

Industrial Organization and Inter-Corporate Relationship:

Telecommunications Industry in Thailand

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Abstract

The Thai telecommunications industry presents a complex commercial environment, yet it has exhibited the best performance of all the ASEAN region's telecommunications industries. Although the contribution of telecom services to Thailand's national GDP is small, the growth rate has been substantially increasing. The mobile segment has exhibited the strongest growth, followed by the Internet segment and the broadband segment. This paper aims to clarify the organization of Thailand's telecommunications industry and to describe the value creation opportunities and inter-corporate relationships among all industrial players by utilizing field-work interviews, case-study methods, and also secondary data from NBTC survey reports. The main findings are summarized as follows. First, the Thai telecommunications industry operates within the context of pyramid-shaped industrial organization and hierarchical governance structure. This hierarchical structure reveals that each tier's players perform specific tasks and create particular values according to their functional specialization. The players in the Thai telecom industry can be divided into seven tiers including (1) the regulator-tier (NBTC), (2) the principle-tier telecom operators (AIS, DTAC, and True Move), (3) the vendor-tier multi-national corporations (MNCs), (4) the first-tier main contractor companies, (5) the second-tier subcontracting companies, (6) the third-tier subcontracting teams, and (7) the supplier-tier. Second, the economic value of tasks reflects the underlying competences and capabilities that are the fundamental source of competitiveness of each tier's players in this industry. Not only strengthening competences and capabilities for competitiveness, all the players have to manage challenges or risks of each tier. Third, inter-corporate relationships are based on both vertical and horizontal axes. The Thai telecommunications industry functions as a vertical integration system; wherein the degree of explicit coordination is high and also the degree of power asymmetry is high. The industry's coordination-rich organizational capability ensures the presence of two important components; a system of checks and balances along the chain of command as well as an efficient and accurate of each particular transaction between the principle-tier and the first-second-third tiers.

Keywords: pyramid-shaped industrial organization, hierarchical structure governance, vertical-axis and horizontal-axis inter-corporate relationships, value creation opportunities

Introduction

Since the third wave of digitalization, telecommunications has become the fifth most

necessary type of support in our daily lives — after food, housing, clothing and medicine. Telecommunications usually takes place by means of two critical technologies: mobile phones and Internet connectivity. The industry has been experiencing significant economic growth, employment creation, and research & development leading toward an ever more intricate information and knowledge-based society (World Bank 1994; Donyapreuth 2001; ITU 2014). Teledensity serves as the chief measure of telecommunications services' development and distribution to users. This measure comprises several key variables: the penetration rates of fixed telephone subscriptions, mobile cellular subscriptions, fixed broadband subscriptions, and Internet use. The measure is positively correlated with per capita GDP of the given countries. Investments in telecommunications infrastructure are, quite understandably, important for economic development (Hossain 1999 and 2001). The Thai government started to focus on telecommunications' roles in the country, particularly on telecom network infrastructure and services in the Seventh Five-Year Economic and Social Development Plan (1992–1996). Indeed, the Eighth Five-Year Plan (1997–2001) was an important force behind enforcing the first telecommunications Master Plan of Thailand, established in 2000. The target of the plan has been to transform Thailand into a trade and telecommunications center in the Indo-China region and to develop human resources in the information-technology (IT) industry (Donyapreuth 2001). Actors in the public sector and the private sector in Thailand have made many attempts to push forward industrial reform and liberalization for the sake of competitiveness and efficiency. However, the Thai government still tightly regulates the industry, in part because of its connection to national security. In 2011, the Ministry of Information and Communication Technology (MICT) set up the Cyber Security Crime Protection and Prevention Bureau and the Electronic Transaction Development Agency to strengthen the prevention of cyber-crimes. The National Broadcasting and Telecommunications Commission (NBTC) is currently an authoritative organization possessing full rights to allocate spectrum under the Radio Frequency Allocation Act (2010) (Settapong et al., 2013). The organization of the Thai telecommunications markets structure inevitably invites political intervention and commitment (Meshor and Jittrapanun 2004). Government policies through financing mechanisms are still necessary for the development of high-tech businesses (Cairns and Nikomborirak 1998; Wonglimpiyarat 2014).

The ever-evolving mobile wireless landscape is becoming an important infrastructure that supports economic growth and innovation in a wide range of consumer-focused areas including health care, public safety, education, and social welfare (Settapong et al., 2013). The Thai telecommunications industry is the most complex of its kind in the world (Oxford Business Group 2014). The history and the evolution of this industry reflect not just changing technology but also changing politics that have involved regulatory bottlenecks holding back development and keeping related markets from advancing as quickly as regional competitors. Despite such complexities (especially as regards spectrum allocation), the Thai telecommunications industry has exhibited constant growth in competitiveness. Thailand's average and peak connection speeds as well as the country's rates of broadband adoption at 4 Mbps and 10 Mbps are the highest amongst the major economies of Asia. In terms of average and peak connection speed, Thailand ranks 42nd (8.6 Mbps) and 20th (51.5 Mbps) on the global scale, ahead of Malaysia, the Philippines,

Vietnam, Indonesia, India, and China. Also, on the global ranking of broadband adoption at both 4 Mbps and 10 Mbps, Thailand comes in at the highest rank at 5 (95%) and 41 (20%), ahead of all the above mentioned Asian countries (Akamai 2015). Between 2012 and 2013, the ratios of smartphones and tablets to the general population doubled at the very least, from 17% to 34% for smartphones and from 2% to 7% for tablets. This also was the fastest growth in the ASEAN region (Oxford Business Group 2014).

