola from disclosing Huawei's confidential proprietary information to Nokia Siemens Networks which acquired Motorola's mobile telecommunications unit. It can be viewed as a watershed moment for Huawei, as it was the first time a Chinese enterprise took up arms against US-dominated rules of IPRs and gained more equal power in bargaining and competition. In Europe, Huawei has also been caught in numerous patent legal battles. The IP department hence had to strengthen patent analysis and prepare for a comprehensive patent portfolio in the

²⁰ Qiu, D. (2008, July 15). "Huawei: Seizing the commanding heights in the era of post-Cisco lawsuit". *Private Economy Newspaper*. Retrieved from <http://www.c114.net/news/126/a330022-2.html>

pre-research stage in order to deal with IP-related lawsuits. This strategy allowed the company to use its patent portfolio to countercharge its rivals. The patent attorney explained in the interview that such patent litigations usually ended up with cross-licensing agreements as a settlement for disputes. In this sense, IPRs could be used not only as the umbrella of protection in the market competition, but also as a means of inter-capitalist collaboration.

At the same time, Huawei also made an effort to link the firms' IPR strategy with the state's technology and innovation policy to gain the Chinese government's support. This attempt was reflected in the speech of Huawei's chairwoman Sun Yafang at the 2006 National Scientific Conference. In her words:

We have to promote IPRs as a national strategy for the national development, turning defensive activities into a proactive approach to establish IPRs systems on our own... We have to integrate in the international market club in terms of IPRs. We believe that our national plan for revitalizing our country's science and technology will be realized. IP is the ticket to the international market without which our high-tech products are unable to be sold in the international market.²¹

As a response to Chinese firms' appeal for IP protection at the state level, the Chinese government enacted *The Chinese National Patents Development Strategy* (2011-2020) in 2011, advancing a specific strategic goal to become an innovation powerhouse through strengthening patent-oriented technology development. This plan included seven strategic industries: biotechnology, alternative energy, clean energy vehicles, energy conservation, high-end equipment manufacturing, broadband infrastructure, and high-end semiconductors. Huawei was found to take a clear lead in China's patent-oriented innovation strategy. The result of China's efforts in establishing a modern IP protection can be directly reflected in the numbers of patents filling. Since 2011 China has become the world's top patent filer, surpassing the United States and

²¹ Sun Y. (2006, January). Public Speech at the 2006 National Scientific Conference. *Huawei People*.

Japan. China's ICT corporations including Huawei and ZTE have accounted for a large proportion of China's patent filings. Especially Huawei has taken a lead in the global IPR regime. Since 2014 Huawei has become the top patent applicant under the WIPO Patent Cooperation Treaty (PCT) system, surpassing other global giants such as Qualcomm, Samsung, Sony and HP. Among these proposals, over 90 per cent were invention patents.²²

As standard patents were seen as a pivotal strategy to achieve high-end IP activities, Huawei has also adopted a preemptive approach to participate in the global IPR regime by obtaining important positions in global standardization organizations. By enjoying more bargaining power in international organizations, Huawei was able to leapfrog ahead and deploy patents in advance to gain comparative advantages in the market. By the end of 2014, Huawei had become a member of 177 standardization and open source organizations and held 183 key positions.²³ More importantly, Huawei has increasingly played an important role in setting new game rules in the regime and initiating new key projects of technological development. For example, Huawei has submitted more than 20,000 standards proposals to various international organizations. The company had 2,137 essential patents in the area of wireless communication. Especially in the area of 4G LTE/EPC, Huawei held about 15 per cent of all essential patents, pioneering in the LTE technology innovation in the industry.²⁴ Moreover, the company had a more than 6 per cent stake in WCDMA patents and controlled 15 per cent of the TD-LTE standard patents. Huawei's successful bidding in 5G standard can also be seen as an accumulation of its patents portfolio based on the company's breakthrough in 5G core technologies.

²² Yu, E. (2016, March 17). Huawei Tops Global List of Patent Applications. Retrieved from <http://www.zdnet.com/article/huawei-tops-global-list-of-patent-applications/>.

²³ Standards & Contributions. Retrieved from <http://www.huawei.com/en/industry-insights/standards-contributions>.

²⁴ Radio Communication Standards. Retrieved from http://www1.huawei.com/en/industry/standards-contributions/hw-u_167829.htm

Having moved from a follower to a leader in the global IPR regime, Huawei's patent-oriented strategy demonstrates the technological capability development of Chinese ICT firms. The presence of Chinese firms in the global IPR landscape also considerably challenges the US-led international governance structure. But at the same time, it is important to point out that though Chinese firms' participation in the IPR regime complicates the power dynamics, it does not fundamentally change the capitalist game rules and the nature of private property in technology and information. The mechanism of exploitation via monopoly over technology and information still stays intact, and TNCs, no matter Western or Chinese corporate power, are still the biggest beneficiaries of this game.

Nevertheless, there should be no denying that the disparity between industrialized countries and developing countries is being reduced with the increasing leverage developing countries exert in global markets and political systems (Zhao, 2010). The involvement of non-Western players in the global IPR regime further provided Third World countries with a ground for democratizing the rule-setting process and realizing what Huawei has desired for a more equitable system under the logic of "techno-globalism".

Conclusion

China successfully developed a distinct technological development trajectory during the Maoist period. However, the dramatic transition to a commercially-driven path has completely changed the initiatives, objects and patterns of the development in the post-Mao era. This strategic change also made Chinese indigenous firms a driving force and a key indicator of national technological capabilities. Huawei was an outgrowth of this transition in the evolution of China's technology policy. To understand Huawei's rise in the global technological landscape, one must take into account the complex relationship

between Chinese enterprises and the state. As Huawei's chairwoman Sun Yafang addressed, the state created the most favorable environment of innovation for Chinese enterprises.²⁵ What really lay at the heart of China's desire to "catch up" with the West was the intention of developing China's path-breaking model of technology development and regaining a significant position in the global technological landscape. To achieve this goal, China has experienced paradoxical policy shifts from dependence on foreign technology transfer to the pursuit of indigenous innovations. Such technology policy shifts combining with the state's interventionist capacity had profound impacts on Huawei's R&D patterns and its technological capability development. Especially the Chinese government's focus on the domestic market-driven growth model in most recent years has provided more incentives and support for nurturing competitive China-based corporate players.

Huawei's case has broader implications for the future shaping of China's technological development. From a small private company to a world-class technological force, the key reason of Huawei's success lay in its insistence on self-reliant R&D and innovations, which can be viewed as one of the complex legacies inherited from Mao's technological policy. Despite its follower strategy in the early stage of development, Huawei has been striving to explore an alternative path to developing its core competitive advantage in the market competition. Its major breakthrough in self-innovated switching technology was exemplary to demonstrate how the company was able to anchor high-tech R&D activities in the basic demand and practice of China's local telecommunications market. In addition, Huawei's R&D in the areas of high-end ICT technologies such as chipsets and new generation telecommunications standards has achieved compatible levels with its foreign rivals, setting a pioneering example for Chinese ICT enterprises to move away from a labor-intensive stage to

²⁵ Sun Y. (2006, January). Public Speech at the National Science and Technology Conference. *Huawei People*.

innovation-centered stage. It fully demonstrated that modern high-end technology was no longer the exclusive domain of the West (Zhou, 2008, p.173). Meanwhile, Huawei's increasing presence and power in international markets and the arena of technological governance suggested that Chinese technological firms have played an increasingly important role in influencing and even defining global technology. It has also become a crucial step to fulfill China's technological ambitions.

Nevertheless, Huawei's pursuit of self-reliant technological development does not necessarily mean corporate interests have to closely align with nationalistic developmental goals in its process of transnationalization. Huawei has expressed a strong desire for integration into the globalized market and production system. Its R&D activities were no longer confined in the domestic boundary but extended to broad-scale collaborations and alliances under the principle of "techno-globalism". The increasingly transnationalized technology linkages via R&D internationalization de facto strengthen its dependence on the transnational capitalist bloc rather than its technological roots in China. This contradiction forced Huawei to adopt more pragmatic policy in choosing its own path of technological development. At the same time, it is important to note that Huawei's technological development trajectory does not fundamentally break with the capitalist logic of accumulation underlying its technological progress and innovation patterns. In this respect, Huawei's technological development trajectory is not yet posited to realize a path-breaking model.

Chapter 6.

Ownership, Management and Labor Discipline

Huawei's innovation capability not only reflects in its research and development process but also in its structure of ownership and management. Along with escalated transnationalization, China's ICT corporations have sought to establish a "modern enterprise system" through ownership transformation and capitalization. The restructuring of ICT firms' ownership relations, especially with the intensive involvement of financial capital in the industry, has given rise to new forms of capitalist governance toward equity-based capital structure and reshaped the capital and labor relations at the corporate level. Huawei's practices in its ownership arrangement and corporate governance provide a distinct experience comparing with its domestic and foreign counterparts however. It has striven for organizational innovation by establishing the "Employee Shareholding Scheme" (the ESS) as a cornerstone of the corporate ownership structure, with an attempt to create a relatively equitable reward and incentive mechanism. Moreover, unlike many other Chinese ICT companies that are eager to seek for various means of transnational capitalization, Huawei's scheme aimed to sustain an independent employee ownership structure, refusing any chance of being controlled by big financial or international ICT capital. In Ren Zhengfei's words, Huawei's ownership design was to realize knowledge workers' full labor values through "capitalization of knowledge".¹ But at the same time, Huawei has been known for its rigid labor control and relentless corporate culture. Has Huawei's ownership design led to an alternative mode of democratic management as the company claimed or deeper labor exploitation? Has it fundamentally changed the antagonistic capital-labor relations? Huawei's case is typical to examine the contradictions and dynamics underlying the corporate ownership structure

¹ Huang, W. (2002). *Walk Out of Chaos*. Beijing: Renmin Youdian Press

and corporate management.

With regard to the relationship between corporate ownership and management, the mainstream inquiry has more interests in looking at how changes of ownership structure bring in economic outcomes and efficiency on corporate performance from a neoclassical economic perspective. But this perspective is based on a linear and efficiency-oriented assumption, obscuring the socioeconomic conditions of ownership transformation at the macro level. Issues related to corporate ownership are often placed at the heart of a political economic analysis of communication, but traditional political economic approach usually focuses on institutional analysis, ignoring the reconfiguration of class relations underlying corporate ownership arrangement and capitalist management. It should be noted that the firm is more than an essentially material entity. It has also been a source of social tensions encompassing “the lives and experiences of people who find themselves subject to an intensifying global political economy” (Amoore, 2006, p.50). Therefore, the discussion of the firm should also be located within a consideration of the social relations of production. This requires not only an analysis of the restructuring of class structure in the transnationalized production relations but also an insight into a domain of everyday experience.

However, traditional Marxist concepts of class have been muddled by the emerging social structure, failing to capture the most striking transformation of class restructuring in the process of globalization. Class analysis in traditional approach has been preoccupied with nation-state-centric orientation (Embong, 2000). Yet the expansion of business to the global-scale and the increasing transnational production flow imply the formation of the new transnationalized relations of production as well as the emergence of new transnationalized classes. The capital-labor relation itself has “shifted from an internal relationship relative to nation-states and national classes, to a partially external relationship relative to nation-states” (Struna, 2009, p.122). Therefore, it is necessary to

locate class restructuring in a transnational formation. In this process, TNCs that constitute the major force of capitalist project of globalization have become a significant source for transnationalization of class relations. It is important to unpack how institutional reconfiguration at the TNC level serves to reshape class power and class struggle. In this regard, Huawei provides a concrete example to comprehend the features of Chinese transnational capitalist class and transnational labor fractions emerging out of Huawei's globalized regime of production.

At the same time, it should be reminded that the essence of class analysis should be built upon an analysis of production relations (Hong, 2011). As the material base for the transnational class formation is focally expressed through the ownership arrangement, the analysis on this organizational aspect can be used as a starting point to shed light on the transformation of class relations. Furthermore, Huawei's labor control practices, ranging from its recruitment strategies, reward system, and "soft management skills", constitute a rigid labor regime, which provide observable evidence to understand the tensions between capital and labor. By focusing on the interplay of power and control, this chapter combines political economic analysis of China's structural change in ownership transformation and corporatization with Huawei's corporate analysis on the one hand, and incorporates class analysis to examine the labor conditions, labor control and labor relations at the corporate level on the other hand.

The Evolution of Huawei's Employee Shareholding Scheme

Since the 1980s the socialist labor regime has been transformed along with the restructuring of China's economic reform moving away from state ownership and socialist welfare system to one driven by market relations and multiple ownership forms (Friedman & Lee, 2010). One significant change in ownership forms was the emergence of non-state enterprises as a driving force of "a realignment of the ownership composition"

(Naughton, 2007, p.298). During the first decade of the reform, collectively-owned enterprises especially the spread of township and village enterprises (TVEs) marked a special distinction “because of their unusual ownership and corporate governance setup” (ibid, p.271). They had developed diverse organizational forms of public ownership such as worker cooperatives and employee-owned corporations, which can be seen as an experiment of indigenous institutional innovation and part of a socialist mixed economy. As private ownership had not been officially recognized by the central government during the same period, this form of collectively-owned enterprises flourished in different industrial sectors as a supplement to state ownership. Starting in the mid-1980s, the ICT sector witnessed the emergence of a large number of collectively-owned enterprises, constituting a significant feature of China’s ICT industrial reform. Huawei was one of these enterprises encouraged by both the state and local government’s policies. In 1987, Shenzhen Municipal government issued a document, encouraging individual technical professionals to establish non-state-owned high-tech enterprises to promote the development of the ICT industry. This policy provided an original incentive for Ren Zhengfei to establish his start-up. In the same year, Ren founded Huawei with a registered capital of ¥21,000. To obtain a legitimate status, the company was originally registered as a collective-owned enterprise affiliated to the Shenzhen Technology Bureau. However, this title was merely a subterfuge to protect the company from its precarious political and legal status. Such an ownership status, which was known as “red hat collectives”, became a common arrangement for newly established technology firms in the 1980s. They were de facto privately owned and operated, but they still enjoyed some benefits by wearing a politically correct “red hat”. Only with this identity can Huawei be allowed to enter the telecommunication equipment market in which private capital was still restricted at that time.

However, Huawei also suffered from substantial political risks because of its obscure legal definition. Despite policy encouragement, the local government did not provide

active support or a level playing field for Huawei's development. One of the greatest concerns Huawei faced was the tight restriction on gaining access to bank loans. Like many other non-state-owned enterprises, Huawei was completely excluded from lending by the state-owned banking system and had to rely on reinvested profits or original funders' self-raised funds. In its early years, Huawei had been on the verge of bankruptcy several times. The company was compelled to resort to high-interest (20%-30%) loans from large SOEs (Breznitz & Murphree, 2011, p.178). To get rid of reliance on external finance, Huawei sought to explore alternatives in diversifying its ownership arrangement. In 1990 Huawei first launched the Employee Shareholding Scheme (the ESS) as a means of internal capitalization. At the beginning, this scheme regulated that only key managers and technical experts can buy the company's shares, and the self-raised capital was primarily reinvested in the company's R&D activities. The original price of the shares was at 1yuan per share. It ensured that employees were able to afford the prices of the company's stocks. Moreover, the ESS was used as a means to substitute cash wages with stocks because of the constraints of cash flow in the company's operations. As the telecommunication equipment industry is highly capital-intensive, Huawei's self-funding model fundamentally resolved the financial difficulty the company faced in its early stage of capital accumulation. It also allowed the company to spread the risk and retain its professional talent. However, Huawei's experiment in its structure of ownership was viewed as an informal and illegitimate practice at that time because non-state-owned corporate forms still lacked both external legitimacy and social approval by the state.

At the same time, China's enterprise reformation has been extended to the urban SOE sector since the late 1980s. In contrast with radical privatization of public ownership, the initial urban enterprise reform adopted a gradual approach by sustaining the continuity of socialist transition and mirrored much of the rural reform (Naughton, 2007; Ning, 2009). Inspired by the success of the rural contract responsibility system, the urban enterprise reform introduced a "profit responsibility system" into the state sector (Ning,

2009, p.60). Guided by this principle, corporate governance was evaluated by various performance targets, such as targets for sales, market share, profitability, and capital accumulation. During the 1986-1992 reform period, the ICT industry, including the sectors of integrated circuits, computers, telecommunications equipment and software, have become the trial sites of the urban enterprise reform (ibid, p.87). The establishment of incentive mechanism and managerial autonomy has also been widely adopted by non-state-owned enterprises that were eager to establish the Anglo-American models of modern enterprises.

