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Social Conditions of Innovation in Latecomer Firms and Countries

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Abstract

Purpose - Focusing on the dramatic rise of the mobile telecommunications industry in South Korea as a case to illustrate, this paper seeks to gain a more nuanced understanding of the sources of the innovative performance of the latecomer firm in the high technology sector by shedding light on the specific social conditions under which dynamic interactions between technological, market, organizational, and institutional forces enable and/or constrain the latecomer firm and its effort toward technology-driven innovation.
Design/methodology/approach - We build on theoretical insights from William Lazonick and use his integrative model of *the social conditions of the innovative firm* in our examination of the recent experience of Samsung Electronics' mobile handset business, and of Korean mobile telecommunications industry.
Findings - We have demonstrated how firms embedded in the existing institutional conditions, are also able to generate innovation through a combination of financial commitment, organizational integration and strategic control reflecting their prevailing organizational conditions.
Research implications or Originality - This study is distinguished from the extant studies on the evolutionary path of latecomer firms in industrializing economies in that it has attempted to reconceptualize the firm as an outcome of dynamic interactions between itself and institutional environments where it is embedded.

Keywords: CDMA Technology, Innovation and Institutions, Latecomer Firms, Samsung Electronics, Wireless Telecommunications Sector
JEL Classifications: L10, L63, M13, O25, O31

Ⅰ. Introduction

Innovation is the engine behind economic progress and industry evolution (Afuah, 1998). Scholars from various fields have long studied how technological development unfolds and affects the competitive advantage of a firm, industry and nation. We have witnessed a vast volume of empirical research that underscores and demonstrates innovation and technological development as a critical factor determining the performance of

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a firm, industry, and nation (e.g., Amit and Schoemaker, 1993; Barney, 1991; Chandler, 1990; Chesbrough, 1999; Christensen and Rosenbloom, 1995). Although it is clear that this stream of research has expanded our knowledge about the content and process of technology-driven innovation and its effects on the competitive advantage of a firm, industry, and nation, much of this work has neglected to clarify how each of the elements yielding innovation and technological development work hand in hand, leading to economic progress and industry change, In particular, when it comes to latecomer (Amsden, 1989) countries and firms - such as South Korea and their major companies - and their endeavors toward technology-driven innovation, our observation is that extant studies on this subject matter does not sufficiently delve into the theoretical insights from related fields. A careful appreciation of key ideas and concepts from adjacent fields can benefit our understanding of technology-driven innovation involving latecomer countries and firms by helping researchers to better capture the important aspects of these economies and firms, which have somewhat evaded the attention of the early work focusing squarely on technology-driven innovation in more developed economies and firms.

In this article, we aim to fill this gap in the prior literature by presenting an analysis of Korea's dramatic rise in the CDMA-based wireless telecommunications sector. To this end, we use Lazonick (2001)'s framework of the social conditions of innovation that is designed to reflect some of the key insights from the theoretical literature on the co-evolutionary process of technology, organizations, and institutions. In our case study of Korea's emergence as a key player in the global wireless telecommunications sector, we pay a particular attention to how Samsung had played a critical role while adjusting to the changing external environment and collaborating with other key actors in the national innovation system.

Indeed, in the literature on technological catch-ups by latecomer nations or latecomer firms in the technology-intensive industries, South Korea and its main company, Samsung[1] have often been cited as a representative case (Kim Lin-Su, 1999; Mattews and Cho Dong-Sung, 1999). Eariler, their success in the world DRAM market in the global semiconductor industry has been frequently presented as a vivid case of the shifts in competitive advantage between firms and nations (Hobday, 1995; Kim Lin-Su, 1999; Mattews and Cho Dong-Sung, 1999). However, analytical approaches to this topic have been taken from either technology-centered views with an emphasis on the process of technological capability accumulation, or the stance of political economy that revolves around the dichotomy of markets vs. state with respect to the mechanism by which economic development has been achieved.