To shed light on the competitiveness and complexity of the Thai telecommunications industry, I have two objectives for this paper. The first objective is to clarify the industrial organization of the Thai telecommunications industry. To achieve this objective, I have analysed data from an empirical case study, thus permitting an exploration of hierarchical structure based on individual firms. I use a multilayer perspective to demarcate the boundaries separating tier-players from one another in the industry. For the purposes of this paper, I place the Thai telecommunications industry's major players into seven tiers by identifying tier-related boundaries on the basis of an important variable: telecommunications firms' main tasks.

My second objective here is to describe and analyse the value creation opportunities and inter-corporate relationships among all industrial players, both on vertical and horizontal axes. I base my analysis on corporate's competence and capability. The vertical axis refers to a type of vertical integration. Individual-tier players typically cooperate and collaborate rather than compete with one another along the chain of responsibility. By contrast, different players on a horizontal axis compete with one another in the same business field at the same tier. However, there are some exceptions to the general working of horizontal axis and these exceptions reveal a striking balance between competition and cooperation at the first-tier, second-tier, and supplier-tier in the Thai telecom industry.

I have organized this paper into five distinct sections. The first section describes the contributions of the telecommunications field to the Thai economy. The second section defines the unique characteristics of Thailand's telecommunications industry. The third section clarifies the structure of this industry with regard to the tasks or values that industry players have performed or created along the hierarchy. Drawing on the ideas of competence and capability, the fourth section presents the value-creation opportunities of each tier's players. The last section discusses inter-corporate relationships as they occur both on the horizontal axis and on the vertical axis.

In terms of this paper's data and methodology, I have adopted a case-study method. I use a multilayer perspective to define players' tier boundaries and players' value creation opportunities as well as to clarify the characteristics of inter-corporate relationships on vertical and horizontal axes. While relying on secondary data from NBTC survey reports, I made use of numerous studies in the field, all of which together helped established a clear backdrop to the issues under investigation. The primary data, including corporate documents and my interviews with key players have made it possible for me to depict — with precision and rigor — the aspects of the Thai telecommunications industry relevant to this study.

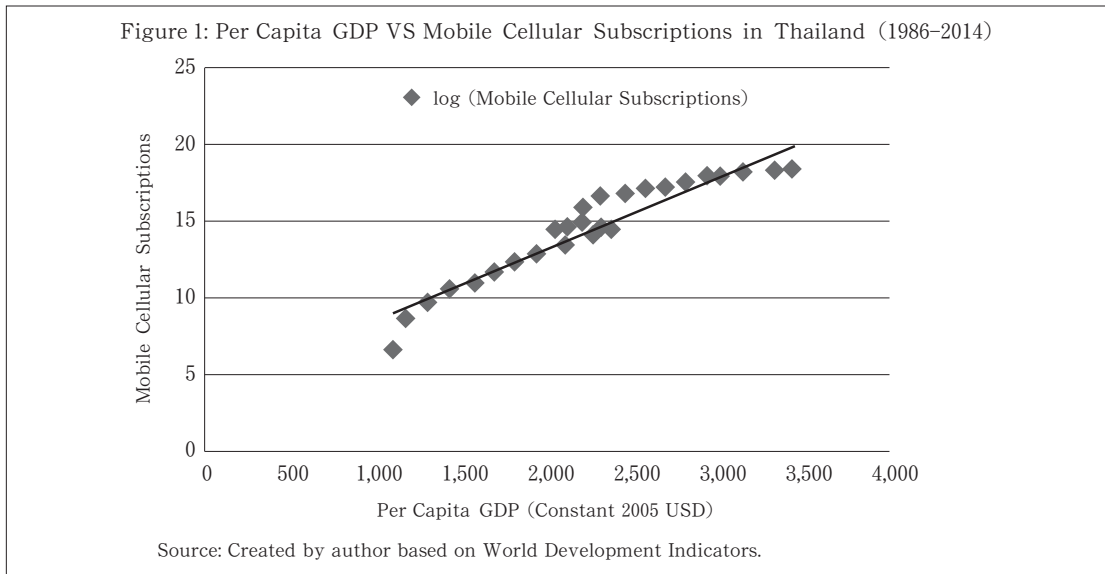
1. Contribution of Telecommunications Industry to Thai Economy

Historically, the Thai telecommunications has operated as a type of public monopoly, the financing of which has contributed to the public debt (Guislain and Qiang 2006). In the first developmental stage of Thailand's telecommunications industry, domestic public and private investors had little or no pertinent operational experience and were largely incapable of providing sufficient funds required for investment. Therefore, they initially competed with one another in an effort to attract foreign direct investment, which was critical to capital acquisition, technology transfers and managerial improvement. With such investments, investors hoped to accelerate the expansion and modernization of Thailand's telecommunications network. Nevertheless, the foreign-ownership laws governing the nation's main telecom operators restricted non-Thai ownership of Thai telecom businesses at 49% (Oxford Business Group 2014). Currently as regards Thailand's big-three telecom operators, Advanced Info Service (AIS) is partially owned by the Singaporean firm SingTel, Total Access Communication (DTAC) is partially owned by the Norwegian firm Telenor, and True Move is partially owned by the Chinese firm China Mobile (Budde 2014).