Since the mid-1990s, the enterprise reform has experienced a second wave of dramatic institutional changes through capitalistic reorganization. One of the central issues of this period's enterprise reform was to implement internal restructuring through corporatization under the "share-ownership scheme". The early trial experiments were initiated by local governments at privatization of collectively-owned enterprises (Nee & Oppen, 2012). This process of corporatization created new corporate forms, including limited liability shareholding corporations, limited liability firms, employee shareholding companies, and private firms. In 1993 the central government first defined that a modern enterprise system had to "clarify property rights, designate authorities and responsibilities, separate government and enterprise functions, and established scientific management",² officially identifying principles of post-socialist enterprise reformation. In the following year, *the Corporation Law* came into force, laying down a fundamental legal framework for corporatization (Naughton, 2007). It set up the standards and principles of mainstream corporate organizational forms in line with Western-style corporate governance. As Nee and Oppen (2012) argue, the reform schema was appealing to entrepreneurs because it "conformed to the myth of becoming modern by adopting the same organizational forms as Western corporations" (p.115). A modern enterprise system, to some extent, "became

² "Decisions of the CPC Central Committee on Some Issues Concerning the Establishment of a Socialist Market Economy System", adopted by the *Third Plenary Session of the CPC 14th National Congress* on November 14, 1993.

synonyms of modernity and economic progress, symbols of legitimacy and prestige in China” (ibid). Although the law intended to provide the state-sponsored guideline for modernizing state-owned enterprises, it also unintentionally accelerated the diffusion of shareholding organizational forms among non-state-owned firms. Private entrepreneurs followed this new trend and gradually established their own practices in the process of incorporation. Meanwhile, the law was also an important turning point for private firms to gain legitimacy for their organizational forms and identities. This policy directly led to an essential change of Huawei’s ownership status. In 1997, just three years after the enactment of *the Corporation Law*, Huawei finally took off its “collective red hat” and registered as a limited liability company.

However, Huawei’s practice in its employee shareholding ownership was still considered as an “informal” structure. The scheme was merely an internal practice without legal registration at any relevant government department. It means Huawei’s employees which were also the company’s shareholders were not legally protected by relevant laws or regulations. It also raised widespread controversies concerning the nature of the company’s ownership structure. The central leadership even received many complaints against Huawei’s ESS, claiming that Huawei’s shareholding structure was illegitimate business because it intended to institutionalize private property rights and completely deviated from the principle of socialism. In 1997, the central leadership assigned a group of scholars and officials to conduct fieldwork research on Huawei’s operations. The result of the research unexpectedly won the central leadership’s endorsement for Huawei’s ownership experiment. In the same year, Huawei’s experience was written into the 15th National Congress of the Communist Party of China. The Congress report specifically declared that “the emerging form of joint stock cooperative venture which was characterized by the association of laborers in labor and the association of laborers in capital” should be viewed as a form of the “new collective economy”, and it should constitute an important component of a socialist market

economy.³ According to the definition, such a new form of the collective economy was first built on the base of workers' collective work and mutual cooperation for shared interests. Meanwhile, it also encouraged workers to buy shares of corporations and enjoy the ownership of corporate assets. Under this ownership arrangement, workers not only play the role as labor but also as the owner of the enterprise in the form of shareholders. Moreover, the report stressed that the shareholding system could be used both under capitalism and socialism, but the key principle lay in who hold the controlling shares. This definition distinguished Chinese firms' experience from the Anglo-American mechanism.

The policy endorsement fundamentally legitimated Huawei's ownership status. By 1997, Huawei's registered capital reached ¥70.05 million, which were all funded by internal employee shares. In the same year, the company's ESS was overhauled by extending the scale of the shareholding to benefit more non-executive employees. The standard of shares distribution was based on an employee's positions, contributions, comprehensive capability and future development potential. As Huawei's rapidly growing businesses since the mid-1990s have enabled the company to overcome the financial difficulty in the initial stage, the ESS was no longer primarily used for self-funding but as an important incentive mechanism.

In 2001 Huawei passed the ESS restructuring plan by introducing the concept of "virtual restricted shares" based on the output-related principle. Under this arrangement, employee shareholders can receive dividends based on corporate performance, but their stocks cannot be transferred or disposed; and if they leave Huawei they have to sell their stocks back to the company for redistribution or to be voided. It means Huawei workers do not possess the company's property rights except the profit-sharing benefit. To encourage employees' capital injection, Huawei even coordinated with Shenzhen's local commercial banks to set up "individual business loan" program. This financial program

³ *Reports on the CPC 15th National Congress* on September 12, 1997

allowed Huawei workers to borrow money with low interests from banks to purchase the company's stocks, while Huawei served as a guarantor on bank loans. By 2011 the total amount of the loans had reached ¥17 billion. In view of the financial risk to the banks, this program was eventually banned by the central government. Despite this restriction, Huawei workers were still able to allocate their high dividends to reinvest increasing shares every year. Since 1997 Huawei's share price has risen more than fivefold with the company's rapid growth.

Huawei's ESS regulated that employees' shareholder rights were implemented and institutionalized through the entity of the Employee Union. The company shareholding structure comprises two shareholders: the Union and Ren Zhengfei. According to the company's disclosure, the ESS involved 82,471 employees as of 2014, accounting for over 60 per cent of its global workforce.⁴ But in the current stage only Chinese employees are allowed to participate in the shareholding plan. It means Huawei is still a 100 per cent Chinese-owned company despite its highly transnationalized operations.

The Distinctness and Limitation of the ESS

Huawei's ESS design is by no means a new practice. Emerging in the 1950s in the US, employee ownership was originally designed as a "third way" alternative to capitalism and socialism by turning workers into capitalists. After the collapse of fixed wage and benefit system in the post-War capitalist system, employee equity was often offered as a means of compensations complementary to flexible wage system. Now employee ownership has become a popular "share-ownership scheme", providing workers with participation in profit-sharing through stock ownership or stock options. Especially in high technology corporations this ownership structure is often used to enhance company

⁴ Huawei 2014 Sustainability Report. Retrieved from <http://www-file.huawei.com/~media/CORPORATE/PDF/Press-Center/media-kit/2014Huaweisustainabilityreporten.pdf>

performance by allying interests of employees and shareholders in risky markets. In essence, employee ownership represents a new paradigm of the economic organizational form that moves beyond the traditional Marxist binary conceptions of worker and capitalist. Under the employee ownership arrangement, workers who are entitled with direct ownership of corporate equity are turned into part of “new capitalists”. Huawei’s innovative ownership design is also characterized by this nature, but at the same time it also has some distinct features as well as limitations in its practices.

Capitalization of Knowledge

Different from other Chinese low-end ICT manufacturing firms that are entrenched in the downstream of global production cluster, Huawei identifies itself as part of high-end “knowledge-based economy”. The company firmly believes in the principle of “capitalization of knowledge”. It means knowledge is not only a primary means and resource of production but can also be translated into capital and surplus value. Under this assumption, knowledge workers who can produce surplus value of knowledge are perceived to have the most important labor power. Based on this assumption, Huawei’s ownership structure is designed to fulfill the value of knowledge labor and to fully respect their work and contribution in their activities of knowledge production. Laborers therefore have not only become the owners of capital but also the recipients and beneficiaries of corporate capital returns. Thanks to Huawei’s generous dividend distribution scheme, Huawei employees can get much higher cash dividends than their fixed salaries.

However, the adoption of employee ownership, even at its best with broadening capital ownership base, would not fundamentally change the capitalist production relations. In fact, Huawei workers do not completely possess proprietary rights of corporate equity but primarily profit-sharing opportunities. The ownership scheme is still subject to the conditions of employment contracts under which the company plays a

decisive role in determining the mechanism of stock allocation and dividend distribution. The capitalist class relation of production between capital and labor stays intact, which constitutes the antagonistic character of capitalist accumulation. Moreover, it is clear that corporate equity shares under the ESS are not evenly distributed. At Huawei the difference in stock allocation may relate to one's seniority and job performance. New hires usually do not enjoy equity share grants. They were required to "stay around" at the company until full ownership of the shares was vested. Senior employees who were allocated more shares can enjoy much greater profit return from the company. The ESS has become a key factor that resulted in the income inequality at Huawei.

Decentralized Ownership Structure

Despite the difference in equity allocation, Huawei ownership structure is highly decentralized compared with many other ICT companies. Many of these joint-stock companies tend to concentrate corporate stock option grants in the hands of executives and allocate a small portion of surplus profits as shareholder returns. For example, the stock option scheme of Baidu was only granted to few senior executives and key technical experts who joined Baidu from scratch. The non-executive employee shares only account for 5.5 per cent of the company's shareholding (Hu, 2008). At Tencent, the ratio of employee shareholding was 17 per cent. From 2009 to 2011, Tencent launched millions of employee stock options to award some selected "excellent employees", but this part of options only accounted for 0.55% of its circulating shares. On the contrary, Huawei' ESS ensured a broader base of ownership structure, with the majority of Chinese employees enjoying stock ownership. Unlike other Chinese ICT capitalists who appropriated the largest shareholding, Huawei's Ren Zhengfei only held 1.4% of the company's total stocks, while the rest of shares were distributed among Huawei's Chinese employees across different layers.

In today's ICT industry, the widening income gaps have become a growing phenomenon. Huge portions of surplus profits were actually appropriated by high-ranking executives or senior managers. The social wealth they accumulated was breathtaking. For example, Lenovo's Yang Yuanqing became the highest paid CEO among all Chinese executives with his annual salary of \$21.4 million.⁵ The financial speculation in the industry further created the myth of "new riches" among the new group of IT entrepreneurs. Among the ranking of China's richest people, leaders from some well-known high-tech company such as Alibaba, Tencent, Baidu, Jingdong and Xiaomi, were ranked on the top of the list. Capitalists' wealth and income fluctuate with the market, largely influenced by their firms' performance and growth opportunities (Harris, 2006, p.28). This market-driven system of corporate governance further consolidated the capitalistic logic of management and the income inequality. Although Huawei's ESS was also based on the performance-oriented premise, the company attempted to constitute a relatively equitable system of redistribution. Besides the high ratio of employees shareholding, Huawei also allocated a large portion of corporate annual earning to pay for employees in the forms of dividends, bonus and benefits. It is reported that the company's total net profit that was earned over the last twenty years was considerably smaller than the total amounts that was paid out to its employees.⁶ Such an ownership structure effectively prevents the company from the concentration of capital monopolized by big capitalists. Corporate wealth and profits became common goods that were primarily shared by internal workers.

A Self-sustaining Model

Under the complex corporate shareholding regime, the question concerning "who is

⁵ Ohnesorge, L (2014, July9). *Lenovo's Yuanqing Yang Tops CEO Pay List*. Retrieved from <http://www.bizjournals.com/triangle/blog/techflash/2014/07/lenovos-yuanqing-yang-tops-ceo-pay-list.html>.

⁶ De Cremer, D. & Tao, T.(2015, September 24). *Huawei: A Case Study of When Profit Sharing Works*. Retrieved from <https://hbr.org/2015/09/huawei-a-case-study-of-when-profit-sharing-works>.

controlling for whose benefit” should be considered as a central issue to unfold the power relations underlying the ownership structure and governance system. Huawei’s ESS intended to shift the corporate control from external shareholders to internal shareholders by insisting on its self-sustaining model of development. This feature of ownership structure greatly differs from public companies where interests of internal workers are hijacked by external shareholders especially by big financial capitalists. With the increasing injections of “deterritorialized” capital especially the inroad of financial and venture capital into the ICT sector, the capital logic of financialization has become a determinant feature in reshaping ICT companies’ ownership structure and governance, with increasing dependence on financially driven or speculative actors (Almiron & Segovia, 2012). Under such a logic, the valuation of a firm is not simply determined by its products or technological innovation, but by its speculation on future profitability. As Hung (2011) argues, this form of “paper-tiger finance” supported by international financiers actually creates numerous “paper companies” under globalized networks of capitalization. In addition, venture capitalists or outside investors whose interests are based on a firm’s premium profit return increasingly play important roles in corporate ownership structure and corporate governance. It subjects the management of the firm to the principle of “shareholder value” to pursue the maximization of shareholders’ gains and profits. It also concentrates major responsibility of corporate control in the hands of few major shareholders. Many companies’ ownership structure and governance have gradually been controlled by the emerging network of TCCs that primarily comprise capital owners, corporate executives, and international financiers. These transnational capitalists often take a concrete shape in the organizational form of a board of directors at the firm level (Carroll, 2010).

Despite the Chinese government’s restrictions on foreign ownership, most Chinese ICT companies still sought to adopt a new equity structure with Chinese characteristics, which was known as the variable interest entities (VIEs), to attract foreign capital

financing and to complete offshore listings. This complicated ownership composition assisted foreign investors to find inroads into China's ICT industry and take control of corporate shareholding system via indirect foreign ownership. In fact, most leading China-based ICT companies are not exactly Chinese-owned. For example, the biggest single shareholder of Tencent is Naspers--a South Africa-based multinational media group. Alibaba's principle shareholdings were held by Japan's SoftBank Corp and Yahoo, which far outweighed its founder Jack Ma's shareholding. Capital relations became a bond that tied various shareholders together to maintain and run the networks of TCCs.

On the contrary, Huawei refused the involvement of external financing control in its corporate ownership and governance. Ren claimed that Huawei would not go public in the future, because he realized that Western capital markets were "greedy" in nature, which may eventually undermine Huawei's long-term self-development.⁷ According to Huawei's 2011 audit report, the company's external financing, which all took the form of bank loans, only accounted for less than 15% of cash flow. The rest were from the self-owned cash flow from operation and internal financing.⁸ In an overarching trend of financialization and capitalization occurring in the global ICT industry, Huawei's ownership structure is distinct from and even contradictory to global common practices. To the largest extent, this self-sustaining mechanism successfully protected employees' interests from the control of global speculative capital and enabled the company to focus on the competitive advantage in technological innovation rather than merely on capitalist tools of accumulation.

Management Structure

⁷ Williams, C. (2014, May 2), Huawei Founder Ren Zhengfei Rejects 'Greedy' Public Markets. *The Telegraph*. Retrieved from <http://www.telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/telecoms/10804835/Huawei-founder-Ren-Zhengfei-rejects-greedy-public-markets.html>

⁸ Liu, F. (2012, October 20). "The virtual and real story behind Huawei's IPO". *21st Century Business Herald*. Retrieved from <http://finance.ifeng.com/news/tech/20121020/7176399.shtml>.

It is important to note that ownership is not only a means of allocation of property rights, but also embodies different forms of social relations. Under the bedrock standard of “one share, one vote”, the controlling shareholders make the basic decisions of what, how and where to produce, and undertake the key capitalist roles—appropriating and distributing the surplus to serve shareholders’ interests (Wolff, 2012, p.87).

Non-executive employees are excluded from the decision-making circle. Power of management is unequally distributed based on equity relations.

Employee ownership, nevertheless, provides part of vision of democratic management through redistribution of power and control. The very existence of employee ownership creates a mechanism for worker control and for their participation in decision-making at the firm level. Huawei’s ESS also attempted to go along with practices of democratic management. In practice, Huawei’s Worker Union, which is not a trade union but an organization comprising all employee shareholders, represents the highest authority of corporate management.⁹ Members of the Union have equal voting rights. They vote every five years to pick 51 representatives who then selects 17 members for the Board of Directors. Employees can also nominate their preferred candidates on the ballots, which are held at roughly 400 voting sites around the world.¹⁰ In this way, Huawei employees can delegate management functions to directors of their own choosing. They are also empowered with certain governance rights to implement their control over the decision-making process.

Huawei’s management innovation also took place at the leadership level where Huawei intended to avoid domination of individual leaders within the company. A system of rotating and acting CEOs was adopted in the company starting in 2012. In this system

⁹ Huawei 2014 annual report. Retrieved from http://www.huawei.com/en/about-huawei/corporate-info/annual-report/2014/img/huawei_annual_report_2014_en.pdf

¹⁰ Sevastopulo, D. (2014, February 27). Huawei Pulls Back the Curtain on Ownership Details. *The Financial Time*. Retrieved from <https://next.ft.com/content/469bde20-9eaf-11e3-8663-00144feab7de>

the three deputy chairs rotate into the top executive role for a tenure of six months and form a board of seven together with another four standing committee members. These four standing committee members are present to provide supporting and supervisory roles to the three rotating CEOs. Ren Zhengfei maintained his role as chair to act as a mentor for the rotating CEOs. He retained authority on major decisions such as corporate development strategies and corporate culture building, but fully empowered workers when the decision-making process comes to R&D, human resource, benefit allocation, and other areas. Although Ren was still viewed as a “heroic leader” in the company thanks to his significant influence in leadership, Ren attempted to challenge the concentration of power by introducing the innovative leadership model. This managerial innovation has delivered a collective decision-making process and a platform where the ideas of democracy and centralized decision making were balanced. It also ensured that Huawei’s collective and sustainable interests would be served under the shared leadership model.