Over the past decades, the rapid growth and expansion of Korea's wireless telecommuni-

1) Samsung is one of the largest chaebols in Korea and controls a large number of companies across diverse industries. Samsung Electronics is the flagship company of Samsung and operates in the semiconductor, consumer electronics, telecommunications equipment (system and handset) businesses among others.

cations sector has attracted significant interest among business practitioners and policy makers alike. The empirical phenomenon of which Samsung has become a front-runner in the global mobile handset market merits some investigations from academia as well.

Overall, this paper is expected to contribute to the related literature by providing a more nuanced understanding of the dramatic rise of the mobile telecommunications industry in one of the 1st tier newly industrialized economies (NIEs), South Korea, drawing on the extant literatures of varied research streams. The analytical standpoint on which this paper builds generally is drawn from the theoretical wisdom of evolutionary and institutional perspectives to economic change. More specifically, we employ a theoretical framework based on Lazonick's (2001) theory of social conditions of innovative enterprise. His perspective is to a great extent complementary with both evolutionary and institutionary perspectives in that 1) it does not presuppose the ontological primacy of price mechanism, thus institutional; and 2) it does not exclude the imperative of technology in economic change, thus evolutionary. Another advantage may lie in its analytical parsimony that enables us to readily operationalize his framework, but without sacrificing much of explanatory power.

The paper will be organized as follows: we will first introduce the conceptual lenses through which this case will be examined. In doing so, Lazonick's (2001) theory of innovative enterprise will be reviewed as this paper borrows much of its theoretical insights from his arguments. This preliminary exercise will set the stage for the rest of the investigation that ensues. In the following sections, we will discuss industrial, institutional and organizational conditions, as suggested by Lazonick's (2001) theory of innovative enterprise, under which the successful performance of Korea's wireless telecommunications sector has been made possible.

Ⅱ. Theoretical Background and Conceptual Framework

Researchers of strategic management, innovation, and industrial organizations have long been addressing the question of sources of firm performance and competitive advantage. Among these studies, a sizable body of literature has examined external actors and systems beyond the firm as the locus of innovation (e.g., Archibugi and Michie, 1995; Batholomew, 1997; Edquist, 1992; Freeman, 1994; Lundvall, 1988; McKelvey, 1999; Yoon Woo-Jin and Hyun Eun-Jung, 2009). Further, scholars from sociology and political economy have also developed comparative models of capitalist economies on a more broad scale. This so-called varieties of capitalism perspective has sought to shed a better light on the reality of the divergent industry-level development trajectories taken by different countries, and their influence on the nations' and firms' economic outcomes (e.g., Boyer and Hollingsworth, 1997; DiMaggio and Powell, 1991; Granovetter, 1995; Soskice, 1999; Whitley, 1994). Albeit with some differences in the level of analysis and styles of research, shared in these two perspectives - national innovation systems and the varieties of capitalism is the intuition that industry evolu-

tion and economic progress is a profoundly path-dependent, socially and institutionally embedded process, an idea that has not been explicit in the mainstream economic theory, which has tended to view factor accumulation as the driving force for economic growth and change.

Against this backdrop, The present section brings to the fore Lazonick's theory, which is, in our view, a comprehensive effort at theorizing innovation process and economic development. Lazonick's (2001) conceptualization of innovation as an outcome of interactions among and transformation of industrial, institutional and organizational conditions of a firm is of great theoretical as well as heuristic value for advancing a contextual understanding of the recent experience of Samsung Electronics' mobile handset business, and of Korean mobile telecommunications industry. Before exploring the Korean case through the conceptual framework derived from Lazonick's (2001) theory, the basic tenets of his proposal need to be outlined.