The next stage in the development of Thailand's telecommunications industry took place in the late 1980s, when the Thai government restructured the industry with a system of build-transfer-operate (BTO) concessions whose central function was to promote competition among private actors (Nittana and Walsh 2015). Under the BTO concessions (which are still in place), Thai mobile operators are entitled: (1) to build and raise capital for investment in Thailand's cellular networks, (2) to transfer network ownership to an agreement's grantor, and (3) to operate cellular networks and services commercially and share 20-30% of all revenue with the grantor (Bengt and Jan 2013).

The current digital era is driven by the economies of speed (i.e. the progress of network linkages). In this regard, the key focus is development of telecommunications technology — especially wireless communications for higher-speed connections. Any interruptions of communication in an information-oriented society will lead to economic losses, as well as — a predictable degree of confusion. Therefore, economies must have *integrated network operations*, whose function is to control a given telecommunications network, including such specific variables as the volume of traffic and the frequency of faults and network experience is a key driver of competitiveness among the main telecom operators (JICA 1989; Kagami 2001; Accenture 2015b).

In general, one can understand telecommunications' significance to economic development by considering two important factors: a telecommunications industry's contribution to total GDP, and the correlation between per capita GDP and teledensity. First of all, let's consider the industry's contribution to total GDP. In the case of Thailand between 1986 and 2014, the telecommunications industry accounted for 4% of total GDP on average (NBTC 2011). This percentage seems to be insignificant. However, in terms of the industry's growth rate, we should bear in mind that Thai consumers have been substantially increasing their consumption of telecom services.



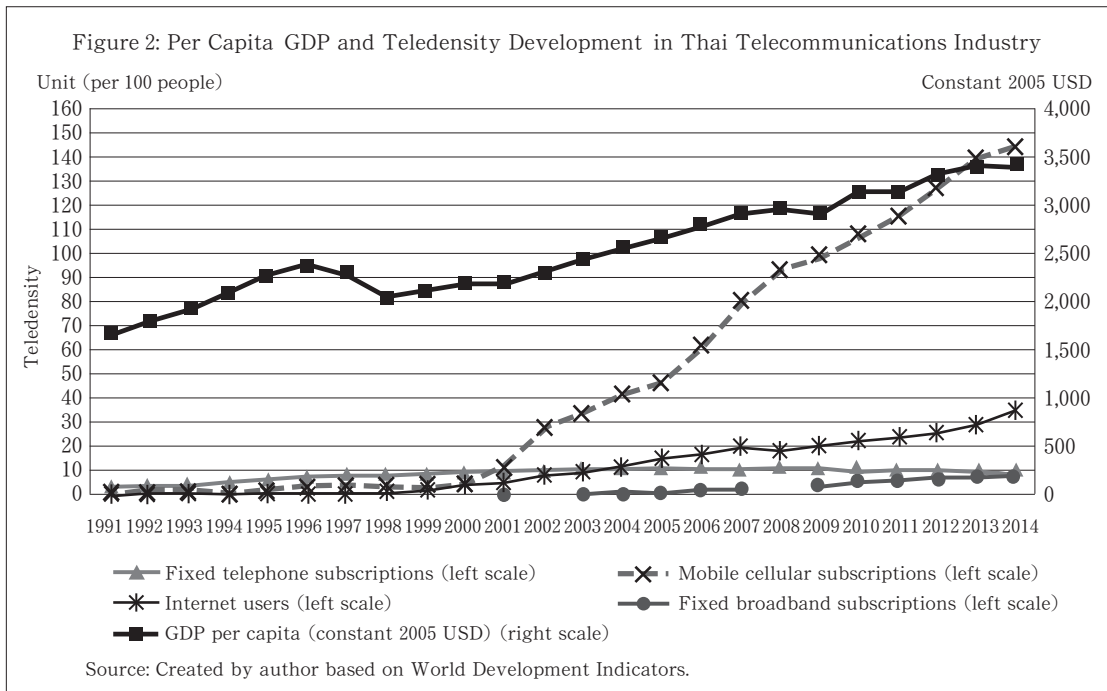
Indeed, average annual growth of post and telecom expenditure during the same range of years was 9.02%, a figure that stands in stark contrast to average annual growth in general expenditure, 3.02% (NBTC 2011). Furthermore, the Thai government's support of mobile broadband networks helped substantially increased demand for the industry's services. Three sets of statistics illustrate the extent of this increased demand: first, by 2014, almost 35% of Thai people could access the Internet; second, average annual growth in Internet use amounted to a whopping 30% between 2000 and 2010; and third, skyrocketing growth in demand for smart phones peaked at 230% in 2010 (Oxford Business Group 2014). What's more, the MICT has established a number of community-focused telecentres, beginning in 2011. They function as a central hub for ICT activity in rural communities, fostering various educational and training opportunities. The Thai government mandates that these services must involve high-speed fibre optics and be connected to high-speed telecommunications lines featuring cutting-edge telecommunications technology.

As I mentioned earlier, there are important methods for determining the significance of telecommunications to an economy, and one such method centers on the correlation between per capita GDP and teledensity. The cross-tabulation presented in Figure 1 shows that there was a positive correlation between per capita GDP and the number of mobile cellular subscriptions in Thailand during the 1986–2014 period. Furthermore, the productivity gained in the telecommunications industry has strengthened productivity throughout the rest of the economy, which relies on high quality voice and data communications in production, distribution, and marketing processes. In short, advances in intermediate inputs like telecommunications services can greatly advance the efficiency of an overall economy insofar as a fixed amount of these services can yield more and better-quality output (Somkiat and Taratorn 2002; Rifkin 2014). It is worth noting that telecom services also give rise to qualitative benefit in terms of social development. For example, these services can greatly widen public access to and public participation in civil society, thereby

providing enhanced opportunities for education and creativity. Such improvements, in turn, can strengthen the public's contributions to the development of the Thai economy as a whole (Prasert 2010, p. 13).