Managerial Style: A Contradictory Mixture

Huawei’s management can be seen as a contradictory mixture, comprising socialist residues and Western-style management in its practice. On the one hand, Huawei inherited part of the legacies of pre-reform socialist enterprise management, that is, the values, attitudes, and behavioral norms deriving from a set of ideals and practices of “socialist democratic management”. These inherited legacies can be better seen as “a product of a socialist regime that actively sought to prevent the emergence of bourgeois individualism” (Sil, 1997, p.133) and a mechanism to achieve politicization of the workplace. But on the other hand, the company also enshrined Western management structures and strategies to promote the doctrine of a “modern enterprise”. Huawei’s managerial experience combining traditions of socialist practices and Western corporate management represents the most distinctive features of Chinese enterprises in transition.

Socialist Residues

In addition to organizational innovations, Huawei was also renowned for its distinct corporate culture, which was informed “with Chinese characteristics” by incorporating the essence of socialist practices of management. This distinct feature was largely influenced by Ren’s leadership. As a representative figure among the first generation of private entrepreneurs in the reform era, Ren fostered some key reconstructed characters and legacies of the Chinese traditional national bourgeoisie. What distinguishes this generation of private entrepreneurs like Ren from other capitalists is their highly “politicized” consciousness and ideological loyalty to the Chinese party-state. Ren’s experience of military service also shaped his ideological orientations and political identities, which in turn exerted great influence on Huawei’s military-style management. Moreover, Maoist thought had lingering influence on Ren’s leadership tactics. Ren had been awarded as a “model of learning Maoist thought” when he served in the PLA. This experience in his early career allowed him to employ a business version of Mao-style in cultivating corporate culture and ideology to ensure employees’ compliance with the company’s management approach, culture and core organizational practices. Ren once said: “The unification of an organization must be built on the basis of the construction of ideology and culture. An organization is a structure system, and culture power and ideology power are the biggest powers” (Qin, 2002, p.222). This thought constituted a key feature of Huawei’s corporate management style.

In practice, drawing from the Maoist practice of “self-criticism”, Ren instituted regular “democratic meetings” in which lower-level employees were mobilized to criticize mid- and upper-level executives. Such a Mao-style mass movement was applied to break the hierarchical structure entrenched in the firm. In addition, drawing on Maoist ideas about combining “knowledge with practice”, Ren also emphasized the combination of practical education and participation in labor. For example, in 1998 Ren launched a rotating

campaign, requiring all technicians especially those with high education degrees to participate in shop-floor production. In his speech, Ren addressed:

Our current management in fact is to promote the Party's exemplary working style of the 50s and 60s when Chairman Mao required that technicians had to align with workers and peasants and combine with productive practice. Now Huawei's engineers with PhD or Master degrees should become "workers and peasants" on the production line.¹¹

Huawei also utilized revolutionary terminology to "revolutionize" employees in a business context, with which moral and political incentives were established as the primary corporate values. For example, Ren used the archetypal Communist hero-soldier Lei Feng¹² and the cadre Jiao Yulu¹³ as symbols to promote the spirit of selfless hard work and dedication. He also organized employees to sing revolutionary songs as part of the company's ideological education.

One of the critical steps in institutionalizing Huawei's organizational practices was marked by the formation of the *Huawei Basic Law* in the 1990s, which intended to imitate the far-reaching "Angang Constitution" in Huawei's management. The Maoist "Angang Constitution", a democratic mass-line style managerial revolution against Soviet "one-mass bossism" and Western-style Taylorism, pioneered a distinct Chinese model of industrial democracy. Its core elements, known as "two participations, one reform and three combinations", were appropriated in Huawei's management practices. Ren accentuated workers' "right to management" in planning, production and decision-making. For example, during the drafting process of the *Huawei Basic Law*, Huawei held a company-wide campaign on the debate of Huawei corporate culture. Workers were encouraged to participate in the debate and their opinions were incorporated into the

¹¹ Ren, Z. (1998). *Dedication to Products and Customer Services*. A speech on Huawei telecom R&D engineers meeting.

¹² Lei Feng was a soldier in the PLA. He was characterized as a selfless and dedicated person and promoted as a model Communist hero by the CCP.

¹³ Jiao Yulu was characterized as a symbol of the honest Party cadre who devoted himself to the Party and people.

written rules. As a result of this large-scale participation, the *Huawei Basic Law* with 103 articles was finally completed in 1997. Each item of the written organizational rules has been thoroughly discussed and agreed on by each member of staff as consensus. The *Huawei Basic Law* has an important symbolic character in signaling the company's fundamental values and offering guidance for day-to-day practices. Workers' participation in formulating these written rules has formed an internal source of legitimacy and further consolidated shared value orientation among top executives, management teams and employees.

Although the enactment of the *Huawei Basic Law* incarnated an ideal of "democratic management" Ren hoped to attain, it is also important to point out that Ren's paternal style of management, which was also a residual managerial character of pre-reform socialist enterprises, still permeated Huawei's practices of management. This contradiction constituted a distinct feature of Huawei's managerial approach.

As observed by Wang Jing (2008), the usage of "corporatized Maospeak" is the most striking approach to construct corporate culture in some leading ICT firms. This managerial strategy still works in China's business context because of its deep ideological origins and socialist legacies. Noticeably, it clearly indicates "the continuity between Mao's China and corporate China" (ibid, p.160). The underlying value of Huawei's corporate culture and corporate structure embodies the ideals of socialist economic democracy. In practice, it also incorporates the work ethics of socialist enterprises in the Mao era and articulates individual self-identification with collective interests by motivating workers' moral attitudes. This distinct managerial method also plays an important role in molding the company into a cohesive entity.

Western-style Management

Apart from socialist residues, Huawei also made efforts to incorporate Western

managerial styles and methods through which the myth of “modern enterprise system” was reproduced. With the company’s accelerated process of internationalization, in 1997 Ren Zhengfei decided to introduce Western managerial experience in corporate restructuring after his visit to the US. He commented that the management restructuring process was painful, but Huawei had to “cut the feet to fit in the (American) shoes (*xuezushilv*)” (Ma, 2014, p.165), aiming to learn from the West to modernize the management system. Beginning in 1998, Huawei hired IBM Consulting and spent over ¥1 billion to implement new managerial systems, including the system of integrated product development (IPD) and integrated supply chain (ICS). The implementation was mandatory at different corporate levels. Another pivotal human resource system was developed in cooperation with the Hayes Group—a US-based management consulting firm—from 1997 onwards. It included standardized models for job design, reward systems, assessment and appraisal, performance management and employees’ qualifications, and selection and retention practices. An interviewee who was Huawei human resource manager explained that the company’s restructuring efforts were meant to rectify “the previous unorthodox structure” and adapt to a global growth model by bringing in Westernized experience.

Underlying the restructuring process was Huawei’s ambition to “catch up” with Western counterparts and become a well-recognized global player. However, it should be reminded that the pursuit of building the Western-style modern enterprise system often accompanies with a decoupling from socialist practices of management and indigenous organizational innovation. Such contradictory practices not only undermine Huawei’s ongoing efforts in searching innovative measures of management, but also lead to a standardized and rigid corporate managerial system.

Labor Practices

The analysis of a firm's ownership pattern cannot only reveal the vast corporate structure but also provides an insight into the relationship between capital and labor. To capture the complicated process of class restructuring and labor relations in a transnationalized production system, this following section provides an analysis of Huawei's labor practices, including its procurement practices, training systems, hierarchical job structure, divisive salary regime and "soft management" skills.

Running in tandem with the corporate restructuring, employment relations in China have undergone a significant shift from socialist social contract to "market-oriented, voluntaristic and individualistic 'labor contract'" (Friedman & Lee, 2010, p.509). On the one hand, the state-sector workers' iron rice bowls were smashed, replaced with commodified employment relationship under the capitalist labor market; permanent lifetime employment in the pre-reform socialist welfare system gave way to market-based contractual and temporary employment; and the equal eight-grade wage system was replaced with performance-related pay based on the principle of economic efficiency. The corporate restructuring in the SOEs sector led to massive layoffs of redundant labor. On the other hand, the emerging non-state sector has become a key force for labor absorption. Especially with China's deeper participation in the international division of labor, the formation of the FDI-driven and export-oriented ICT industry has re-shaped the country's employment structure (Hong, 2011). Globalization created interdependence on the part of capital, but it also integrated workers into the global productive system. In this sense, it is important to take into account the transnational dimension in examining the characters of Chinese ICT labor. Recently, important advances have been made by some critical communication scholars in studying emerging Chinese industrial workers who were compelled into informal employment in China's labor-intensive and low value-added ICT industry (Hong, 2011; Qiu, 2016; Zhao & Duffy, 2007). These studies

have documented the evolving labor conditions and labor relations that were shaped by China's political economic transformation. This segment of Chinese working class actually constitutes a significant part of "transnational labor" in transnationalized digital capitalism. However, it should be recalled that increasing stratification in China's ICT workforces continued to underlie the ongoing class restructuring. The soaring ICT professional labor such as R&D and technical workers that are situated in the high-end segment of workforce presents different characters of Chinese ICT workers. Yet the social formation and changing conditions of this segment of Chinese skilled ICT labor remain under-explained in extant literature. The case of Huawei provides an insight into this dimension at the enterprise level.

Labor Procurement

As non-state-owned enterprises were positioned outside the formal state-run labor allocation system in the initial stage of market reform, Huawei had difficulties in developing labor procurement channels at the beginning. In Huawei's early start-up days, the company only employed 3 workers for trading business. The lack of procurement of technical and managerial workers became a crucial challenge to Huawei's operations. In addition, the situation of a private enterprise was far from promising in the early 1990s. Especially under the state's FDI-friendly policy, foreign-invested firms not only became the major source of job creation for low-skilled labor (Hong, 2011) but also the most sought-after choice for top talent in the labor market due to their high pay and full welfare packages. Some renowned high-tech TNCs such as Siemens, Motorola, IBM, and Microsoft had become the most desired employers for graduates from Chinese prestigious universities. During the same period, China's high-tech labor market faced the "brain drain crisis" because the best-performing Chinese science and engineering graduates flocked to US high-tech companies and leading research laboratories. In contrast, Huawei was in a lower tier in the job market vis-à-vis SOEs and foreign-invented

firms. This compelled Ren Zhengfei to turn to personalized recruitment channels for hiring professional workers in the initial stage of development. Nevertheless, Huawei's strategic decision to build its in-house technological capability later attracted some skilled engineers who were ambitious to look for new challenges and excitement. During my interviews, several engineers all expressed that at Huawei they had more autonomy in R&D activities and obtained more fulfillment from developing indigenous innovative technology. An engineer who switched his jobs from a foreign high-tech company to Huawei explained that Chinese employees were often excluded from the mastering of core proprietary technologies and were only allowed to take some peripheral R&D activities in foreign-invested companies. He further commented that Huawei's job, in contrast, seemed more "interesting" to him because his values can be better realized as a skilled engineer by fully engaging in the company's technological development. Technical workers at different levels can be empowered to make decisions without intervention of the top managerial circle. In this situation, labor is not a necessary alienated form of work, but possesses the subjectivity of self-determination and self-achievement in their work.

In order to procure the most "suitable" employees who can fit in the company's "hard work" culture, Huawei set up a series of norms in its standardized recruiting practices. Huawei preferred to hire employees with humble family backgrounds such as from rural or urban laid-off workers' families. Workers with such backgrounds were perceived to be more diligent and disciplined. They were assumed to have strong incentives to change their material conditions through "hard work". These "virtues" were posited to be congruent with Huawei's corporate culture that placed priority on the spirit of diligence in its quasi-military management. In addition, Huawei preferred to recruit graduates from interior areas at its early stage of development. Some recognized universities in this region, such as Huazhong University of Science and Technology in Wuhan, University of Electronic Science and Technology of China in Chengdu, and Xidian University in Xi'an, became the major access to skilled talent. This recruitment procedure has also become a

typical model for private high-tech companies in the Pearl River Delta where technological innovation capabilities are weak relative to Beijing and Shanghai. With Huawei's rapid expansion since the late 1990s, Huawei has adopted a "sweeping recruitment strategy" to hunt for graduates across China. From 1998 to 2002, over 10,000 university graduates were employed by Huawei. According to an informal survey conducted by the Ministry of Education, over 20% of science and telecom engineering graduates from China's top 20 universities were hired by Huawei during this period. And over 80% of these new graduates were appointed to R&D positions.¹⁴ Such a sweeping strategy not only enabled Huawei to lure talent away from other competitors but also constituted the company's R&D-based, ICT-skilled workforce.

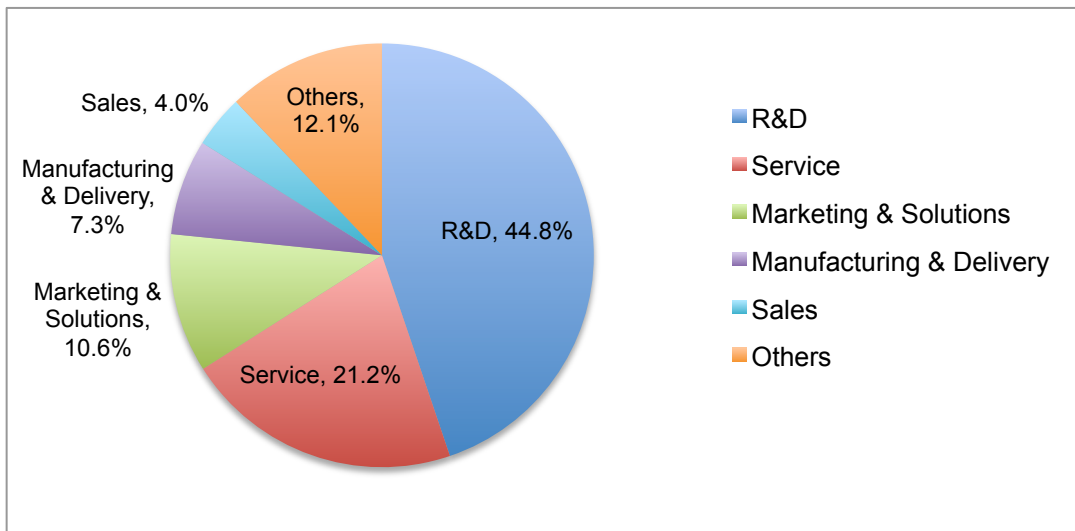
After 2002 Huawei started to emphasize "average labor productivity" in production. As a result, procurement channels focused more on the existing labor market to hire experienced workers. An interviewee told me that the majority of his colleagues were actually procured from competitor companies such as Ericsson, Siemens, ZTE and Foxconn. Besides R&D talent, Huawei also placed more emphasis on the recruitment of experienced employees in the fields of marketing, technical services, human resources, and finance.

With Huawei's deepening engagement with transnationalization of the R&D network, the company also shifted its focus to the procurement of high-end talent on the global scale. Since the 2000s, Huawei has strengthened recruitment of advanced and experienced scientists and researchers working in basic scientific research. They are not involved in practical R&D activities but mainly responsible for exploring forward-looking research and cutting-edge technologies in multiple domains such as 5G standards, chip architecture, big data, and platform systems. As of 2015, 14 top scientists and engineers

¹⁴ Ji, Y. (2016, May 2). *Ren Zhengfei's Recruiting Strategy*. Retrieved from <http://finance.sina.cn/chanjing/gsxw/2016-05-20/detail-afxsktkr5787071.d.html?vt=4&pos=17>

had been appointed as *Huawei Fellows* which were the most senior rank of the company's R&D positions. And over 2,000 scientists are working at Huawei's research institutes across the world.¹⁵ Despite low capital return on their scientific research in a short-term, Ren still insisted on consistent investment in high-end talent in the field of basic scientific research, which was incorporated as one of the significant strategies to achieve the company's "sustainable development". As of December 31, 2014, Huawei employed 170,000 workers around the world, with 45% of all employees involved in R&D.¹⁶ This R&D ratio was significantly higher than that of many other tech companies in China. The company even looked to doubling R&D teams in 2016 to accelerate the development of cutting-edge science and technology. In terms of the workforce's education level, more than 85% of its employees had at least a bachelor's degree and over 60% of them had a master or PhD degree.¹⁷

Figure 6.1: Huawei Labor Composition



Source: *Huawei 2014 Sustainability Report*.