Given that firms are social structures that are embedded in broader institutional environments, the theoretical perspective on innovative firm necessitates a model of the relations among industrial conditions, organizational conditions and institutional conditions in the process of transforming technologies and markets to generate innovation. To the extent that innovation process can be characterised as cumulative, collective and uncertain, a theory of innovative enterprise also needs to accommodate the implications of this nature of innovation for the abilities and incentives of firms to transform the technological and market conditions that underpin an industry. The abilities and incentives of firms (the organizational conditions) to transform these industrial conditions so as to generate innovation in turn depend on the social conditions of firms as determined by the interaction of organizational and institutional conditions across industrial activities in the innovation process (Evenson and Singh, 1997/1998; Hollingsworth, 1997; Kim Lin-Su, 1999; Lazonick, 2001; Mattews and Cho Dong-Sung, 1999; Romer, 1990).

Within this theoretical framework, Lazonick (2001) identifies three social conditions of innovative enterprise: financial commitment, organizational integration and strategic control. These social conditions, he asserts, reflect prevailing financial, employment and regulatory conditions (institutional conditions) that are embedded in prevailing cognitive, behavioral, and strategic conditions of the firm (organizational conditions). To sum up, Lazonick (2001) seeks to provide a theoretical framework that can be used to capture the dynamic interactions between the organizational conditions of firms and the institutional conditions in which they operate, and the relation of these social conditions of firms to the transformation of technological and market conditions, and thus of competitive conditions.

We first specify the key characteristics of the industrial, institutional and organizational conditions (Lazonick, 2001) that may promote or constrain the innovation process. This will set in motion the development of conceptual lenses through which to view the successful performance of Samsung in the international mobile handset market.

1. Industrial Conditions (Technological, Market and Competitive Conditions)

Technological conditions refer to the pro-

ductive capabilities, embodied in both human and physical capital, that characterize an industry (Lazonick, 2001), in our case, the nature of the technological trajectory manifested in the mobile telecommunications sector. We concentrate on the CDMA-based technology[2] since it is the core technology that has propelled the success of Korean wireless telecommunications industry. *Market conditions* refer to the existing demand for an industry's products and the existing supply of factors of production (Lazonick, 2001). Following this, both domestic and global market conditions for mobile telecommunications will be looked at from demand/ supply sides. *Competitive conditions* refer to the differential ability of firms in an industry to transform productive resources into revenue-generating products (Lazonick, 2001). We convey a competitive landscape of the mobile telecommunications sector deemed relevant herein focusing on underlying forces behind this competitive scene.

To put this in perspective, the technological and market conditions under which a firm operates at a point in time constrain or promote the ability and incentive of the firm to transform productive resources in generating economic revenues over time. The success of a firm in transforming these conditions and thereby generating innovation in turn transforms the competitive conditions facing other firms in the industry. Challenged by this, other firms may seek to adapt to the status quo or innovate by themselves, instilling dynamism into the industrial structure. In this light, we need to address the questions such as what industrial factors have contributed to Samsung's rapidly enhancing status as a global contender in such a short period of time and to what extent this has affected the global mobile sector.

2. Institutional Conditions (Financial, Employment and Regulatory Conditions)

Financial conditions designate the ways in which financial resources are allocated and financial returns are distributed (Lazonick, 2001). This is to ask the way in which financial resources have been directed and redirected toward investment opportunities in the context of Korea. *Employment conditions* shape the development of labor force capabilities and their recruitment by firms (Lazonick, 2001). This aspect requires an understanding of Korean higher education system, job market mobility, and remuneration system, particularly in association with high-tech areas. *Regulatory conditions* influence the distribution of rights and responsibilities over the management of productive resources to different groups of people and the type of sanction mechanisms (Lazonick, 2001). Relevant issues may pertain to regulatory policy and (intellectual) property right regime.

Lazonick (2001) emphasizes that as a modern economy is increasingly dominated by large corporations, prevailing rights, responsibilities, and restrictions in the society over the management of corporate resources are of particular importance. It then follows that issues pertaining to corporate governance

2) 2G (digital system) standards in the countries such as Korea (single standard), US (multiple standards), China (multiple standards), and some other countries in the Pacific Rim. But the dominant standard was European GSM. 3G (or IMT2000) of which its main technological feature was the incorporation of high-speed multimedia.

need to be brought to prominence such as the organizational structure and governing mode of the chaebol (large corporations that dominate most of the Korean economy). According to Lazonick (2001), institutions related to finance, employment and regulation become embedded in the financial, employment and regulatory practices of firms, and in turn these conditions determine the types of industrial transformations that can occur in the economy. Hence, we need to contemplate what kind of financial, employment and regulatory practices and institutions have been produced and reproduced in Korean society that support (or hamper) the rise and growth of ICT industries, especially, wireless telecommunications sector.