2. Characteristics of Thailand's Telecoms Industry

Thanks to its contributions to economic and social development, Thailand's telecom industry has attracted widespread interest and heavy investment. All the key players in this market have aggressively aimed to extend and upgrade their own network systems (Oxford Business Group 2014, p. 163). Thailand's mobile operators are now functioning in a more complex market than existed just a few years ago. Now, priority has shifted to becoming *mobile-internet capabilities*. Smartphones in particular have driven this change; operators have to contend with the massive data demand from users (Oxford Business Group 2014, p. 175). In Thailand, the telecom industry's ratio of "revenue from non-voice services" to "revenue from voice services" was 100/89 in the second quarter of 2015 (NBTC 2015b). Most domestic mobile operators have already invested heavily in their networks' 4G capacity. The aforementioned big-three Thai telecom operators (AIS, DTAC and True Move) are competing to expand their coverage and improve their network capacity, and this competition eventually reinforces the national economy's tremendous potential for growth in the industry (Oxford Business Group 2014, p. 175). The Thai telecom industry's stage of development can be ascertained from the industry's rate of teledensity, which is a measure comprising fixed telephone subscriptions, mobile cellular subscriptions, Internet users, and fixed broadband subscriptions (see Figure 2). The growth rate of mobile cellular subscrip-



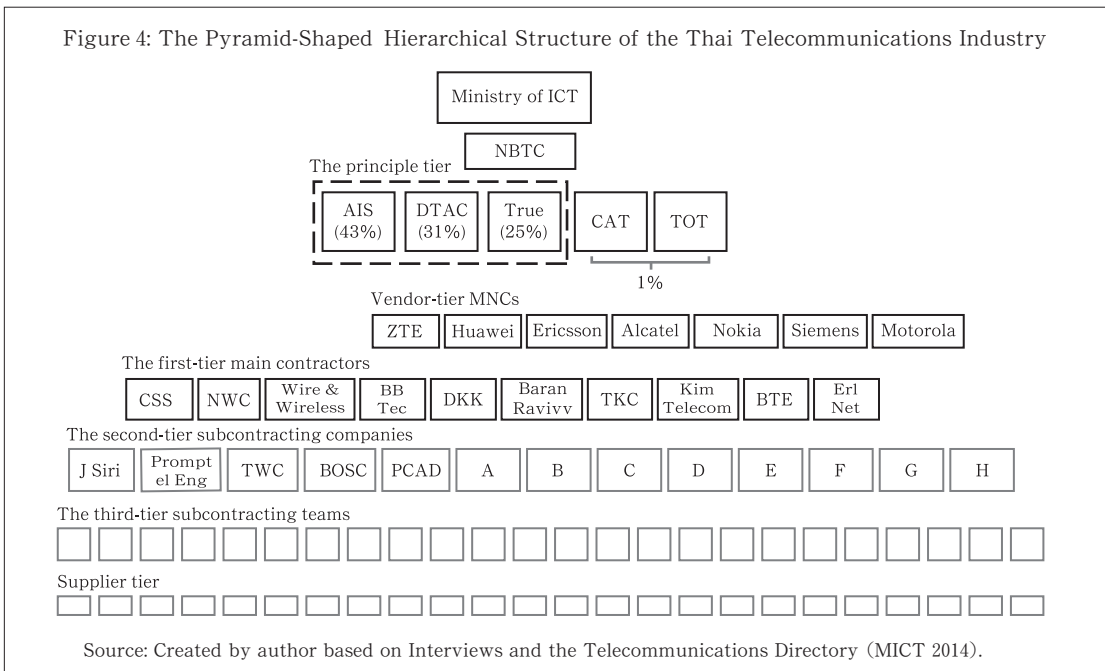
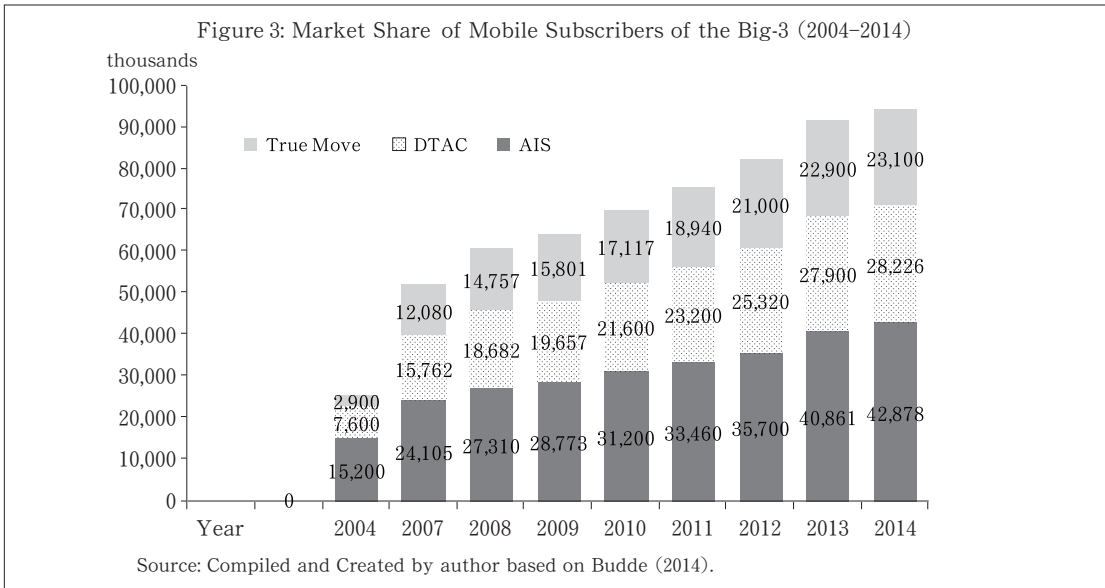
tions exhibited a substantial increase of approximately 150% in 2015 while the rate of fixed telephone subscriptions exhibited a trend of gradual decrease. Particularly since 2001, liberalizing developments in the Thai telecom industry have inaugurated and fuelled massive increases in the mobile-cellular sector. In addition, the increasingly mobile lifestyles of Thai people have both arisen from and contributed to the growing importance of mobile-cellular, Internet, and broadband services — all three of which have also benefited from a supportive Thai government. This fact is confirmed by the rise in the number of fixed broadband subscriptions, Internet users, and mobile-cellular subscriptions throughout Thailand.