¹⁵ Huawei 2014 Sustainability Report. Retrieved from <http://www-file.huawei.com/~media/CORPORATE/PDF/Press-Center/media-kit/2014Huaweisustainabilityreporten.pdf>

¹⁶ *ibid.*

¹⁷ *ibid.*

Training Methods

In order to create disciplined and proficient workers, Huawei developed the so-called “New Employee Cultivation” program. All of new recruits were required to receive one to six months’ internal tailored trainings at its in-house training center—the Shenzhen-based Huawei University. The training primarily comprised cultural education, technical training and production shop-floor practices. Ren Zhengfei mentioned that the Huawei University functioned in different ways from formal education at Chinese universities: its main goal was to combine “training with practical experience”. Ren used the military metaphor to emphasize the importance of cultivating “elite combat force” before they were sent to “battlefront”. The training process often started with a military-style boot camp, which was designed to instill the company’s core values and culture and develop employees’ spirit of cooperation, loyalty, conformity and solidarity. An interviewee recalled that all trainees had to get up at 5:30am to do morning exercises and then continued a long day’s technical and professional training classes from 8:30am to 11:00pm. Before the classes they were often organized to sing revolutionary songs and read the company’s propaganda materials. After professional training, all engineers were sent to production shop floor to learn manufacturing process such as assembly and test from production line workers. Such training methods served to cultivate new recruits with the spirit of collectivism and facilitate the combination of technical skills and production practices. Many Huawei employees mentioned in the interviews that most new recruits were completely “brainwashed” by Huawei’s training and formed very strong identification with Huawei’s “hard work” culture from the beginning. Besides intensive training, Huawei also adopted a mentoring scheme through which each new hire was assigned to an experienced employee in the first three months. Mentors were responsible to help new hires adapt to Huawei’s corporate culture and provide advisory support in their work and life.

Salary Regime and Reward System

Huawei has been well known for its generosity to employees in terms of the company's salary regime. In the early 1990s when Huawei's business took off, its employees' salaries had been equivalent to that of many other foreign-invested competitors. An interviewee commented that one of the greatest contributions Huawei had made in the 1990s was to increase the overall levels of Chinese ICT skilled workers' salaries in the domestic industry (Personal interview, November 2, November 16, 2013). The high salary policy has been further institutionalized in the *Huawei Basic Law* as one of the key characters of Huawei's human resources strategies. In 2013, Huawei increased the salary package of its entry-level employees by an average 30 per cent, with some employees getting more than a 70 per cent salary hike. Meanwhile, starting salaries for new graduates increased from ¥6,000 to ¥9,000 for undergraduate students, and from ¥8000 to ¥10,000 for postgraduate degrees. The company reportedly spent ¥1 billion on this salary increase.¹⁸ In 2014, the company's personnel expenses reached ¥71.9 billion, accounting for 25 per cent of its annual revenue.¹⁹ The average of Huawei employees' annual income, including their basic salaries, bonuses and stock dividends, is substantially higher than the market average.

Although Huawei's highly competitive pay package significantly distinguishes the company in talent hiring wars in the domestic ICT industry, a huge wage gap still exists within the firm's reward system. As Huawei is an intensely performance-driven organization, the company adopted a highly strict evaluation system to determine employees' income and rewards. Ren highlighted that the standard of income distribution should hinge on individual contribution, responsibility, capability and attitude. In addition,

¹⁸ Lee, C.(2013, July 26). *Huawei ups pay for entry-level staff*. Retrieved from <http://www.zdnet.com/article/huawei-ups-pay-for-entry-level-staff/>

¹⁹ Huawei 2014 Annual Report. Retrieved from http://www.huawei.com/en/about-huawei/corporate-info/annual-report/2014/img/huawei_annual_report_2014_en.pdf

the *Huawei Basic Law* says that the principle of distribution should be “efficiency first then equity”.²⁰ This principle of distribution is reflected in a variety of labor control devices such as the company’s salary structure, reward and punishment mechanism, and evaluation grading system.

In general, Huawei employees’ income comprises base salary, annual bonus, and stock dividends with 1: 1: 1 ratio. With increasing years of employment and growing corporate profits, the proportion of bonus and stock dividends would be far greater than that of base salary. In 1998 Huawei implemented the position-based reward scheme based on Western HR techniques. Specifically, the job evaluation methods comprises five elements: know how (30%), influence (30%), problem-solving ability (15%), communication (15%) and accountability (10%). Based on such a point-factor job evaluation, each employee’s role and performance are scored and graded. Performance pressure is also internalized as a factor of labor discipline. As a result of this job grading scheme, Huawei’s employees are ranked from Grade 8 to 22 according to their positions, education, technical levels, performance and working experience; each grade is further divided into 3 different levels (A,B,C). The lowest-ranked 3,000 workers (below Grade 13) such as factory production line workers, operators and warehouse workers are excluded from the company’s ownership arrangement ESS. New entry-level employees with a bachelor’s or master’s degree are ranked Grade 13. Experienced employees usually start from Grade 15. Ren and other chairs are ranked Grade 22A at the top. In addition, a general proportion of performance evaluation grading is implemented based on the strict result-oriented standards (Rowley & Cooke, 2014). Only those who are ranked above 50 per cent are eligible to obtain dividends. Those who are ranked at the lowest level twice would be dismissed.

Huawei’s performance-related management techniques created a mechanism of

²⁰ Huawei Basic Law (1998 May), Chapter 19.

“strict discipline”. It subjected labor to corporate control and disciplinary apparatus through which workers became individualized, objectified and differentiated. Such a coercive discipline mechanism functioned to establish a standardized norm to extract compliance from the workforce. The development of “advanced” methodologies in the company’s human resources management de facto sought to strengthen the machinery of capital control and legitimize the harsh labor regime.

Moreover, the performance-related and result-oriented reward system led to erosion of job security and welfare provision. In addition to the grading evaluation scheme, labor control was exercised through some invisible coercive approaches. For example, the company’s ESS, which was previously designed as a relatively equal means of income distribution for the majority of employees, has increasingly been tied to the productivity- and efficiency-oriented values. Because of the rapid expansion of Huawei’s workforce in most recent years, Huawei’s employee stock distribution is shrinking. In 2014 the company made an adjustment in its ESS, regulating that new Chinese hires were no longer eligible to obtain stocks in their first three years. This policy forced them to stay at the company as long as possible in order to obtain the shares-offering. Although the new ESS policy was used as an incentive by Huawei to retain talent and reduce turnover, it is de facto a form of invisible coercion and a means to increase surplus-value production by exploiting entry-level graduates and new hires. During the interview, a new employee complained that new hires like him were the most “exploited” in the company. They had to work harder than veteran workers and sacrifice their own short-term benefits to obtain stocks. The ESS was no longer a guarantee of employees’ welfare, but a “golden handcuff” to bind employees together and to test their “loyalty” to the company. Moreover, the ESS tended to consolidate and even widen the wealth gaps. According to the stock options structure, 30% of employee shares were granted to “excellent” and “loyal” employees who were at the top level, approximately 40% to medium level employees and merely 10%-20% to selected lower level employees.

At Huawei, the hierarchical job structures are also reflected in its culture of “staff ID numbers” (*gonghao*). It means those people with long-time working experience at Huawei, whose IDs were also placed at the top of the list, usually enjoyed much higher salary and more privileges than others. It resulted in an unequal system of power and wealth distribution. Some senior managers and technical engineers, who have been working at Huawei for more than ten years, can earn more than one million yuan annually because of the high dividends of their accumulated stocks. This part of veteran employees who earned surplus wages became the “aristocratic” workers in the hierarchical labor structure. But for new recruits, their income mainly relied on base salary. The mismatch between veteran and new employees has been further institutionalized by the divisive reward system.

The deepening inequality generated the need for Huawei to carry out deep reform on its distribution policy. To solve this problem, Huawei started to implement a large-scale salary adjustment to optimize the distribution structure in most recent years. On the one hand, Huawei boosted the base salaries of grassroots workers considerably instead of offering equity packages. On the other hand, veteran employees’ stocks would be diluted and extra shares would be redistributed to lower level employees. This approach intended to reduce the salary gap between veterans and grassroots employees by striking a balance between efficiency and equity.

Soft Management Skills

Unlike many other Chinese manufacturing factories’ depersonalized management applied in the discipline of low-skilled workers, Huawei tended to use soft and social forms of coercion to exercise its labor control. Huawei kept emphasizing the combination of collectivism and individual entrepreneurship spirit to engage and mobilize employees. It used the ESS to bind individual interests with the company’s collective interests. It

embraced the idea that Huawei belonged to every worker and the development of the company was determined by workers' contribution and commitment. The socialist moral ethos of "dedication" and "hard work" was re-appropriated as a core value of corporate culture to inspire workers' subjectivity in making collective efforts. The corporate culture also highlighted competitive individual performance in the organization. As argued by Fuchs (2014), such a mechanism is usually employed by modern capitalist enterprises to transform workers into individualized, self-managed and self-directed "entrepreneurial employees". For example, Huawei is well known for its "wolf spirit", which was proposed as a core value in the company's initial stage of development. It relentlessly emphasized employees' spirit of self-sacrifice and self-motivation in the work and promoted the principle of "the survival of the fittest" in the fierce market competition. This aggressive work culture compelled workers to invest a lot of time in their work to fulfill both collective and individual interests.

Huawei's "dedication" culture was employed as a means to justify the high intensity of work and the lengthening of working hours. There is considerable anecdotal evidence of Huawei's "hard work" culture in its everyday labor practices. In the early stage of Huawei's development, Huawei's workplace was known for its "mattress culture". At Huawei, every engineer had a folded mattress under their desk. They often kept mattresses to sleep off their overtime hours in offices to maximize their productivity. "Mattress culture" was not only a symbol of Huawei's "hard work" spirit but also an indicator of workers' intense workload and pressure. Although the company claimed that "employees follow voluntary principle for working overtime", in fact overtime working has become a norm at Huawei. The frequency of overtime was even considered an essential part of performance evaluation. Many workers said working a 12-hour day was normal and the average weekly working time often exceeded 60 hours. One interviewee claimed that he had to be on call throughout the night and on weekends. He explained that at Huawei overtime work was "non-compulsory". It means employees can barely get paid

for overtime hours unless one's supervisor approved his or her application for compensation. The unpaid extra work time was turned into surplus value and profit for the company. Additionally, there was no annual paid vacation at Huawei. Employees were required to work every last Saturday of the month, which was seen as the "official overtime working day", for exchanging vacation days.

What is worse, the extremely heavy workload seriously damaged workers' physical and mental health. In 2006, Hu Xinyu, a 25-year-old engineer at Huawei headquarter in Shenzhen, died from exhaustion. Before his death he had worked every day from 9am till 3am for nearly two weeks.²¹ From 2007 to 2008, several employees' suicides occurred at Huawei, yet all of these tragedies were described as "unnatural deaths" and concealed by the company's public relations department. This evidence was indicative of the exploitative working conditions skilled workers faced. Since then Huawei has adopted some overtime management measures for "stress relief", attempting to help staff alleviate stress and improve their physical and mental health. For example, workers' overtime work was monitored through an IT platform. Any abnormal overtime work would be recorded and reported to managerial staff. Health education and psychological counseling activities were carried out to promote the idea of work-life balance and healthy living and work. However, such changes in the "soft management style" had little effect in changing the deep-rooted "hard work" corporate culture and the mechanism of surplus value production. Employees who were dissatisfied with working conditions and high pressure usually chose to leave jobs. There was high labor turnover among new graduates in their first five years. Only a small proportion of new graduates can eventually "survive" the company's hard work culture and become the backbone of R&D staff. As an interviewee commented, these workers were not the "strongest" talent in terms of their technical capability, but they were the "fittest" ones to endure hardship. In turn, veteran

²¹ Xie, Y. (2013, August). "Worked to death". *News China*. Retrieved from <http://www.newschinamag.com/magazine/worked-to-death>

employees who benefited from the company's high capital returns usually had more identification with the company's hard work culture.

As discussed above, Huawei's managerial practices were largely influenced by Ren's paternal authority despite the ideals of "socialist democratic management" the company has been pursuing. To further advocate the "dedication" culture, Ren Zhengfei launched a campaign in 2010, calling for employees to sign on the "agreements of dedicated workers" (*fendouzhexieyi*). Ren classified three categories of workers: ordinary workers, general dedicated workers and outstanding dedicated workers. Employees who wanted to obtain high reward of bonus and stock dividends had to sign on an agreement of "dedicated workers", declaring that they voluntarily gave up paid vacations and overtime pay to work harder. An interviewee who was working at an overseas branch at that time told me that almost all of the employees in different departments were "forced" to sign on the agreements, or they would be labeled as "general workers" and disqualified for annual bonus, equity and opportunity of promotion in the future. Ren Zhengfei explained that this campaign was designed as a scheme of redistribution with an attempt to guarantee material rewards for those "outstanding dedicated workers". While regulations on payment of overtime and paid vacation have been widely publicized in recent years, Huawei's practices intended to evade these regulations through non-transparent methods to impose unfair conditions on workers. This measure not only deprived workers of basic rights but also intensified the conflicts between management and workers. It raised widespread discontent among Huawei employees who disputed this managerial measure as "a covert act of exploitation". To some extent, it also contradicted to the fundamental principle of the *Huawei Basic Law* which claimed to protect workers' rights and benefits in the company's management.

Despite Huawei's massive efforts to align labor's interests with corporate interests, measures to control or suppress workers' rights were also employed to guarantee the

conditions of capital accumulation. This even involved the violation of the labor law to overcome the limits posed by the state. In December 2007, just before the country's new *Labor Contract Law* came into effect, Huawei implemented a large-scale layoff program. This program urged all veteran employees who had worked more than eight years in the company, including Ren Zhengfei, to hand in "voluntary resignations" and then re-sign new employment contracts on one- to three-year fixed term agreements. This layoff program, which was claimed to be a "corporate restructuring scheme", intended to pre-empt the *Labor Contract Law* and to replace permanent employment with casual labor relations (Silver & Zhang, 2009, p.176). Huawei explained that this "voluntary resignation scheme" was to dismantle the aristocracy-oriented "staff ID culture" by re-arranging the ranks of senior employees' positions and salaries. As a result, 6,687 senior employees who submitted resignation all obtained a compensation package of ¥20,000 to ¥160,000 according to their length of services, and 99.9 percent of them were eventually rehired by Huawei. Although Huawei was meant to break managerial elites' entrenched interests and hierarchical structure existing in the management system, the approach was highly controversial. It attempted to create a sense of insecurity by breaking veteran workers' permanent employment contracts. Such a fear of job insecurity can be translated into workers' self-disciplinary value which further subjects labor to more arbitrary and stringent control.

Reproduction of Capitalist Labor Relations

As part of the "carrot-and-stick" managerial strategy, Huawei also provided convenient working and living environment for employees as part of corporate welfare. Huawei's Shenzhen headquarters, unlike other typical Chinese ICT manufacturing factories such as nearby Foxconn, resembles Silicon Valley-style campuses with acres of R&D facilities and recreational amenities. Employees can rent apartments on campus at very low prices. However, it also results in a blurred boundary between work and social

life. Some interviewee complained that there was almost no life outside their work. Located in the outskirts of Shenzhen, the neighborhood of Huawei campus is more like an urban village (*chengzhongcun*). It usually takes more than one hour to get to Shenzhen city center. An interviewee mentioned that Ren Zhengfei even refused Shenzhen government's proposal for extending subway lines to Huawei campus because he attempted to create a relatively isolated environment from the outside world. Huawei's internal office environment was also isolated. Some R&D offices even have no windows, which made engineers feel extremely depressed. In this environment, engineers are compelled to concentrate on and dedicate to work regardless of day and night. In this way, the corporate disciplinary apparatus has penetrated into workers' social life and into the circle of reproduction, which significantly dismantled their work and life balance.