3. Organizational Conditions (Cognitive, Behavioral and Strategic Conditions)

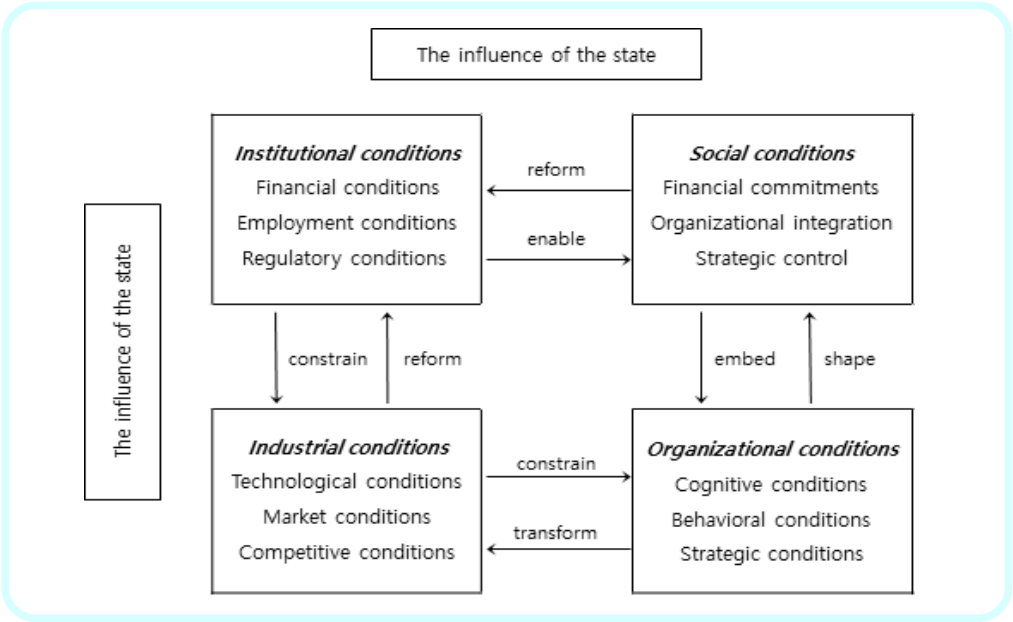
Cognitive conditions refer to the cumulative knowledge and available skill base on which a firm can expect to develop and utilize its productive resources (Lazonick, 2001). When it comes to sources of economic rents in the context of East Asian economies, the ability of a firm to adopt and accumulate knowledge and accompanying organizational learning capability have usually been cited as main dual ingredients. We will see then the path of the CDMA-based knowledge capability building differ from other paths (for example, automobiles, DRAMs, etc.). *Behavioral conditions* refer to the set of incentives existing within the organization that can motivate employees to use their knowledge and skills to develop and utilize productive resources (Lazonick, 2001). We examine the internal incentive mechanisms (or lack thereof) present to stimulate and encourage innovative activity among Korean employees in the emerging high-tech industry. *Strategic conditions* refer to the structure of control within the firm over the allocation of financial, physical and human resources (Lazonick, 2001). We probe the key decision-making processes of Korean business organizations directly involved in the successful performance of the CDMA-technology sector.