In brief, the Thai telecommunications industry presents a complex commercial environment because it presents “a mixture of government-linked companies and private operators functioning under a wide variety of corporate interfaces and a volatile regulatory structure” (Budde 2014, p. 3). Despite an attempt at liberalization (specifically, regulatory reform that shifts from a concession regime to a market-based license spectrum approach), the NBTC continues to play a crucial role in the Thai telecom industry as a regulator on the one hand and as an informational intermediary on the other. Moreover, whereas the ratio of telecom earning to GDP in Thailand may seem small, the growth rate of this industry is very high. The mobile segment exhibits the strongest growth, followed by Internet and broadband services. Also, the Thai government has publicly embraced “broadband development” as a national agenda. In the next section, I will clarify the hierarchical structure of Thailand’s telecom’s industry, with an emphasis on its function.

3. The Pyramid-Shaped Industrial Organization and the Hierarchical Governance Structure of Thailand’s Telecom Industry

The mobile-phone market in Thailand consists of three major private operators, the so-called Big Three: AIS, DTAC, and True Move. The competition among the three operators is based on their effort to differentiate themselves from one another regarding network quality, advertisements (promotional packages), and value-added services¹ (Somkiat and Taratorn 2002). Figure 3 shows the Big Three’s market shares of mobile-phone subscribers. As the number of subscribers increased rapidly (especially after 2007), AIS constantly gained the biggest market share of mobile-phone subscribers, followed by DTAC and True Move. In 2014, AIS accounted for 43.7%, DTAC for 30%, and True Move for 25% of the market.

The hierarchical structure of the players in the Thai telecom industry is shaped according to their main tasks. The players in the Thai telecom industry can be divided into seven tiers: (1) the regulator-tier (NBTC), (2) the principle-tier telecom operators (AIS, DTAC, and True Move), (3) the vendor-tier multi-national corporations (MNCs), (4) the first-tier main contractor companies, (5) the second-tier subcontracting companies, (6) the third-tier subcontracting teams, and (7) the supplier-tier (see Figure 4). Each tier performs a specific set of tasks reflecting the tier’s value creation along the hierarchy. On the vertical axis, these tasks do not overlap. Actually, they require collaboration for a smooth flow of operations. In other words, this hierarchical structure possesses a vertical integration system. On the horizontal axis, the relationships among the



industrial players may give rise to competition, reflecting efforts to increase their own profits and to strengthen their own share of the market. It is interesting to note that, in the Thai telecom industry, the first-tier main contractor companies, the second-tier subcontracting companies and the supplier-tier present a striking balance between competition and collaboration.

The shape of the hierarchical structure in the Thai telecommunications industry is pyramidal. Atop the pyramid, sits the Ministry of Information and Communication Technology (MICT),

which leverages the authorization to NBTC in order to regulate the industry. The NBTC acts as the spectrum granter, distributing licenses for use of the radio-frequency spectrum to the Big Three operators, so that they can provide cellular mobile services on the 850 MHz, 1,800 MHz, 3G-850 MHz, and 2.1 GHz bands. Outside the Thai economy as a whole, the most important regulator on the global stage is the International Telecommunications Union (ITU). The MICT and NBTC must comply with ITU regulations to meet International standards (ITU 2013).

In Thailand, the principle-tier telecom operators are required to abide by the NBTC rules and regulations. After gaining government authorization for roll-out project activities, the main operators can fulfil their main function, which is to engage in mobile-cellular service operations. Using a “build-transfer-operate (BTO)” model, the operators develop telecom infrastructure by subcontracting projects to the first-tier main contractors or to the vendor-tier MNCs. Upon reaching the expiration of the concession contracts, the operators must either transfer the infrastructure to the government or prolong the continuation of the contract.