At the same time, Huawei employees had to face increasing pressure due to the housing affordability crisis in Shenzhen. The continuous flood of financial capital into the city in search of property assets sparked a housing bubble, leading to a big surge in the property market. The Longgang district, a major industrial district of Shenzhen which is also home to Huawei and Foxconn, witnessed the expansion of real estate bubble in which industrial estates were being converted into more profitable residential properties. This speculation-led trend hollows out the city's pillar industries, compelling many high-tech companies and leading manufacturers to relocate their headquarters to lower-cost districts. Likewise, Huawei moved its global consumer business arm to Dongguan to reconstruct its manufacturing facilities. For the city's middle-class professionals like Huawei employees, they had to face the soaring costs of living, which forced them to leave the city. According to the official figures, the number of Huawei employees in Shenzhen headquarters has slid by 10.5 per cent in 2015.²² A Huawei

²² Ge, C. (2015, May 25). Housing Crisis in China's 'Silicon Valley': Huawei, other hi-tech giants head for cheaper cities as rising costs deter talent. Retrieved from <http://www.scmp.com/news/china/policies-politics/article/1952617/housing-crisis-chinas-silicon-valley-huawei-other-hi>

engineer who has worked at Huawei for five years said his family faced incredible difficulties to settle down in Shenzhen despite his monthly income tripling the average income in Shenzhen. During my fieldwork at Huawei headquarters, an interviewee showed me the construction sites of commercial housing estates around the neighborhoods of Huawei's campus. The construction development showcases the potential of the area to become a convenient and attractive living environment for middle-class residents, but it is likely lead to greater segregation within the district, with new and expensive gated communities on the one side and poorer communities for Foxconn workers on the other. At the same time, the quest of the middle class for urban lifestyle, which is primarily embodied in the possession of private housing property, is coupled with their precarious work and life status. Such a dilemma Huawei workers faced is very typical among the Chinese middle-class professionals as a whole. In comparison with Chinese industrial workers, there is no doubt that Chinese technical workers occupy more privileged economic status and enjoyed better social reproduction opportunities. Nevertheless, as part of the Chinese emerging middle class they are also subsumed in the global capitalist system particularly under the ideology of cosmopolitan consumerism and the concentration of speculative capital. The exploitative relationships they face not only come from direct extraction of their labor power in the production but also from the appropriation of their life materials in the circle of reproduction.

Labor Subjectivity

Huawei's structured disciplinary mechanism does not necessarily mean the alienation of workers in their consciousness and subjectivity. Many times in the interviews, a few interviewees expressed their strong prides in Huawei's achievements and being as a "Huaweier". They also felt Huawei represented China's national pride in the global ICT industry. Especially for some veteran workers in their 30s and 40s, they were more willing to internalize Huawei's practices and culture because their collective memories were still

imprinted with the country's socialist experience. Even though the "hard work" culture at Huawei seems crucial, they said most Huawei workers were far from being atomized and apathetic about their work; rather, they have fostered a strong consciousness of being "masters" of their enterprise, which was also a crucial base of socialist residues. However, divisive attitudes toward Huawei's corporate culture have been formed among workers. In most recent years, there has been a gap between Huawei's corporate culture and young generations of workers who have grown up in an era of transition toward neoliberalism. The ideologies of nationalism and collectivism have less appeal for this group of employees.

In addition, the strained labor control has also raised some workers' resistance. For example, when the campaign of "agreement of dedicated workers" was deployed, some reluctant employees voiced their discontent through different channels including the company's internal online community and some influential websites. A Huawei employee even founded an organization *Underground Resistance Fighter*, calling for widespread resistance against exploitation in Chinese ICT companies. The organizer published a "Manifesto of a Fighter" on Tianya—one of most popular and influential online communities in China—to criticize Huawei's crucial managerial practices and claim to defend workers' basic rights. This petition was widely circulated in Huawei's different departments. The protests as such showed new possibilities for the formation of digital labor's subjectivity and agency to resist the exploitative production relations.

Transnational Labor Regime

The globalization of production not only provides the basis for the formation of the TCC but also constitutes a large pool of transnational labor. However, in the contemporary stage of globalization, transnational mobility of labor is not as fluent as that of capital flow due to the nation-state-embedded regulations and control. As Robinson

(2014) argues, “National borders are mechanisms for controlling global flows of labor, disaggregating the global working class into national contingents and fragmenting both the political mobilization and subjective consciousness of workers” (p.51). This process leads to fragmentation and heterogeneity of the global working class in its formation and structure. But physical mobility across territorial boundaries is not the only criteria to define the nature of transnational labor. To some extent, Huawei is a prototypical company to analyze the heterogenous compositions of transnational labor.

One important indicator of Huawei’s transnationality is its highly transnationalized workforce. Along with Huawei’s global expansion, the company’s global workforces, which are composed of Chinese expatriate workers and local employees in host countries, grew significantly. They operated across more than 300 Huawei branches in more than 170 countries and regions. According to the company’s figures, the number of Huawei’s foreign employees reached 35,000 in 2014, with a localization rate of over 75% for non-managerial employees and 18.7% for middle and senior managers.²³ These global workers, no matter geographically fixed or flexible, are subordinated to the systematic process of transnational capital accumulation. As noted by Robinson (2014), capital has come to exploit global labor in new ways to construct a transnationalized labor regime (p.53). Within this regime, centralized labor management has become a pivotal mechanism to strengthen the control over the decentralization of global production and geographically diffused labor.

Chinese Expatriate Workers

Within Huawei’s transnationalized workforce structure, Chinese expatriate workers played a critical role in facilitating the company’s global expansion. At Huawei, every

²³ Huawei 2014 Annual Report. Retrieved from http://www.huawei.com/en/about-huawei/corporate-info/annual-report/2014/img/huawei_annual_report_2014_en.pdf

employee has an equal chance to be sent to overseas subsidiaries. As Huawei's internationalization started in underdeveloped countries, Chinese workers had to overcome extremely tough environment and challenging working conditions to explore new markets. For some veteran employees, they were purely inspired by the company's "hardship" culture. During my interviews, I heard about many Chinese expatriate workers' stories. What impressed me most were the stories of an engineer who had stayed in Africa for eight years. He described his extraordinary experience:

We often faced life-threatening conditions when working in Africa. We had experienced a terrorist attack in which one of our colleagues had been seriously injured. We had also encountered a robbery by several armed robbers in our dorm when we fell sleep. The majority of Chinese employees had suffered malaria or many other diseases. The working conditions were also challenging. In many cases we had to go to the remote areas on foot to install and maintain base stations... Because of long-time expatriation, we were unable to take care of our family. There was a high divorce rate among expatriate workers. It is hard to imagine what difficulties we have gone through no matter in our work or in our personal life (Huawei engineer, personal interview, October 22, 2013).

Chinese workers' dedication to "hardship" was the prerequisite of Huawei's success in its global expansion. To inspire more Chinese employees to work overseas especially in underdeveloped regions, Huawei offered generous compensation and benefit packages for overseas employees. In addition to base salary, annual bonus and stocks, a Chinese expatriate worker can receive "hardship allowance", "living-away-from-home allowance" and food allowance. The amounts of allowance were determined by the conditions of host countries. For example, workers living and working in African countries can receive as much as 70 dollars per day for allowance, which is much higher than that of workers working in developed countries. An interviewee said material reward was the key factor that motivated the majority of employees to work overseas in the initial stage of internationalization. Nevertheless, at the current stage the new generations of employees generally had no incentives to endure "hardship" in tough conditions. Ren recognized that

this has become an obstacle and a challenge to the company's expansion. Therefore, Ren advocated to "enhance frontline employees' welfare" and to ensure massive rewards for employees in underdeveloped regions.²⁴ In addition, Huawei tended to tie employees' expatriate experience with their career development. The employees who had overseas working experience especially in underdeveloped markets had more opportunities of promotion. The company also sent groups of senior cadres to regional markets for training, and appointed employees from the "frontline" to managerial positions.

It is important to recall that China-based TNCs' approach to assess China's qualified and diligent labor is the key factor that made these TNCs competitive in international markets. Many of my interviewees who had overseas working experience agreed that Chinese workers were more compliant with the company's tenets and labor discipline than their foreign co-workers. At Huawei's overseas branches, Chinese workers generally had segregated lives from local workers in their own compound, equipping with security guards, canteens, and entertainment spaces. Most of them lived in company-based industrial dormitories, which resembled a typical "collective" way of living of Chinese industrial workers. These practices, which are framed as the "dormitory labor regime" (Smith & Pun, 2006), was reproduced by Chinese firms abroad to strengthen control over transnational labor.

Localization

Since the mid-2000s, Huawei has accelerated the pace of localization under the strategy of "internationalization through localization". For example, Huawei's Indian operations have the highest rate of localization. Over 95 per cent of the employees at India-based subsidiaries were local workers, with the majority of them working at R&D positions. In Asia Pacific area, 70 per cent of the employees were non-Chinese. In

²⁴ Ren, Z.(2016, August 15). Speech on Huawei's HR meeting.

developed countries, natives were employed at high-level managerial positions to conduct PR strategies. Yet in underdeveloped countries, the localization rate of employment was much lower. A former Huawei marketing manager who had worked in Africa and the Middle East explained that Chinese workers usually occupied technical or managerial positions that were vital for local subsidiaries' operation, while local staff usually acted as administrators to support Chinese managers and engineers. This led to the hierarchical employment structure between Chinese employees and local workers. At the bottom of the hierarchy of Huawei's transnationalized workforce are local temporary/outsourced workers who work in Huawei's subcontracting units and undertake major manufacturing and construction work. They are either casuals or on fixed-term contracts, working in precarious conditions and receiving much lower wages and allowances than permanent workers. The casualization of employment system, which is an outgrowth of the neoliberalized labor regime, has been adopted by Chinese TNCs to reduce the labor costs and to realize the flexible capital accumulation.

International Management

As I mentioned before, the decentralization of production and workforce network gave rise to centralized management process. Huawei's control over transnationalized workforce is actually built upon such a centralized management mechanism that has unified standards, structures and processes across all of Huawei's global operations. The centralized corporate control to some extent has deprived global workers of local empowerment and autonomy. A Huawei service manager working at the North African subsidiary explained that Huawei's managerial practices at overseas subsidiaries basically duplicated its domestic models. From regional managers to grassroots employees, all employees at different levels had to keep communicating with the headquarter everyday and implement policy and strategy issued by the headquarter.

In terms of the reward structure, Huawei's foreign workers are excluded from the company's employee ownership scheme. This divisive reward structure not only undermined foreign workers' incentive but also increased the income gap within the transnational labor structure. To solve this problem, Huawei reformed its profit sharing plan by rolling out the Time-based Unit Plan (TUP) in 2013. This long-term incentive plan was designed to provide foreign employees with share compensation similar to that of Chinese employees. Foreign employees could receive a large amount of dividends and bonus in every five years. This plan was also adopted as a strategy of "integration into internationalized management" by Huawei to reduce the gap between Chinese employees and foreign workers. However, foreign workers who are rewarded by the TUP actually don't have the same ownership and voting rights as Chinese employees. This means Huawei's unique employee ownership and governance structure based on domestic practices is far from being realized across its global operations.

Moreover, Huawei has also faced the challenge of identification among foreign workers. To overcome such an obstacle in transnational management and obtain global recognition, Huawei has increasingly changed its nationalistic image toward the "custom-centric" value that is based on the universal language of market logic to integrate transnational labor into its corporate culture. To advocate the company's "corporate social responsibility", Huawei set up a number of training centers in underdeveloped countries for professional and technical training. These training programs provided local workers with engineering skills in the field of telecommunication as well as a variety of training in project management and "soft skills". This strategy of international management aimed to transfer skills to local workforce on the one hand and to strengthen the company's unified standards of management and culture on the other.

Tensions between Chinese Management and Foreign Workers

Despite Huawei's massive efforts in constructing a unified corporate culture across the world, foreign workers' views on Huawei's practices are mixed and layered. I used Glassdoor and Indeed, the websites that offer the inside look at jobs and companies, as a source to analyze thousands of job reviews by Huawei employees especially by foreign employees working outside China. Some people appreciated the company's "innovative" culture and the opportunities for learning the trend of technological advancement, while a large amount of reviews are complaints of Huawei's crucial "hard work" culture. These reviews foreground the tensions between Huawei's centralized management and localization.

One of the most salient conflicts arising from Chinese capital's localization lay in the gap between what Chinese managers require "work ethics" and local workers' resistance (Lee, 2009). Huawei's hard work culture, which was understood as the spirit of devotion to work and a willingness of self-sacrifices, was repeatedly emphasized as the fundamental principle of "work ethics" by Chinese managers. Local workers, nevertheless, viewed these requirements as Chinese cruel methods of "exploitation". The complaints about "overtime work" and "imbalance between work and life" were common. Such a gap existing in labor process has further strengthened the class and racial tensions between Chinese capital and local workforce. Especially in some countries, racial stereotypes were institutionalized in the management. During my interviews with Huawei's managers working in Africa and Latin America, they all complained about local workers' "backward" work ethics and indolence. They used their own hard work as standards to demand similar work style from their local co-workers, but this method of management usually intensified tensions and raised resistance from local workers.

In some countries, foreign workers' struggles have escalated to labor strikes. For example, in 2011 workers at Huawei's Algerian subsidiary went on strike over the company's poor working conditions, calling for higher wages and a collective bargaining

agreement. In 2014 Huawei's Indonesian labor union launched two strikes against Huawei's unfair treatment on Indonesian workers. The union claimed that temporary workers accounted for 70 per cent of Huawei's entire workforce in Indonesia. A lot of Huawei's outsourced workers have been contracted several times and still haven't been offered full time positions. They called for conversion of casual contracts into full time employment.²⁵

Although it is too early to predict that the global working class has developed a subjective consciousness of itself or shared cultural practices as a collective actor to form transnational agency as a "class-for-itself" (Robinson, 2014, p.51), the incipient labor activism and the increasing militancy among transnational workers to the largest extent increased their bargaining power, which may "cause a large disruption to the capital accumulation process" and "reverse the mounting class power of capital against labor" (Hung, 2009a, p.16). The tension between Chinese capital and transnational labor may generate profound effects on Chinese capital's behavior on the ground.

Conclusion

Huawei's experience provides a typical yet distinct case to analyze the transformation of the Chinese TNC's ownership structure and labor practices. Its employee shareholding scheme, which was originally designed as a self-funding measure, has developed into a form of collective ownership. Although this ownership arrangement is far from an ideal model, it can still be viewed as a meaningful experiment to break down the monopoly of big capitalists in the property ownership structure. Under this structure, laborers consist of primary shareholders and recipients of corporate surplus profits; capital is highly decentralized; and financial capitalists are excluded from

²⁵ Lukman, E. (2013, May 4). *Huawei Facing second Labor strike in Indonesia*. Retrieved from <https://www.techinasia.com/huawei-indonesia-protest>

the firm's ownership system and corporate control. These characteristics of the ESS entail a relatively democratic system of management and corporate governance.

However, in reality, Huawei's management still involved some stringent practices and coercive modes of labor control. The inculcation of the corporate "hard work" culture is implemented in the labor process through a variety of disciplinary apparatus. Although Huawei ensured share earnings for workers, the antagonism between capital and labor has not yet been mitigated under so-called "employee ownership". Moreover, Huawei's ownership structure has generated very complicated impacts on its labor practices. On the one hand, the high reward mechanism has become a key incentive for workers' dedication to work. Under the ownership arraignment, workers also enjoyed a certain level of autonomy and power in management. But on the other hand, the alignment of corporate interests and individual interests has been used as a means to legitimize the exploitative production relations and to extract more surplus value from labor.

What distinguishes Huawei from many other ICT firms also lies in its distinct mechanism of ideological construction and politicized corporate culture. It is reminiscent of some managerial experience of socialist enterprises in the Mao era. It is argued that Ren represents the old generation of Chinese corporate leaders who possess some key characters of the Chinese national bourgeoisie. These characters also enabled the company to develop some alternative experience to Western-style management. But at the same time, Huawei's structured management is also characterized by paternalism and a strong style of leadership cult with which employees own absolute loyalty to the company's supreme commander--the founding father Ren Zhengfei.

The transnationalization of Chinese capital has proceeded in conjunction with a transnational labor regime. Those workers that are incorporated into the circuit of global capital accumulation are increasingly subject to the hierarchical, precarious and

exploitative capital-labor arrangement. Huawei's practices in constructing and disciplining its transnationalized workforce foreground the conflicts between Chinese transnational capital and transnational labor. What is at stake is the growing divisions within the transnational labor, which are primarily reflected as the gaps between Chinese workers and foreign workers, between technical professionals and manufacturing workers, and between full time workers and casual/outsourced workers. Nevertheless, the ongoing struggle of transnational workers, which are contingent upon their national and local experience, might pose a daunting challenge to China-based transnational capital and complicate the tensions between Chinese capital and transnational labor.

Chapter 7.