According to Lazonick (2001), embodying these organizational conditions is a hierarchical and functional division of labor, which is itself influenced by the combination of industrial and institutional conditions. He also highlights that strategic conditions determine the response to change in competitive conditions as to whether to react innovatively or adaptively. Executing an innovative strategy to transform technological and market (industrial) conditions entails strategic choice concerning whose knowledge and skills will be developed and utilized (thereby reshaping cognitive conditions), and what incentives will be offered to motivate those selected to cooperate in the pursuit of organizational goals (thereby reshaping behavioral conditions). Apparently, what Lazonick attempts to demonstrate is that a firm does not evolve independently of institutional and industrial environments where it operates and, equally significantly, that the firm is not just a passive agent influenced by outside forces but it can also change those conditions by generating innovation, and to a lesser extent by challenging prevailing practices of the society where it belongs.

4. Social Conditions of Innovation Firm

The need for *financial commitment,* as a social condition for innovative firm, derives from the *cumulative* nature of the innovation process, which in turn implies a sufficient period

Fig. 1. Social Conditions of an Innovative Firm



of time is entailed to earn a corresponding financial return. In this light, given the financial requirements of innovation process, we need to address the question of how institutions and organizations combine to provide the requisite financial commitment. *organizational integration*, as a social condition for innovative firm, is required because innovation is an innately collective process. Then it raises the question as to how institutions and organizations combine to create the necessary incentives for organizational learning. As a social condition for innovative firm, the need for *strategic control* derives directly form the *uncertain* character of the innovation process. Hence, we need to consider how strategic decision-makers, who have the ability to use control over financial commitment and organizational integration, attempt innovative transformations of technologies and markets (Lazonick, 2001) (see Fig. 1).

Ⅲ. Korean CDMA Case: Government as Visible Hands?

In the application of the conceptual framework constructed above, a special attention will be paid to the nature of government influences in Korea's economic affairs specifically focusing on the mobile telecom business coupled with rationales behind them. The influence exerted by the state can be critical, particularly in the development process of the NIEs, like Korea, where full-fledged market mechanisms of any neo-classical sense were near absent at the early stages of industrialisation (Chung Gil-Young and Shin Ho-Sang, 2019; Park Seok-Ho, 2020). The state itself has been an active agent in the management of the both macro/micro economy. There is a body of literature within academic and policy circles that put a huge weight on the role of government intervention with respect to the phenomenal

Table 1. Mobile Communications Standards

Region	1G (analogue)	2G (digital) Cellular mobile system/ PCS	3G (multimedia)
National (regional) standards		GSM (Europe, 1992, TDMA-based) PDC (Japan, 1993, TDMA-based) ANSI-136 (US, 1993, TDMA-based) cdmaOne (US, 1995, CDMA-based)	IMT-2000 (2000) 3 main versions 1) W-CDMA (GSM evolved) 2) cdma2000 (cdmaOne evolved) 3) UWC-136 (ANSI-136 evolved)
Features	Voice only	Voice + data (< 9.6kb/s) Better voice quality More efficient use of radio spectrum	Voice + data (<2 Mb/s)
Radio technology	FDMA	TDMA (+ CDMA)	CDMA (+ TDMA)

Source: Kano (2000).