The vendor-tier provides consumers with telecommunications products. All vendor-tier members are MNCs. Each pursues an aggressive and active strategy for competitively selling their products to the Big Three operators, CAT, and TOT. The robustness of the MNCs’ strategies reflects the fact that a selection of telecom technology of each brand is the most important initial step in their pursuit of profitability. Because the vendor-tier MNCs operate chiefly in the field of telecom technology, another important task they must carry out is the training of key principle-tier, first-tier, and second-tier players: the training enables these players to match their competences with one another and with the overall marketplace (Adner 2006).

The next layer, or tier, in the Thai telecom industry’s pyramidal structure consists of the first-tier main contractors. Between approximately ten and twenty companies make up this tier and act as telecommunications intermediaries between the principle-tier operators and the second-and-third-tier subcontractors. The first-tier main contractors perform chiefly such tasks as telecom-equipment installation and integrated commissioning. Their business activities can be summarized by the principle “derive demand, design, develop, and deliver”. They derive demand on the basis of project contracts drawn from the principle-tier Big Three operators or the vendor-tier MNCs. After acquiring projects, the first-tier main contractors design telecom antenna and subcontract project-development tasks including the aforementioned tasks of telecom-equipment installation and integrated commissioning to second-tier subcontractors. At the same time, they strictly supervise and coordinate every step in the work flow to ensure satisfactory quality and timely customer deliveries.

The main task of second-tier subcontracting companies is on site construction (as can be surmised from the previous discussion of first-tier subcontracting). Many indigenous companies belong to the second-tier category because such companies are not that difficult to start up. Indeed, these companies tend to be quite small, each consisting of about a dozen employees. Therefore, second-tier subcontracting companies often need manpower for on-site construction work, and they get it from the third-tier subcontracting teams, which typically involve between six and ten. On-site construction workers who, rather than constitute an established company, engage in nomad-style work. The last tier, the supplier tier, carries out its main task of supplying

materials for telecom antenna construction.

4. The Value-Creation Opportunities of the Key Players in the Thai Telecommunications Industry

The value-creation opportunities of each tier's key players in the Thai telecommunications industry are summarized in Table 1. As explained above, the *raison d'être* of these players is to

Table 1: The Value-Creation Opportunities of the Key Players in the Thai Telecommunications Industry

Tiers	Tasks	Core Competences	Core Capabilities	Challenges
The regulator-tier	<ul style="list-style-type: none"> Strictly regulate the industry Approve RF-spectrum licenses 	<ul style="list-style-type: none"> Market-based licensing regime Liberalizing development 	<ul style="list-style-type: none"> Credibility ITU's global standards 	<ul style="list-style-type: none"> Meet ITU's global standard Catch up to and compete with other countries' technological development Overcome domestic digital divides
The principle-tier	<ul style="list-style-type: none"> Acquire RF-spectrum licenses Raise capital for investment Operate and provide mobile-cellular services 	<ul style="list-style-type: none"> Government connections Network quality management Pricing and marketing 	<ul style="list-style-type: none"> Political bargaining power Cost-efficient technology Operational excellence 	<ul style="list-style-type: none"> Reach and maintain high-speed pace of technological development Achieve continuity of concessions with the government Secure airtime money
The first-tier	<ul style="list-style-type: none"> Design telecom antenna Supervise civil work, telecom equipment installation, integrated commissioning 	<ul style="list-style-type: none"> Connection with principle-tier Telecoms engineering CAD (i.e. antenna designs) 	<ul style="list-style-type: none"> ISO 9001-2008 in telecommunications The principle-tier standards (C-FBOQ, C-PAT, C-PAC, C-FAC) Negotiating skills 	<ul style="list-style-type: none"> Reach and maintain high-speed pace of technological development Achieve continuity of project contracts Achieve desirable capital and cash flows Manage time
The second-tier & the third-tier	<ul style="list-style-type: none"> Perform civil work, telecom equipment installation, and integrated commissioning 	<ul style="list-style-type: none"> Civil-engineering design Construction management Telecoms engineering 	<ul style="list-style-type: none"> ISO 9001-2008 in telecommunications The principle-tier standards (C-FBOQ, C-PAT, C-PAC, C-FAC) Negotiating skills 	<ul style="list-style-type: none"> Reach and maintain high-speed pace of technological development Achieve continuity of project contracts Achieve desirable capital and cash flows Manage time
The vendor-tier	<ul style="list-style-type: none"> Provide telecom technology to other key players Strengthen know-how & technology transfers 	<ul style="list-style-type: none"> Communications technology Sales-and-marketing strategies (regional → global) 	<ul style="list-style-type: none"> Untethered and wireless communications integration systems 	<ul style="list-style-type: none"> Compete successfully in the field of technological development Achieve and maintain compatibility with market contexts Acquire satisfactory knowledge & technology transfers
The supplier-tier	<ul style="list-style-type: none"> Supply materials & equipment Perform logistics 	<ul style="list-style-type: none"> Supply inventories Logistics management 	<ul style="list-style-type: none"> Comprehensive industrial analysis Warehouses and fleets 	<ul style="list-style-type: none"> Avoid excesses or shortages of supplies Deal with the depreciation of materials

Source: Created by author based on interviews, Natee (2011), NBTC (2011), Settapong et al. (2013), Oxford Business Group (2014) and Accenture (2015a, 2015b).

perform specific tasks. These specific tasks reflect a pursuit of value creation and also facilitate the classification of players in specific tiers. Companies can gain a competitive advantage by building foundational competences; therefore, they need to be more deliberate in understanding which competences affect business performance (McKinsey 2011). A core competence is a set of integrated skills and technologies that enables a company to provide a particular value or benefit to the customers. It transcends any particular product or service. Indeed, it is the root of competitiveness and the source of fundamental growth (Hamel and Prahalad 1996 and Accenture 2015c). Competence is accumulatively based on capability. 'Capability' here is defined as resources leverage for the benefit of business performance (Fukushima and Yamaguchi 2009). To achieve resource leveraging, companies must accumulate and orchestrate their own resources and multiply their resources' effectiveness (Hamel and Prahalad 1996, page 171). Challenges essentially refer to the risks accompanying acts of initiative, interdependence, and integration-risks that each tier must bear to varying extents (Adner 2006).