Conclusion

In the context of China's rise to global power, the growth of China-based ICT corporations have gained new attention and relevance (Batjargal, 2007; Golwik, 2016; Shen, 2017). The fundamental question underlying the rise of Chinese ICT firms finds roots in a broader set of issues—that is, how to re-orient China's growth direction of the high-technology industry and to re-position China in the global system. The development of China's ICT industry has been facing the deep-rooted internal predicaments, characterized by the heavy dependence on foreign capital and on low-end ICT manufacturing capacity (Hong, 2011), or the "Foxconn Model". One of China's efforts at industrial restructuring rests on the growth of Chinese indigenous high-tech companies and their capability development. At the same time, the growing presence of Chinese ICT corporate power in global markets indicates a new trend of China's development path toward "outward-bound transnational capitalism" (Harris, 2012), or the globalization of "corporate China" (Wu, 2005). In this context, a competing mode of development—the "BAT model" led by the trio of China's Internet giants Baidu, Alibaba, and Tencent—has increasingly gained leverage in China's national economies and has been at the forefront of the trend toward China's innovation-led growth. However, this model, which can be seen as an emulation of the Silicon Valley experience, converges into part of the universal model of globalized digital capitalism. Is there a genuine Chinese model that shows traces of China's local trajectories of ICT development and provides some normative values for China's future development? This work aims to provide some new evidence to extend the debate with regard to the "Chinese model" by focusing on the case of Huawei.

This dissertation not only has taken an in-depth look at how Huawei grew within national, regional, and geopolitical economic contexts, but also attempts to reflect China's ICT developmental trajectory and its process of integration into global digital capitalism. What this story presents is not an isolated case specifically addressing one particular company's history and influence. **Rather, the case allows us to understand the legacies of China's socialist industrialization in the past, to reveal the paradoxical nature of China's development strategy of the present, and to elucidate the potential of the "Chinese model", or a sustainable mode of development, in the future.** In this concluding chapter, I try to discuss the important trends and implications deriving from Huawei's experience and the challenges that Chinese high-tech firms must tackle in forging their own path of development.

Distinct Experience and Tendencies of Chinese ICT Enterprises' Development

Huawei was born in the late 1980s when China sought to aggressively launch its great "digital leap forward" in the post-Mao era. This period witnessed a drastic shift from the Maoist policies of industrialization. The military-led, heavy industry-oriented model of development was given way to the civilian, commercial-driven pattern of growth. Demand from civilian uses and transnational businesses for advanced information and communication infrastructure stimulated massive investments into the ICT sector. The resulting high profit margin in the ICT equipment business further provided strong incentives for indigenous manufacturers to enter the highly competitive market. Nevertheless, the guiding idea of China's ICT development during this period was to make use of foreign capital and advanced technological skills from the capitalist world to leapfrog technological development and to ramp up the country's ICT industrial capacities. The "attracting-in" policy led to lower barriers to foreign vendors' entry, along with surging imports of foreign-made switches. Chinese indigenous companies had to

face head-to-head competition with foreign ICT giants from the outset. Although the Chinese state government reacted with a selective protectionist policy to restrict foreign direct investment in the ICT sector, leading foreign multinationals still made rapid headway in the Chinese market (Nolan, 2004). The “trading market for technology” strategy not only led to the encroachment of the domestic market by foreign vendors vis-à-vis Chinese indigenous companies, but also trapped China in technological dependence and engendered national information security due to the Chinese government’s losing control over national information and communication networks (Hong et al, 2012, p.917).

Since the early 1990s, China’s ICT sector has been explicitly embraced as the priority of the state’s neoliberal-oriented developmental strategy and the beachhead of China’s reintegration into transnational capitalism. Despite rapid expansion of China’s information and communication networks during the most explosive phase, China’s domestic ICT industry has still been locked into undesirable patterns of growth: foreign investment continued to dominate the ICT manufacturing and export sectors; indigenous firms relied heavily on unskilled-labor-intensive production such as assembly and processing activities; structural imbalance between oversupply of production capacities and shortage of domestic demand aggregated the crisis of capital accumulation; and the digital divide between urban and rural areas has become increasingly acute under the city-centered development scheme, which further depressed the Chinese rural market and purchasing power. These structural problems have largely constrained Chinese indigenous firms’ development in their home market. In particular, market unevenness reinforced an unfavorable environment in which Huawei found itself squeezed between state-owned enterprises and foreign competitors. This sheer disadvantage forced Huawei to “escape” from the Chinese domestic market and start the process of internationalization. In this regard, Chinese indigenous ICT firms’ outward expansion did not yet match the patterns of Western companies. The imperative of Chinese ICT firms’

initial internationalization was not precisely driven by the aggressive motive of exporting surplus capital from home market to new territories as Western multinationals did, but a means of looking for the new space of survival and capital accumulation in overseas markets.

At the same time, the Chinese leadership has been aware of the structural disparity brought by the FDI-driven regime. Instead of being “captured” by interests of foreign capital, the Chinese party-state possessed the autonomy and capacity to seek reorientation of China’s ICT developmental path and to increase the country’s competence in indigenous technology. As Lin Chun (2008) argues, post-Mao China still inherits some outstanding advantages from the Maoist regime, which amount to a “super model of a socialist developmental state” (p.13). These advantages include the Chinese strong state capacity, which is defined here as the capacity to implement its priority policies, to mobilize nation-wide resources and social participation, to control strategic industries, and to keep ideologies of social and redistributive justice alive (So, 2009). The powerful state capacity made the cooperation of the indigenous business more likely, which also formed a strong state-capital alliance to carry out strategic developmental plans. Furthermore, the failures of neoliberal market policies have led to massive pressure on the Chinese government to seek more state intervention in the new stage of reform. In particular, even in the liberalized ICT manufacturing industry, the Chinese state has also made ongoing struggles against the overriding logic of neoliberal capitalism along with industrial restructuring, aiming to strengthen its state machinery to coordinate diverse interests of national champions and make the emergence of Chinese globally competitive ICT firms viable. The complicated role the Chinese state played in the making of Chinese transnational ICT corporations is manifest throughout the evolution of China’s ICT development.

First of all, in parallel with market liberalization policies, techno-nationalistic strategy

continued to underpin China's "dual-track" developmental model. The ICT development was not only posited as an engine of economic growth but also a means to strengthen national competitiveness. Since the late 1980s China has embarked on a set of state-led technology programmes to guarantee core technology development and to create an environment conducive to innovation for corporate players. China's major technical breakthroughs in the realm of ICTs, such as China's first indigenous central switching, fiber-optic telecommunications technology, and mobile network technologies, precisely benefited from the state-supported programmes like 863 Plans with the collaboration of indigenous high-tech firms. Particularly, Huawei was promoted as the "backbone" enterprise to facilitate the state's strategic goals and to take a lead in the forefront of China's cutting-edge technology research and development. Instead of a pure market-driven model, the combination of Chinese corporate players' R&D participation and the state's techno-nationalistic initiatives explored a "multi-driver model" of technology development and innovation system (Fu, 2015). This model allowed national R&D projects to generate greater technological spillover effects and transform them into higher production capacity at the enterprise level.

Second, Huawei's experience illuminates the Chinese government's effort to create particular sizes of indigenous firms in the ICT industry, which is also part of the state's big business strategy. Early to the mid-1980s, the Chinese government already proposed to build state enterprises into vertically integrated and international competitive giant companies at the national level. In response to this national scheme, in 1986 Li Tieying announced to extend the enterprise reforms into the electronics industry. Some enterprises that were identified as "most crucial to the strength, continued growth and defense of a modern, urban, industrial and technologically advanced society" were selected to constitute the "national team" (Chandler, 1990, p.257). Although this "national team" primarily comprised large state-owned enterprises, Huawei's increasing influence in the domestic high-tech industry endowed the company with the status of "national

champion” and more preferable policies from the central and local governments. As observed by Nolan (2001), Huawei’s development since the mid-1990s was crucially related to government support (p.176). From the late 1990s into the 2000s, Huawei started to join the global level playing field and spearhead the state’s “going-out” strategy. Its rise to the global industrial leader is exemplary of China’s big business strategy.

Despite Huawei’s remarkable success, it should be noted that many other Chinese indigenous ICT firms in general have not yet matched the economies of scale or technology capability Huawei has achieved. More importantly, following the 2008 global crisis, the drastic decline in foreign investment and the slump in ICT product exports have also bankrupted a large number of Chinese ICT manufactures and exporters. The crisis propelled the Chinese state to launch a set of economic readjustment policies to boost domestic demand, with an aim to reduce Chinese firms’ reliance on external markets and change the imbalance between overcapacity and underconsumption (Hong, 2011, 2017). These domestic market-driven initiatives include directing state and corporate investment into rural markets, a vast and uncharted frontier for ICTs goods, to transfer the overcapacity in saturated urban markets. Following this strategy, a few Chinese Internet giants such as Alibaba and JD.com have taken some aggressive measures to tap into rural markets. By the same token, it could be expected that the state’s readjustment programs would motivate Huawei to revive its rural market-driven strategy that had helped the company achieve its initial success in the mid-1990s. In addition, other selective import-substitution measures such as the adoption of indigenous 3G/4G wireless standards and government procurement policies also aimed to generate huge domestic demand as well as a domestically accumulated regime for indigenous companies. Especially in the aftermath of the Snowden revelation, the Chinese government planned to gradually remove foreign technologies from banks, the military, state-owned enterprises and key government agencies. These “high security enterprises” and sensitive sectors would be required to use homegrown technologies at all layers,

including infrastructure hardware, networking equipment, servers, and operating systems,¹ due to the escalated national security concern. This move indicates the Chinese state would take a more energetic role in moderating the presence of foreign companies and preserving domestic markets for indigenous high-tech firms. As a result of this protectionist policy, Huawei has quickly gained local market share at expense of that of foreign rivals. In 2015, Huawei's revenue in domestic market has grown 54.3 per cent, accounting for 42 per cent of the company's overall revenue.² This policy shift came as a sign that Chinese indigenous companies like Huawei, which had been lagged far behind foreign multinationals, were competitive to join the fray in the Chinese domestic market and gradually regained market status vis-à-vis their foreign rivals. From being a laggard "escaping" from the home market, to an international market-driven multinational, and currently to a heavyweight "national champion" rivaling foreign giants in both domestic and overseas markets, the course of Huawei's development was marked by a detour moving from "inside-out" to "outside-in" paths. Its distinctive features of growth also illustrate how the state's policy struggle and inter-capitalist market competition shaped domestic corporate players' development, and how Chinese indigenous firms have the capacity to cope with the market dynamics and policy changes.

Meanwhile, accompanying the state's domestic demand-driven policy, the Chinese leadership also endeavored to redress the development course toward an innovation-driven growth pattern. It should be noted that the technological capability of Chinese ICT firms is still painfully weak especially in comparison with that of foreign rivals. It is not surprising to see that most Chinese indigenous ICTs firms still stay away from the core competitive areas, engaging in less specialized activities and downstream niche

¹ China Said to Plan Sweeping Shift From Foreign Technology to Own (2014, December 18). *Bloomberg News*. Retrieved from <https://www.bloomberg.com/news/articles/2014-12-17/china-said-to-plan-sweeping-shift-from-foreign-technology-to-own>.

² Huawei 2015 Annual Report. Retrieved from <http://www.huawei.com/cn/about-huawei/annual-report/2015/>.

markets and following modularized production (Ning, 2009, p.182). Nevertheless, Huawei's technology development model might provide a distinct experience of industrial upgrade for the Chinese state to readjust its industrial policy. It also sets a pioneering example for latecomer firms on how to move from the labor-intensive stage to the innovation-centered stage. As analyzed in Chapter 5, Huawei has been pursuing its core competitive advantages by insisting on the centrality of research and development and the innovation-driven growth strategy. Huawei's technical progress in the areas of high-end technologies, such as chipsets and new generation telecommunications technologies, shows us its capability in pushing forward China's technology frontier. At the same time, Huawei's technological development strategy also actually reflects China's ongoing efforts and future trends in industrial restructuring.

In the early 2000s, China's ICT industry came to a hugely important turning point. By recognizing the country's disadvantaged position in the global ICT sector, the Chinese state geared up to pursue its own indigenous and proprietary technologies central to the country's national competitiveness (Zhao, 2010). Since 2006, indigenous innovation has been formally designated as one of the government's strategic priorities (Fu, 2015, p.385). This state-led initiative was further concretized in a number of central party-state policies. In the Eleventh Five-Year Plan (2006-2010) and its *Plan for Medium and Long-Term Science and Technology Development*, the Chinese government called for building an innovative society with heavier investment in national research and development programs. In the 18th National Congress of the CPC of 2012, the Chinese leadership proposed to "speed up the creation of a new growth model...and increase motivation for pursuing innovation-driven development".³ The Congress report further stresses the need to promote integration of IT application and industrialization as the new approach to the "Chinese-style path of development".⁴ In response to the appeal of domestic Internet

³ Hu Jintao's Report at the 18th National Congress of the CPC (2012, November 27).

⁴ Ibid.

entrepreneurs who clamored for massive policy support, in 2015 Chinese Premier Li Keqiang proposed “the Internet Plus” action plan in his Government Work Report, advocating the priority of the Internet and other information technology in building new technology-driven economic engine. Furthermore, this Internet-based developmental scheme was posited to trigger a “new Industrial Revolution”, or “Internet 4.0”, by using informatization to propel industrialization. It also signaled the centralized government’s policy support for the Internet-led “BAT model”. In May 2016, the Chinese central government released the *Outline of the National Strategy of Innovation-Driven Development*, providing specific guideline for developing the new regime of technological innovation. It highlighted the necessity to strengthen R&D capabilities at multiple levels and to promote entrepreneurship in the process of innovation. These state initiatives indicate China’s new trends of industrialization: the ICT-enabled technologies, such as big data, cloud computing, and Internet of things, would become the forefronts of new technological trends and new sites of capital accumulation; moreover, the application of these new technologies is also posited to “modernize” traditional industries and generate a new wave of ICT infrastructure expansion in the near future.

Among the beneficiaries of China’s pro-Internet policies are certainly those newly emerging Internet giants such as Alibaba, Baidu, and Tencent. In contrast, Huawei, which has been perceived as a “traditional” ICT manufacturing company, is facing the imperative to upgrade its own technological structure and capability in order to catch up the new trend of development. In most recent years, the company’s core business areas, such as the basic telecommunications equipment business, are confronting considerable challenges. It is clear that the traditional telecommunications equipment manufacturing industry has been caught in the “sunset stage” characterized by lower profit margin, increasingly saturated markets as well as adherence to standardized technologies. In addition, with the process of Internet-driven industrialization, the disintegration of China’s heavy industry base would generate damaging impact on China’s IT manufacturing

industry, which may deprive Chinese ICT manufacturers of the necessary heavy industry infrastructure in the long term (Zhao, 2010, p.284). These pressures forced Huawei to focus on more sophisticated technologies and innovative activities to strengthen its competitive advantages. Unlike many other Chinese high-tech firms that have a reputation for simply copying or “indigenizing” Western designs and innovations, Huawei has been making endeavors to turn itself from a technology follower to an innovation leader. For example, it is making push to transform its mobile-handset business from a manufacturer of cheap phones to a global brand that can compete with the industry’s top players including Apple and Samsung. Meanwhile, it is ramping up R&D in core proprietary technologies such as chipset technology to reduce its reliance on foreign technology. Its efforts in strengthening its own intellectual property regime and standard-setting activity also enabled the company to acquire a leading position in international governance. In short, Huawei’s experience not only reflects the potential of Chinese indigenous companies in the high-tech development but also provides important policy lessons for the Chinese state to build independent and sustainable innovation capacities.

The case of Huawei also demonstrates that the development of China’s ICT industry is not simply the story of the centralized statist policy initiative. As So (2009) argues, because of the legacy of communism and the decentralization of state authority, the Chinese developmental state has also adopted the local, “bottom-up” strategy to promote development (p.60). This led to a multi-layered mechanism of capital accumulation, or “local state corporatism” (Oi, as cited in So, 2009, p.58), in which local governments and institutions played more active roles in nurturing local business. For example, industrial policy decisions made by the Shenzhen municipal government not only catalyzed Huawei’s creation but also directly impacted the company’s funding strategies and internal organizational structure. The decentralized telecom policy that endowed local telecom operators with decision-making autonomy also assisted Huawei in obtaining

market shares in marginal markets, especially at county and village levels. Such a local, “bottom-up” mechanism based on the interaction of local states and business created distinct patterns of Chinese ICT companies’ development.

Uncertainties: Geoeconomic and Geopolitical Challenges

As analyzed above, we see the contradictory nature and tendencies of China’s ICT development and how this evolution has shaped the historical contour and internal accumulation of Chinese ICT firms. Given this context, Huawei’s external accumulation may generate profound understanding on the transnationalization of Chinese corporate power. For one thing, Huawei’s outward expansion is touted as one of the most successful cases of China’s “going-out” strategy. The company not only establishes itself as a global industrial leader but also illustrates a Chinese firm’s significant step in the ascent of “corporate China” to the international business stage. For another thing, Huawei’s transnationalization also encountered many obstacles and uncertainties, which highlighted inter-capitalist and inter-state tensions engendered by capitalist globalization and illustrated the tremendous disparity in global business power. To understand such dynamics and tensions, it is crucial to embed the enterprise strategy with regional and international political-economic processes to assess the global impact in regard to the rise of China’s ICT corporations.