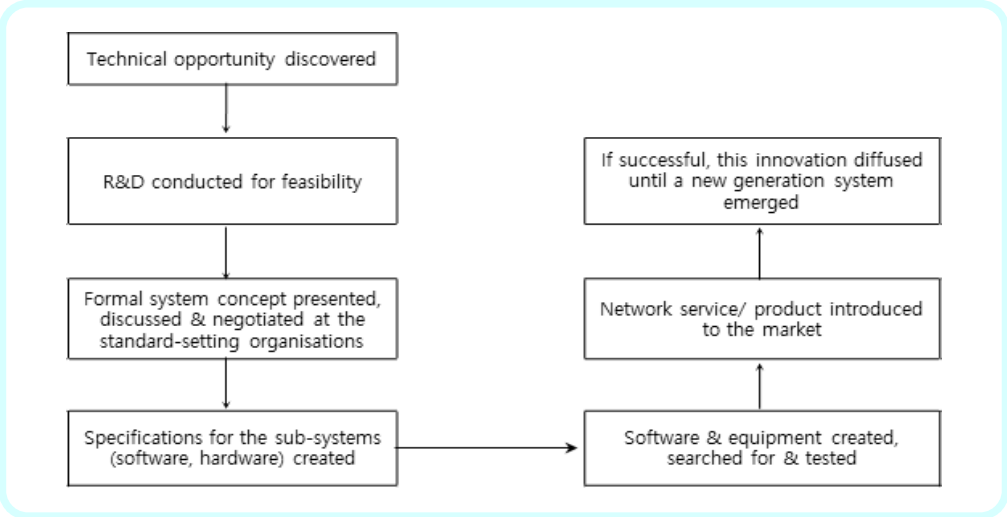
economic growth of East Asian economies during the second half of the last century. Yet this line of thinking has been controversial and is likely to continue to be so. Not surprisingly, the literature on the notion of the so-called developmental state has been attacked from the neo-liberal front over the past decades (Amsden, 1989; Jones and Sakong, 1980). Other critiques in recent years have arisen from advocates of globalization who cast a serious doubt on the ability and power of the nation state to exercise authority in the rapidly globalizing world, and also from those concerned about growing and sometimes uncontrollable power of interest-groups (such as large global corporations) within and across national borders.

Notwithstanding this debate, we try to integrate various influence of the state into the existing Lazonick's (2001) framework. Even a casual observation reveals the influence of the government, direct or indirect, being permeated in many aspects of industrial, institutional and organizational conditions of the Korean economy and its agents. In this line, it will be difficult to paint a complete picture of this case without giving a serious consideration to the political economy of Korea. In the application of the conceptual framework constructed above, a special attention will be paid to the nature of government influences in Korea's economic affairs specifically focusing on the mobile telecom business coupled with rationales behind them.

1. Industrial Conditions of the Korean Firm

Most analyses on the experience of Korean semiconductor producers (especially, memory chip sector) focus on the characteristics of technology competence (i.e., 64kDRAM, 128k DRAM, 256kDRAM, 1MDRAM, etc.). Comparing the technological aspects, some degree of affinity clearly exists between them: that is, the predictable and continuous nature of the di-

Fig. 2. The Continuous and Predictable Process of Systemic Innovation in Mobile Telecommunications



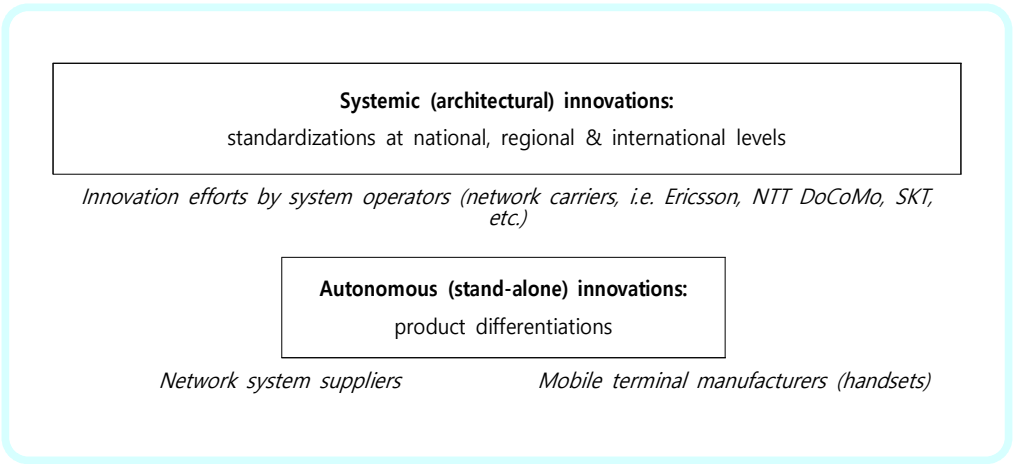
Source: Kano (2000).

rection of both technological trajectories shifting toward enhancing capacity of memory and transmission, respectably. Importantly, a major difference is expressed in the network properties of telecommunications, which is one of most salient features of the technologies embodied in the mobile telecom sector. In mobile communications industries, an overarching system framework (systemic innovation) is innovated at certain intervals through standardization processes with a view to establishing successive generations of future standards (Godoe, 2000) (See Table 1).