First, vendor-tier MNCs establish strategic standardization² in terms of telecommunications technology. They act as innovators who provide telecom technology to the principle-tier operators and who transfer knowledge as well as technology in the field of innovation. Their competences lie in communications technology and also sales-and-marketing strategy. The competition field which was once regional in the past (for example, Alcatel-Lucent versus Siemens in Europe, Nortel versus AT&T in the United States, NEC versus Fujitsu in Japan and Samsung versus LG in South Korea) have competed on a global scale (Hamel and Prahalad 1996). Therefore, untethered and wireless communications integration systems are recognized as vendor-tier's fundamental capability. The challenges besetting vendor-tier MNCs include fierce competition in technology development, possible incompatibilities with a given market context, and inefficient transfers of knowledge and technology.

Next, the regulator-tier NBTC strictly oversees all the industrial players within a nation's geographical boundaries. The NBTC also can approve or deny RF-spectrum licenses. There are two core competences necessary for creating a "fair" playing field and for maximizing efficiency: the first is an ability to engage successfully in market-based licensing regimes, and the second is a talent for promoting liberalizing development. The NBTC's critical resources include its own credibility and the ITU's global standards. The regulator-tier's challenges include the difficulties often inherent in meeting the ITU's global standards, catching up to, and competing with other countries' level of technological development, and coping with domestic digital divides.

If the vendor-tier MNCs standardize telecom technology, the principle-tier must set industry-wide standards for the work process itself. They create values by operating and providing mobile-cellular services after acquiring RF-spectrum licenses and raising capital for investment. The principle-tier telecom operators' fundamental source of competitiveness lies in their connections with the Thai government, their handling of network quality management, and also their pricing-and-marketing strategies. The core capabilities of the principle-tier are its adept pursuit of political-bargaining power, of cost-efficient technology, and of operational excellence. The challenges consist of achieving a high-speed pace of technological development, establishing continuity of concessions with the Thai government, and securing airtime money.³ The tasks,

core capabilities, and challenges of the first-tier main contractors, the second-tier subcontractors and the third-tier subcontracting teams are relatively the same. Whereas the first-tier acts as *supervisors* who design telecom antenna and who supervise civil work, telecom equipment installation, and integrated commissioning, the second and the third tiers act as *practitioners* who perform all the above mentioned tasks. The core capabilities are the same for each of these three tiers: the capabilities involve chiefly ISO 9001-2008 in the field of telecommunications, the principle-tier standards (e.g., C-FBOQ, C-PAT, C-PAC, C-FAC), and negotiating skills. Whereas the core competences of the first-tier comprise connections with the principle-tier, CAD for antenna designs, and telecom engineering, the core competences of the second-and-third tiers consist of civil-engineering design, construction management and also telecom engineering. The challenges are relatively the same for these tiers: reaching and maintaining a high-speed pace of technological development, achieving desirable capital and cash flows, securing satisfactory continuity of project contracts, and managing time well.

Lastly, the supplier-tier creates value by supplying materials and equipment and by handling logistics. This tier's core competences include the ability to supply inventory items and to manage logistics. The tier's crucial resources (in the form of core capabilities) involve comprehensive industrial analysis as well as such material capital as warehouses and fleets. The supplier tier's challenges lie in the constant risk of either accumulating an excess or incurring a shortage of supplies as well as the equally constant risk of material depreciation. Now that the above section has presented a rigorously and sufficiently detailed summary of the Thai telecommunications industry, the next section will describe inter-corporate relationships among industrial players on both the vertical axis and the horizontal axis.

5. Inter-Corporate Interactions and Relationships on Vertical and Horizontal Axes

The value-chain governance of the Thai telecommunications industry is a type of hierarchy. It is characterized by vertical integration. The dominant form of governance is managerial control, flowing from the players at a higher hierarchical rung to the ones on a lower rung. Complexity is high because it is difficult to codify the transactions. The steps of work flow are available to key players in specific detail. The degree of explicit coordination is high. The degree of power asymmetry is also high. As mentioned in the fourth section, the principle-tier has established industry-wide standardization for pertinent work processes. The principle-tier's main telecom operators strictly follow the principle of workflow. They provide the work-process manual, as it were: a kind of guideline for "work-orders" and "purchase orders". The first-tier main contractors have to follow a precise workflow in every specific step in a rigidly defined process. In a particular transaction, the principle-tier players will test design services and construction services and approve a certificate in every step until the final stage of project delivery.