Reposition in the Geoeconomic Order

One significant global impact in relation to the rise of Chinese transnational ICT corporations is the country’s changing geoeconomic position in global production networks and in the regional economic system. Though China’s ICT developmental trajectory shared some similar experiences with that of the Asian “developmental states”, it is problematic to treat the Chinese experience as another example of the “East Asian miracle”. As analyzed before, the rapid economic growth of East Asia was far from a

miracle merely shaped by these countries' endogenous conditions. In fact, they were consciously cultivated by the United States as part of its anti-communist strategy during the Cold War period. This has led to Asia's "twin dependence", both economic and geopolitical dependence, on the US-led capitalist powers. On the contrary, China's distinct path of industrialization in the Maoist period had laid an independent industrial foundation and the legacies of socialist self-reliance for China's spectacular growth in the reform era (Meisner, 1996).

When Cold War tensions started to ease in the 1980s, Chinese policymakers expressed their ambition to integrate into transnational capitalism. The country's initial move to jumpstart economic growth was to participate in the "flying-geese" mode of East Asia's regional production networks, specialized in low-value-added exporting goods to the Western world. However, it came as no surprise that China's aggressive promotion of information and communication technologies along with its active participation into the global ICT production networks has not necessarily improved China's geoeconomic position and translated into sustainable economic and social development. In spite of China's ascending role as the world's ICT manufacturing and export powerhouse, the country is still positioned as a final assembly platform for foreign transnational corporations. China's export-led economic growth, which is based on exploitation of domestic labor and underconsumption of domestic population, actually has become a precondition to sustain US mounting appetite for low-cost manufactured imports (Hung, 2009a, 2015). In addition, tremendous trade surplus generated by China's growing low-cost exports has made China the world's largest foreign exchange reserve. Like many other exporters, China invested most of its savings in US Treasury bonds, emerging as the largest creditor to the United States to finance US domestic consumption (Hung, 2009b). This unbalanced relationship exposed the unsustainability and vulnerability of China's export-oriented economic growth.

Apart from reliance on the US consumer market, China also heavily depends on the imports of high-end technology products from industrialized countries, especially from the United States. China's trade liberalization policy has produced a market that is of great importance for globally dominant US high-tech firms. Between 1990 and 1998, US exports of communications equipment to China increased more than ninefold (Nolan, 2001, p.203). US policymakers put intense pressure on the Chinese side to make concessions in the ICT sector upon China's entry to the WTO. The White House even claimed that access to the potentially vast Chinese market for ICT products and services was "vital to maintaining US global leadership in information technology" (ibis, p.202). After China's entry to the WTO, trade imbalance between China and the US has been further deepened and become one of the great barriers to Chinese ICT firms' development. Such a "disadvantaged" geo-economic position not only limited the country's own technological development and industrial diversification, but also made Chinese ICT companies locked into its current structure in global value chains (Hart-Landsberg, 2013, p.47).

China's ICT industrial restructuring initiative, therefore, not only involved the industrial upgrade at the national level, but also included a policy shift from the "attracting-in" to "going-out" strategy to reposition its role in the global political economic system. As Ning (2009) argues, the "going-out" strategy comprises two steps—the first step of exports and the second step of outward investment (p.107). By encouraging domestic capital's participation in the ICT exports under the selective import-substitution policy, Chinese indigenous firms have played increasingly important roles in China's exports structure: in 2015 exports by Chinese indigenous enterprises grew 13.2%, accounting for 30% of total exports; among them private ICT enterprises grew faster than state-owned and collectively-owned enterprises.⁵ The growing weight that China's

⁵ Electronics and Information Industry Statistics 2015 (2016, February 29). Retrieved from <http://www.miit.gov.cn/n1146312/n1146904/n1648373/c4655602/content.html>

domestic firms have gained in the country's ICT export structure has laid a foundation for strengthening indigenous manufacturing capabilities and achieving long-term "going-out" strategy.

Chinese leaders have also acted out of a conviction that China-based indigenous "backbone" enterprises must move beyond simple exporting activities to in-depth engagement in the globalized circuit of accumulation, which included the goals of climbing up to the upstream value chain, achieving greater scale economies by extending their global reach, and building up their global brands. In line with this long-term strategy, in 2014 Chinese State Council issued a statement, promising to further promote outbound investment by Chinese firms. The statement addressed that "(t)his move will raise the international competitiveness of Chinese products especially Chinese equipment products, boost structural upgrading of foreign trade and push manufacturing and financial sectors to a medium-high level".⁶ As such, Chinese firms' "going-global" process witnessed more "qualitative" expansionary activities, such as outbound foreign direct investment, cross-border acquisitions and mergers, cross-border financial investment, and set-up of global assembly line, joint ventures, and global R&D centers.

From Huawei's internationalization trajectory, we can see that the company typically followed the different stages of "going-out" strategy, moving from direct exports to deep insertion into the globalized circuit of capital accumulation. Huawei's initial internationalization fully took advantage of China's geoeconomic advantage by exporting its low-cost ICT products to neighbor countries in order to gain a foothold in the region. Following this geoeconomic strategy, Huawei became an "export-driven" company and quickly acquired large market share in many developing countries by providing high-end products close to Western quality at competitive prices (Hong et al., 2012). In addition to

⁶ China Stresses Finance for Companies "Going Global". (2014, December 24). Xinhua News Agency. Retrieved from http://english.gov.cn/premier/news/2014/12/24/content_281475028954646.htm

the export-driven strategy, Huawei has placed increasing weight on brand building and technology acquisitions as rationales of deepening internationalization. Its business spans the whole chain of the industry, taking control from R&D of core technologies to equipment manufacturing, and from marketing to after sales maintenance service. Huawei along with other thriving China-based ICT firms are reshaping the distribution of profit along the global value chain the upstream of which have primarily been controlled by Western multinationals. The increasing influence Chinese ICT firms have gained in global markets also endowed them with growing bargaining power vis-à-vis transnational capital and Western governments. In short, Huawei's experience created a greater inspiration for other Chinese high-tech firms to find innovative ways of development and to win a competitive position in the global economy rather than reliance on their existing cost-effective manufacturing capabilities. More importantly, it also drew wider policy implications for the Chinese government to improve its geoeconomic position and reshape the balance of power in the global economic order.

Geopolitical Implications

The rise of Chinese ICT firms is renovating the landscape of the global ICT sector and altering China's position in the global production network. At the same time, China's ambitious "going-out" strategy also generates some significant geopolitical implications. If "attracting-in" was used to facilitate China's reinsertion into global capitalism and to jumpstart the country's "digital revolution" in the post-Mao period, the "going-out" strategy, in contrast, was likely tied to the Chinese state's geopolitical efforts for an assertion of greater political and economic power (Schiller, 2011a, 2011b, 2014).

On the one hand, the combination of foreign direct investment and economic assistance in developing nations has been used as a new approach of China's economic diplomacy to project China's power in the global South. At the same time, China's

growing OFDI by China-based transnational corporations can be better seen as an attempted strategy to gain relative geopolitical autonomy from the United States. There is a tendency that the Chinese government has gradually retreated from the US government debt and redirected surplus capital to the global South to diversify the country's OFDI. This indicates China's efforts in increasing its leverage outside the orbit of the US influence and cultivating a new form of South-South relations. On the other hand, the Chinese government's drive to push forward the "going-out" policy comes to be seen as a means to serve Chinese corporate players' extraterritorial strategies and to embrace the emergent China-based transnational capitalist class's interests as an integral component of China's national interests. In turn, the global expansion of China-based capital can be posited as an extension as well as an expression of China's geopolitical economic initiatives. Take Huawei's trajectory of internationalization for example, the company's global expansion has been closely entangled with China's foreign policy to serve the country's geopolitical interests. The company also received relevant state support, such as preferential loans from the state policy banks, to finance its global operations. This case fully illustrates the mutual relations between the state and China-based capital in forging the regime of corporate China.

However, China's increasing weight and active engagement in the global South have also elicited widespread controversy. Chinese firms' expansion into developing nations was always accompanied with Western criticism against China's "new colonialism". But in fact, as argued by Brautigam (2009), many of the fears about China's rise are misinformed (p.307). China's "going-out" initiative, to be sure, has no intention to colonize other countries, dictate the politics or economy of local countries, bring destruction to local culture or deprive them of development opportunities. Though China's current engagement in the global South is primarily driven by economic interests or *realpolitik*, there is no doubt that the legacies of Mao's "Third World Internationalism" continued to evolve and exert influence on China's diplomatic strategies with developing nations. The

long history of China's involvement in developing nations' struggle for national autonomy and development gave China legitimacy and credibility (Zhao, 2011). These historical factors and linkages made many developing countries more willing to accept the Chinese model as an alternative to the Washington Consensus. In essence, the patterns of Chinese firms' engagement in developing countries are still different from that of Western multinationals. First, Chinese investment and economic assistance usually did not come with political conditionality, which allowed developing countries to be free to find their own pathway for development. Second, contrary to Western capital pursuing the doctrine of "profit maximization", Chinese capital's engagement in the global South is characterized by the logic of "encompassing accumulation", which is based on strategic, long-term, and win-win result-oriented involvement (Lee, 2014). The presence of Chinese ICT firms in developing countries is exemplary of such a pattern of capital accumulation, which goes beyond the imperative of profit maximization and economic efficiency. For example, the advent of Huawei and ZTE not only prevented developing nations from reliance on Western companies' provisions of telecom equipment but also considerably contributed to underdeveloped countries' social development through their involvement in local communities' telecom infrastructure development, technical assistance and provisions of a variety of technical training programmes.

However, Chinese capitalists' engagement in developing countries is far from the story of "love without borders". The impacts of the presence of Chinese capital in the global South are complicated and mixed. As a matter of fact, China-based capital's forays into developing nations were motivated more by pragmatic imperatives such as to secure a steady supply of strategic resources and develop markets for exporting domestic overcapacity than by the pure "solidarity rationale" of the past. The infrastructure loans provided by the Chinese government were not merely a form of financial assistance to underdeveloped countries, but a means used by Chinese ICT firms to secure long-term construction contracts from local governments. Although the Chinese government as well

as Chinese firms appreciated this approach of “trading loans for markets” to a “win-win” model of engagement in the global South, it is important to point out that this approach might usher underdeveloped nations into new cycles of debts which might deepen their reliance on the “debt-driven growth model”.

Moreover, what was less noticed is that China’s “going-out” initiative coincided with some developing countries’ sweeping “opening-up” process. Therefore, China-based capital actually constituted part of the forces of neoliberal globalization that brought exploitation, polarization, and environmental destruction to local communities. In this vein, Chinese transnational capitalist class acted in similar ways with their Western counterparts. For example, the rigorous labor regime built by Chinese transnational corporations, which is characterized by low-wage exploitation, precarious employment, poor working conditions and hierarchical organizational structure, is precipitating class conflicts between Chinese capitalists and local workers. Moreover, the increasing social upheavals along with local people’s discontent with incumbent governments for becoming subordinate to Chinese capital’s interests started to ferment and may develop into widespread anti-Chinese sentiment across some nations (Hung, 2015, p.140). Such conflicts may raise a great deal of uncertainties and risks for Chinese capital’s expansion in the global South.

From Huawei’s internationalization trajectory, we can see that Chinese ICT multinationals’ “going-out” remained fraught with inter-state and inter-capitalist tensions, contradictions, and pitfalls. Not surprisingly, in most recent years, Huawei has increasingly shifted away from its image of a “Chinese national brand” to a market-oriented multinational enterprise and denounced its linkage to the Chinese military in order to accommodate international markets in its newly globalized stage of development. Especially in European and North American markets, Huawei tended to seek cooperation and coalition with multiple actors in different ways, such as establishing

joint R&D centers, signing global procurement agreement with global leading vendors and even cooperating with its competitors in many respects. Huawei also actively participated in a number of international standardization organizations to strengthen its position in international governance. However, Huawei's efforts received completely different results in different markets. In Europe, Huawei along with ZTE has made deep inroads in multiple business domains including the supply of telecom equipment, networks infrastructure construction, data services, and consumer electronics hardware. Apart from the role as a telecommunications equipment supplier, Huawei has also been treated as a preferred investor by many European countries that attempted to use surging Chinese outward direct investment to boost the EU economy and to renew their economic interests in the ICT industry.

On the contrary, Huawei's expansion in some countries, such as the United States, India, Australia and Canada, has been facing arbitrary trade barriers that kept the company out of these markets. Huawei's entry into the US, for instance, was fraught with complicated issues and conflicts. Huawei was blocked at the door of the US market from inception. For one thing, in view of the pivotal role of ICTs in economic growth and national defense, the US side had fears of Chinese ICT firms' expansion into its core telecom businesses. For US policymakers, China's increasing weight in the global economy is at the expense of the relative weight of US political economic powers in a zero-sum competition for global influence (Hung, 2009a, p.189). In particular, there is also a prevailing concern that Huawei's widespread ICT applications and infrastructure construction across the world will eventually post a direct threat to the US control of global network infrastructure and its own national security system. For another thing, Huawei's businesses are in direct competition with American giants in multiple ICT business domains. For example, Huawei has challenged Cisco's dominant position in the business networking market. In the burgeoning consumer electronics markets, Huawei has increasingly encroached on Apple's turf with unprecedented rate of market

expansion. Moreover, Huawei's emerging chipset business might pose a threat to Qualcomm's position in the high-end chipset market. In these profitable, high-value-added markets, Huawei is emerging as the most powerful rival for US multinationals to undercut their profits and interests. As noted by Robinson (2004), "(F)ierce competition among oligopolistic clusters, conflicting pressures, and differences over the tactics and strategy of maintaining class domination" may lead to divisions of the transnational capitalist class and further intensify inter-capitalist rivalry (p.46). To outflank Chinese corporations' expansionary initiative, the US government played an important role in setting the rules of games to drive Chinese competitors out of its home market. This also explains why the US government overstated "China's Rise" and "national security concern" to justify its protectionist policy (Schiller, 2008, p.111). Moreover, the ongoing worldwide political shifts toward protectionism would eventually lead to "multinationals in retreat",⁷ which compelled global companies to localize their operations into regional or national units. For Huawei, the restructuring of the global political economic landscape may generate a new trend of development. The enormous market dynamics of emerging-market countries and new frontier of businesses are producing a great deal of opportunities for Chinese high-tech firms to offset their disadvantaged positions in the global North.

Belt and Road: A New Geopolitical-economic Initiative

China's escalating conflicts with core powers is tempting it to seek new geopolitical strategy and alliances with other developing nations that are aspiring to move out of the US orbit of influence and to challenge the US-led global capitalist order. China's most recent "Belt and Road" initiative, also known as "New Silk Road", can be seen as a real example of such a geopolitical-economic strategy. This initiative is far from a simple

⁷ In Retreat: The Multinational Company is In Trouble (2017, January 28). *The Economist*. Retrieved from <http://www.economist.com/news/leaders/21715660-global-firms-are-surprisingly-vulnerable-attack-multinational-company-trouble>

replication of the premodern Sinocentric tribute-trade order; instead, it aimed to reconstitute a new regional development pattern by linking China with Europe through Central and Western Asia by inland routes, and connecting China with Southeast Asia, Africa and Europe by sea routes in the new stage of “going-out” strategy. This geopolitical move is also an attempt to counter the post-2008 US rebalance strategy to the Asia-Pacific. Supported by China’s Silk Road infrastructure fund of US\$40 billion and the Chinese-led Asian Infrastructure Investment Bank (AIIB), this initiative focuses mostly on infrastructure construction, including a vast network of transportation, energy and communication projects. Extraterritorial telecommunications networks, in particular, were designated as one of the most crucial infrastructure construction plans to promote intraregional trade and connectivity and to export China’s infrastructure know-how. As part of the Belt and Road initiative, the Chinese government tended to strengthen intercontinental backbone networks, which was also known as “fiber optic Silk Road”, linking Europe to Asia and facilitate international data traffic within this region (Rolland, 2015). Chinese ICT giants, including Huawei and ZTE, have become the key investors and actors in such a new strategy. Apart from commercial incentives driven by Chinese ICT corporations, at the core of this new “fiber optic Silk Road” is the geopolitical goal for constructing independent network sovereignty as a counter-hegemonic offensive. As Zhao (2015) observes, “the Snowden-triggered implosion of the US imperial information surveillance state has created a hegemonic crisis” to the US legitimacy in global governance (p.70). In the post-Snowden era, Russia and China evidently shared a desire to construct alternative communication routes to the US-controlled electronics surveillance network. This strategic scheme largely relied on non-Western high-tech companies for infrastructure construction. Likewise, the same motivation has been taken by the Brazilian government to build a submarine cable EulaLink linking South America and Europe to bypass US Internet traffic routes. The Brazilian state-owned telecom operators Telecommunicacoes Brasileiras, known as Telebras, which is also the investor

of this project, insisted that US vendors and their technology would be excluded from this cable project.⁸ Huawei will be included in the project as the key equipment supplier. Chinese ICT firms are posited to play more important roles in pushing forward the realignment of extraterritorial communications system. However, the division as well as the geopolitical tensions among developing nations might prevent the formation of a coherent counter-hegemonic alliance, which would pose challenges to the BRICS bloc's initiative in forging an alternative communications system to the US-centered infrastructure networks. The flop of the BRICS cable project, which was devised to connect all of BRICS member countries yet appeared stalled in 2015, is illustrative of the potential, follies, and contradictions of such a counter-hegemonic initiative (Zhao, 2015).