As Kano (2000) notes, the standardization processes prompt synchronization of sporadic and uncoordinated innovations that are taking place at numerous R&D centers, leading to an approximation of a wave of creative destruction. Once standards come into being, stand-alone incremental innovations (autonomous innovations) can be undertaken independently within the specifications prescribed (Kano, 2000) (See Fig. 2). Equipment manufactures' effort at differentiating their products in terms of design, performance and functions within certain standards illustrate this point (See Fig. 3).

Within IO literature on economic effects of standards, disagreement arises as to the relative efficiency of government intervention (i.e. the role of EU in establishing a single standard, GSM, in Europe) vs. market mechanisms (i.e. multiple standards in the US) in the selection of industrial standards (Shapiro, Carl and Varian, 1998). Proponents of government intervention argue that the sooner a single standard is established, more customers will benefit from the reduced market uncertainty and lower costs of the products that are based on the standard (Gruber and Verboven, 2001). Subsequently, the government has a positive role to play in increasing future product demand in the market by pushing through a single standard, thereby motivating businesses to act on this optimistic scenario. Yet, the extent

Fig. 3. Two Types of Innovation in Mobile Telecommunications



to which the reality of Europe's GSM as the de facto global standard (having the largest market share) in the digital mobile phone market is attributable to the role of EU in the standard-setting process still remains to be discussed.

1.1. Technological Conditions

When the industry and the government considered the development of the cellular phone system, the analogue system was dominant in the USA, and the TDMA-based GSM system was the dominant system in Europe. However, the MIC (Ministry of Information and Telecommunication) paid special attention to the emerging CDMA technology, which is claimed to be more efficient in radio spectrum utilization and better and more secure in voice transmission. Thus, despite great uncertainty over the development of the world's first CDMA system, and resulting strong reservations expressed by the carriers and equipment manufacturers, the Ministry decided to go along with the CDMA. The logical inference from the arguments on network externality and the importance of winning the standard war is that firms who create the winning standards are most likely to reap disproportionately large benefits through expansion of its market share (Shapiro, Carl and Varian, 1998). Then, the fact that Korean firms have been able to gain substantial rewards both at home and overseas markets from their venture into the CDMA technology is quite puzzling. A possible explanation for this is related to the economic argument of the first-mover advantage. That is, once the expected gains from being the first to market were perceived large, firms started to intensify their R&D efforts (although CDMA core technology is proprietary technology owned by a US firm, Qualcomm, SK Telecom is the first company succeeded in commercializing digital mobile phones based on CDMA). However, following industry- or product cycle theory (Vernon, 1966) based catch-up explanations by latecomer firms, emerging technology in-

dustries, like the mobile phone sector, do not provide the latecomers with sufficient incentives for intensive R&D effort. In this case, however, the high technological risks (measured by the probability of realisation of R&D input into R&D output) were shared by the government-led R&D consortium. And there were existing avenues for accessing foreign technologies (the possibility of buying a core technology from a foreign company for the commercialisation of CDMA-based products) even at the preliminary stage, thereby further mitigating the perceived technological risk. Insofar as the implication for latecomers of Perez and Soete's (1988) argument that every country is a beginner in the newly emerging techno-economic paradigm is the possibility of leapfrogging, it also makes an economic sense to create a path in the hitherto unexplored CDMA territory. Anecdotal evidence is in support of this revealing that one of the main rationales behind the government's decision to adopt a CDMA-based mobile system was its anxiousness to become a leader in this newly emerging technology[3]. To recap, at the early stage of innovation, the public-private partnerships in R&D functioned as a vital inducement to pursue R&D effort by contributing to the moderation risk inherent in the emerging industry. Once uncertainty was lessened with the adoption of the national standard, which also promises enhanced domestic market prospect, firms started to accelerate their R&D efforts in search for first-mover advantages. Throughout this process, the government research institute (ETRI) continued to offer support by providing ancillary research aids. In the mobile communications industry, where incremental innovations occur frequently, and product lead time to market shortens quickly, a firm's ability to create better quality products (autonomous innovations) and market them in a timely fashion grew increasingly important at the later stages.