In the Thai telecommunications industry, there are four main work-process stages: (1) site acquisition, (2) site preparation, (3) site construction, and (4) site operation. On a vertical axis, the inter-corporate relationship seems to be cooperation rather than competition. Regardless of

whether the projects are given to the vendor-tier MNCs or the first-tier main contractors, all stakeholders have to cooperate with one another to perform their tasks and to ensure that the principle-tier can complete the projects according to quality-assurance standards and deliver the projects in a timely manner. However, on the flip-side, vertical axis relationships implicitly involve the competitive forces, especially from second-tier subcontracting companies seeking to climb up the chain in pursuit of a first-tier status. Nevertheless, there are obstacles to this upward push, and the biggest ones concerns difficulties in acquiring financial funding and in establishing close connections with the principle-tier and the government players. Also, there is no precedent where a first-tier main contractor competitively climbed up the chain to a principle-tier position in the Thai telecom industry. The vendor-tier MNCs are like outside players that create value in the form of telecom technology. One more important role played by the vendor-tier MNCs is transfer of know-how and technology to the principle-tier and first-tier through “training and development”. In terms of training and development, the second-tier subcontractors can also help support the first-tier main contractors (this kind of relationship is known as “reverse-back” training.)

On a horizontal axis, the inter-corporate relationship naturally presents competition rather than cooperation. Players in the same field have to compete for market share and profitability. The business strategy of increasing productivity is then the key element. The gain of one player may imply the loss of other players. A win-win relationship hardly ever occurs on the horizontal axis. However, there are some exceptions to this general rule in the Thai telecom industry. Take, for example, Communication & System Solution (“CSS”) which has specialized in an area of civil work and which currently collaborates with Neonworx Communications (“NWC”), itself a specialist in the field of telecom equipment installation and integrated commissioning.

The collaboration between these two companies took place so that they could assure the principle-tier of both the high quality and the timely completion of an entire given project. Additionally, the second-tier subcontracting company, J-Siri, which is the main subcontracting company of CSS on “civil work” in Southern Thailand, has collaborated with other subcontracting companies on on-site construction project. The companies shared the projects in order to maintain their own customer bases. As with J-Siri, PromptTel Engineering engages in a similar strategy of sharing — and for the same general reasons. PromptTel, specifically, is the main subcontracting company for NWC regarding “telecom equipment installation and integrated commissioning” in the Bangkok Metropolitan Area. Even the first-tier main contractors and the second-tier subcontracting companies are on the same business-field level, they strike a notable balance between competition and cooperation to create, maintain, and strengthen long-run value in the Thai telecommunications industry.

Conclusion

The Thai telecommunications industry presents a complex commercial environment that, nevertheless, has yielded the most competitive performance among the neighboring countries in the ASEAN region. Though the contribution of Thailand’s telecom industry to the national GDP

is not particularly large at the moment, the growth rate has been noticeably robust. The mobile segment, in particular, has exhibited the strongest growth, followed by the Internet and then by the broadband segment. The Thai telecommunications industry operates within the context of pyramid-shaped industrial organization and hierarchical governance structure. Each-tier player of industry players performs specific tasks and creates particular values along the rungs of the hierarchy. The industrial structure characterizes a dominant managerial control over the telecom roll-out projects. The Thai telecommunications industry functions as a vertical integration system; wherein the degree of explicit coordination is high and also the degree of power asymmetry is high. The top position is dominated by a few powerful incumbents. Moving down the Thai telecom industry's pyramidal organization, one discovers that the number of players grows significantly. The economic value of tasks reflects the underlying competences and capabilities that are the fundamental source of competitiveness in the Thai telecom industry. The vendor-tier positions are at the core of innovation in a global telecom technology. The regulator-tier sits atop the Thai telecom industry. The principle-tier players and the first-second-, and third-tier players carry out complementary functions in the Thai telecommunications industry. These various tiers of players must evolve roughly at the same pace (i.e., at a pace consistent with technological development) while the supplier-tier players carry out supplementary functions geared toward the supply of materials, including equipment. This pyramid-shaped industrial organization and hierarchical governance structure can be seen as sources of substantial growth and competitiveness in the Thai telecommunications industry. And the strength of this assertion is rooted in the fact that each tier comprises players that perform specific tasks and create specific value according to each tier's functional specialization. The industry's coordination-rich organizational capability ensures the presence of two important components: first, that a system of checks and balances is in place along the chain of command, and second, that each particular transaction between the principle-tier and the first, second, and third-tiers players are efficient and accurate.

Notes

- 1 Value-added services in the telecom industry include voice services, non-voice services, data usage, and online transactions.
- 2 "Standardization" has become a strategic tool with which big firms form a consortium to establish industry-wide standards. This process has yielded many consensus standards that change the division of labor in each tier's firms. Standardizations or consensus standards are based on two practices: adjusting the scope of knowledge (the scope of work) and selecting new business partners who adopts the standards (Tatsumoto, Ogawa and Shintaku 2011).
- 3 Mobile-cellular subscribers spend money in order to talk, to transmit data (by means other than talking), and to engage in online transactions. Many cell-phones plans are based on the number of airtime minutes that subscribers can use each month. Pay-as-you-go plans, for example, enable cell-phone owners to pay in advance for talking time-and these owners can add more airtime as needed, by day, week, or month.
- 4 The companies maintained the customer base by not refusing requests for on-site construction projects from the first-tier main contractors but by finding diverse ways to perform the requested tasks. After

all, the players that make up the second-tier subcontracting companies are the players most susceptible to the cycles of the telecommunications industry. The cycles characteristic of the Thai telecommunications industry tend to have peaks of 3–4 years and silent periods of 1–2 years. Incidentally, the strongest impact of the industry cycle on the key players has generally occurred in the second-tier level.

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