At the same time, it should be emphasized that the “fiber optic Silk Road” is more than a strategy of exporting domestic excessive capacity. In fact, the reconstituted “fiber optic Silk Road” tended to incorporate the goal of China's internal industrial restructuring with the state's geopolitical strategy to inspire new growth impetus and promote the domestic regional development. As Chinese critical scholar Wang Hui (2015) argues, the Belt and Road initiative is bound to coordinate internal and external opening, east and west opening in China's new regional development policy. Given the geographical advantage of China's central and western region in the Belt and Road initiative, the demand for cross-border network connectivity linking central Asia and China's inland will generate a new strategic growth pole for indigenous ICT firms. Moreover, it will encourage both the government and firms' investment in infrastructure construction and promote industrial relocation from coastal region to western interior, or to markets along “Belt and Road”. The prospect underlying China's “fiber optic Silk Road” strategy not only indicates a new direction of China's ICT development and industrial upgrade, but also

⁸ Edgerton, A. & Robertson, J. (2014, October 30). Brazil-to-Portugal Cable Shapes Up as Anti-NSA Case Study. Retrieved from <http://www.bloomberg.com/news/articles/2014-10-30/brazil-to-portugal-cable-shapes-up-as-anti-nsa-case-study>

presents a new approach of regional development and a favorable geopolitical environment for the growth of China-based ICT firms.

Self-reliant Mode of Development

This dissertation delineates a China-based ICT firm's trajectory of development and a realistic picture of China's ICT industry including its strengths, weakness, and potential. A central question running through this dissertation is: can China provide an alternative approach of ICT development? Though the answer is still uncertain given the paradoxical nature of China's post-Mao market reform and the complicated characters of its reintegration into global capitalism, the case of Huawei, or the "Huawei model", might demonstrate some potential dynamics and great impacts of Chinese ICT firms on the global political economy system.

First, as Lin Chun (2005) asserts, China's quest for an alternative model of development is characterized by the tensions between "integration and autonomy" (p.244). At heart of China's distinct experience of industrial development was its self-reliant path toward industrialization and modernization. In the 1980s, Ren Zhengfei already went further than government officials to challenge the doctrine of China's neoliberal-oriented technological development and "trading markets for technology" policy. He questioned the government's technology transfer schemas, warning about the consequences of relinquishing the country's technology autonomy and industrial self-protection. As noted by Mattelart (1983), the schemas of technology transfers were far from a simple process of transferring skills, knowledge, technologies, or methods of manufacturing; rather, these schemas conveyed "transplantations of power structures" and linear industrialization strategies (p.25). Recognizing such a pitfall underlying the ideas of technology transfer was a precondition to pursue a more sustainable developmental path. Mattelart (1983) further argued that, "(D)velopment begins to be

envisaged, no longer as an externalization movement, whose motor of development is trade and transfers from the exterior, but as a process of mobilization of local resources with a view to satisfying local needs” (p.22). This interpretation points to the essence of “self-reliant” mode of development--that is reliance on the capacity of people themselves for autonomous goal-setting and decision-making, and their capacity to invest and generate new resources and techniques. In practice, Huawei firmly adhered to such a doctrine by committing to independent research and development. From its first self-invented digital switch that satisfied fundamental needs of the Chinese local market especially China’s neglected rural market to its high-end chipmaking technology, the achievements Huawei has made fully illustrate the capacity of Chinese indigenous high-tech companies in creating an independent path of development and making creative solutions to satisfy local needs.

Of course, self-reliance does not mean autarky or exclusion of external cooperation. It also emphasizes the capacity to absorb new techniques and adapt them for generation of local technology. Huawei’s innovation activities were not implemented in a closed internal circuit; rather, the company was open to hybrid forms of research and development. Drawing on its “learning-by-doing” practices, Huawei built up core competence rapidly by acquiring knowledge and capability from rivals, collaborators and interaction with customers. At the same time, the company insisted on its own autonomous trajectory of development and took a measure of command over core proprietary technologies. This approach enabled the company to rapidly move from the position of a late-follower to an industrial leader that plays a significant role in influencing and defining global technology.

More importantly, this approach also implies broader cooperation for “collective self-reliance” at different levels. Take the genesis of Huawei’s first self-invented digital switch for example, it owed much to the technical assistance from China’s military

research institutions and inland manufacturing factories that were part of the Maoist legacies of military R&D capabilities. In addition, Huawei's involvement in the development of the indigenous standard along with other China's technology developers, telecommunication operators, and equipment manufactures can also be seen as part of the endeavor of "collective self-reliance". While the interests of different actors are hardly unified in such a national project, the national self-reliance strategy is still vital to overcome domestic divisions and to promote national development. Moreover, it is important to note that "collective self-reliance" is not just confined to a national strategy. Instead, the new trend of collective self-reliance tends to extend collaboration to broader South-South cooperation. Although there remain wide divisions within global Southern countries, the emergent powers' consensus on pushing the move "from a liberal-unilateral to a developmental multipolar" discourse created the cornerstones of South-South cooperation and the conditions for forging counter-hegemonic forces (Mielniczuk, as cited in Thussu & Nordenstreng, 2015, p.7). In this sense, the alignment of collective self-reliant efforts may become a strategy to construct a more equitable global information and technology order.

Another important lesson deriving from Huawei's self-reliant development is its innovative design of the ownership structure and independent financial system, which distinguishes itself from other conventional TNCs. In the context of globalization, the contradiction between "integration" and "self-reliance" has been quite pronounced. On the one hand, China-based corporations have increasingly been integrated into the transnational chains of accumulation, which primarily takes the forms of accelerated cross-border mergers and acquisitions, transnational ownership of capital shares, and the increasing transnational interlocking of boards of directors. On the other hand, with increasing integrated financial system, financial capital has reached unimagined heights in transnational capitalism. Especially the interpenetration of financial capital and the ICT sector has become a striking feature of global digital capitalism. Since the late 1990s,

many Chinese ICT firms have also plugged into the global financial networks to speed up corporatization and capitalization. The influx of short-run, speculative capital into the high-tech sector not only engendered Chinese ICT firms' dependence on transnational financial capital and external stakeholders, but also increased their vulnerabilities in global ICT markets. On the contrary to transnationalization of capital ownership, Huawei's experiment in its distinct employee shareholding ownership structure provides an innovative measure to solve the problem of structural dependence and unravel the contradiction between integration and self-reliance to some extent. Its collective ownership structure enables the company to resist the control of transnational financial capital and external capitalist groups on the one hand and create a relatively independent corporate structure to implement self-management on the other.

The increasing global operations and transnationalization of capital ownership have made the nationality of multinationals less irrelevant, leading to the formation of the "stateless" corporate identity. The corporate nationality of Chinese ICT multinationals remains as an enigma in light of their intricate ownership and corporate structure (Shen, 2017). Although major China-based Internet giants such as Tencent, Baidu, and Alibaba are highly dependent on the Chinese domestic market for revenue and profit, they are barely considered as purely independent "Chinese companies" because of their extensive ties with transnational capital (ibid). Rather than falling into the reification of the "corporate identity", we should bear in mind that the "corporate identity" is de facto an expression of transnational capitalist class' identity in the process of transnationalization. As argued by Robinson (2004), the spread of large corporations from the Third World resulted in an accelerated transnational integration of local capitalists into the ranks of the TCC. Although these emergent capitalist groups demonstrate different degrees and types of integration into the global capitalist system and different relations to local states, they tended to converge on certain economic and political interests along with shared values of global corporate responsibility, which constituted the underpinning of their class

identity. However, it is also important to note that an internally unified, borderless, and homogeneous class identity is impossible to be achieved among different TCC fractions. The formation of the TCC class identity does not prevent particular national and regional contingents tied to specific histories, norms and values. Such a contradiction between preserving a distinct national identity and forging a globalized corporate identity is also manifest in Huawei's experience. Even while Huawei's business and assets became increasingly globalized, its corporate culture and managerial methods continued to be shaped by particular Chinese cultural practices and experience inherited from pre-reform socialist enterprise management. These practices include the socialist work ethic, the use of ideological education, organized political control and institutional culture of authority. For instance, the essence of the "Angang Constitution" was translated into Huawei's tenet of management. In addition, the nationalistic sentiment that combined the development of the enterprise with the fate of the country was also used as an inspiring ideology to mobilize workers. Ren Zhengfei, as a representative member of the Chinese national bourgeoisie emerging from the post-Mao market reform, tended to preserve such distinct legacies and cultural practices to consolidate his experiment of management and growth path. His assertion to construct autonomous corporate culture and identity contributes to the formation a globally competitive corporation "with Chinese characteristics".

However, there is also a deep contradiction embedded in Huawei's managerial practices. Paradoxically, while Ren emphasized the importance of Chinese socialist management practices in the early stage of Huawei's development, Ren was also open to bring Western managerial doctrines into the company's management with an aim to build up a "modern", formal corporate management system. This incentive is due in part to Chinese entrepreneurs' common belief, or the mythmaking, which equates Western-style experience with modernization. In the ongoing process of transnationalization, the contradiction between Westernization and indigenization in

corporate management will become one of the most striking characteristics of “corporate China”.

As analyzed in previous chapter, Huawei’s innovative ownership arrangement was meant to create a fairer redistribution of resources for employees through its profit-sharing bonus plan. Meanwhile, the desired strategy also aimed at creating a democratic mechanism by encouraging workers’ participation in management to protect their basic rights. To some extent, this organizational innovation at the firm level played an important role in constructing Huawei’s core competence that is highly reliant on its R&D and quality labor resources. It contrasts sharply with many other Chinese manufacturing firms’ growth strategy hinging on the low-cost, cheap labor “competitive advantages”. In spite of these advantages, there are also some critical flaws underneath Huawei’s ownership arrangement and management. Though Huawei workers can enjoy pretty high salary and material rewards, the ownership design and rigid corporate culture also led to brutal labor exploitation. While Huawei’s Chinese workers are ostensibly the shareholders of the company, they actually do not “own” the company except for the material incentive. The tale of a handful of Huawei senior employees becoming millionaires has also obscured the huge income gap between executives and lower-paid workers. Hierarchy and disparities still exist in Huawei’s labor practices. The “collective” redistribution scheme that combines corporate revenue growth with individual gain tended to extract more labor surplus value from their work. The “hard work” culture expressed in its “wolf spirit” actually brought a great deal of labor issues such as long working hours, high work stress and poor work-life balance. The high paid strategy was primarily implemented as a means of material incentive to exploit high volumes of unpaid labor time. Moreover, its transnational labor practices also exposed deep conflicts between Chinese managers and local workers, which has become one of the thorny problems for Huawei’s internationalization. In short, though Huawei has made some extraordinary measures in advancing workers’ benefits and incentive mechanism, its

labor practices and ownership arrangement still fail to solve the fundamental antagonism between capitalists and labor. However, it is important to bear in mind that the experiment of Huawei's ownership structure and management still provides some important lessons to construct a more democratic corporate system and revive the socialist management experience in contemporary "corporate China".

An Open-ended Contour in the Future

This dissertation seeks to examine the nascent and expanding phenomenon of the rise of Chinese transnational ICT corporations through the case of Huawei. At issue is not the specific business strategies that forge Chinese globally competitive firms; nor is it simply a matter of China's growing corporate power in the context of "China's rise". What does need to be emphasized is the internal dynamics of China's ICT development and the geopolitical economic implications of China's corporate globalization strategy. For one thing, Huawei's path to becoming a global industrial leader allows us to reflect on the trajectory and tendencies of China's growth schemas that are historically contingent on the process of China's integration into global digital capitalism. This process is also in concert with China's paradoxical dynamics of technological development, which can be seen as a blending of paradigms of techno-nationalism and neoliberal transition (Zhao, 2010). Such internal dynamics has pushed China to crossroads: on the one hand it is facing a complete and deepening process of capitalist development and on the other is the necessity of the paradigmatic reorientation toward a more sustainable path of growth (Lin, 2008, 2013). As Lin (2008) argues, the possibility of breaking free from the deep-rooted predicament of capitalist mechanism lies in local alternatives and indigenous agencies (p.19). A basic point to stress is that it is time for recasting the desirable concept of "Chinese competitive advantage" when we are seeking an alternative path, especially in China's current conditions of "a peculiarly crude, unsettled, contradictory, and confusing process of accumulation" (Lin, 2013, p.206). Only by identifying and grasping

genuine advantages can Chinese firms find self-confidence in their own path rather than adopting those taken by others. In this sense, Huawei's story sheds light on certain distinguishing features that contribute to dynamic advantages of China's transnational ICT corporations and a path-breaking model of development. At core of such "competitive advantages" is the ability to insist on self-reliant, open-minded, innovation-oriented development strategies. The successful experience to renovate the socialist collective legacies is also proved in Huawei's story, which may provoke other Chinese firms to seek more desirable options of development and the revival of indigenous experience.

Huawei's story is not only highly relevant as a reference of China's domestic developmental trajectory but also raises legitimate questions about China's evolving position in the global system. In the past several decades, China has turned itself into the new spaces and growth centers of the global capitalist system. Especially the conjunction of the two poles of market growth—China's expanding domestic markets and the momentum of ICTs development— has been perceived as one of the most important antidotes to the ongoing global economic crisis. Nevertheless, the Chinese state's FDI-dependent policy and the race to the bottom industrial strategy have not only impoverished the domestic market and native entrepreneurship, but also made the country entrench in relatively disadvantaged position in the global system. But to some extent, it is also such a disadvantaged status and "backwardness" situation provoked China's quest for its corporate globalization strategy. A parallel movement to China's domestic industrial restructuring was the extension of Chinese economic influence in the global scale. While many Chinese high-tech companies have gained the scale of multinationals, few are able to climb up the technology ladder, to transfer a business model from a low-cost market to an advanced market, and to compete via innovation rather than just with cheap manufactured goods and speculative capital investment (Goldstein, 2007, p.151). Huawei's unique path of internationalization, which distinguishes from those of state-owned national champions and private Internet

enterprises with foreign linkage, presents a possible solution for Chinese corporate players to climb up the global value chain and the potential to reposition themselves in the global industry. It also indicates a means of spring-boarding into a stronger and more independent role within the transnational political economy.

The other side of the coin is that the unprecedented expansion of China-based ICT capital has generated growing geopolitical-economic tensions. The presence of Chinese ICT giants in combination with the Chinese state's "going-out" initiative has evinced great salience and controversy. Chinese ICT giants are becoming a significant source of FDI in many developing countries. Their foreign investment and aid, to be sure, reduce these developing countries' dependence on Western powers and improve their technology infrastructure. The presence of Chinese firms in these countries also presents the potential model of South-South cooperation that is built on the legacies of international solidarity and mutual geopolitical economic benefits in the current context. This process will change the operating rules of the multinational game and the dynamics of power relations in an unexpected ways with the rise of China's corporate power. But, we should bear in mind that Chinese firms' expansion is still driven by the same capitalist logic of accumulation as that of Western corporate powers. We can hardly say an anti-neoliberal ideology has been articulated in the development of "corporate China". Therefore, it remains an open-ended question whether the advent of "corporate China" constitutes an alternative anti-capitalist model of development. However, it is also noteworthy to point out that the strong tradition and historical legacies of China's socialist approaches continue to cast a long shadow in China's future transformations. More importantly, the Chinese state's initiative of reposition in the global political economic system, which was articulated with the ongoing transnational politics for pursuing a multipolar order, might contribute to the radical realignment of global power relations.

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