1.2. Market Conditions

According to Chesbrough and Teece (2003), markets are inherently conservative and reactive as sources of innovations because these usually do not have a rhetoric that is capable of articulating demand for non-existent, radical innovations. They observe that even if efficient and creative in matching supply and demand, markets are usually incapable of organizing the risky, long-term and complex R&D processes entailed in creating radical innovations. When uncertainty was abound in the marketplace, there also existed little demand from the consumer side for not yet existent products. In these circumstances, domestic demand created through the adoption

3) The selection of CDMA technology over the *de facto* GSM standard stirred a flurry of controversies at that time due to the obvious disadvantages felt by the carriers and equipment manufacturers. Although the government pronounced its reason based on the technical superiority of CDMA over TDMA in terms of use of radio spectrum and other factors, it has been alleged in several news articles that the US pressure on the government served as an important factor. Core CDMA technology supplier, Qualcomm, is a San Diego-based US firm that used to have a highest market share in the CDMA handsets in alliance with Sony.

of a single standard helped diminish market uncertainty, and at the same time provided an economic rationale for firms to make substantial investments in the R&D and manufacturing infrastructure required. Since the domestic demand was growing large enough to justify heavy investments, the selection of a standard that was not the dominant global standard did not necessarily disadvantage domestic firms. As the market reached its peak, in order to extract maximum economic rents possible from the past investments, domestic producers began to turn their eyes into overseas markets. The government's strong inclination towards export initiatives was another factor at work[4]. At first sight, entry into global markets that are dominated by the European standard could have been considered as an enormous obstacle to domestic producers. Yet, Korean equipment manufacturers were able to enter the markets, where there exist multiple standards (i.e. the US, Australia, Canada, etc.) and possibilities of the existence of multiple standards (usually developing countries like China, Vietnam, Mongolia, etc.). Counterfactually speaking, if Korean firms followed the then already developed GSM standard, they would not have been able to successfully compete with European leaders simply because they would have lagged far behind them in terms of technological capability.

1.3. Competitive Conditions

The need to harness economies of scale in order to justify large sunk costs incurred in the facility and technology investment at the initial phase and high marketing expenses to promote brand image thereafter worked as inhibitingly high entry barriers. The leading global handset manufacturers remain predominantly European (i.e., Nokia, Ericsson, Siemens, and Alcartel), except for Motorola (US), thanks to the early development GSM standard. Samsung was the leading CDMA handset manufacturer followed by another Korean firm, LG.[5] Inter-firm alliances have

4) The MIC announced an ambitious project to make CDMA products the country's second biggest export, after semiconductors by 2005. The projected export target was $35 billion, making up 12% of all exports ($7.4 billion, or 4.7% of total exports in 2000). By 2005, the government planned to occupy 50% of the world's CDMA and cdma2000 mode IMT-2000 (CDMA evolved) handset markets, 30% of the system market, and 10% of the GSM and W-CDMA mode IMT-2000 (TDMA-evolved) handset markets. The project also included the establishment of the Asia-Pacific CDMA Belt, comprising South Korea, China, Mongolia, Vietnam, the US and Canada.

5) LG Electronics is the 2nd largest handset manufacturer in Korea and LG Telecom (also a subsidiary of the LG Group, another largest Korean chaebol) is the 3rd largest wireless network carrier (a PCS operator) in Korea after SK Telecom (the flagship company of the SK Group), KT Freetel (a subsidiary of Korean Telecom, which is the largest telecom company with largest market share in fixed lines and broadband Internet businesses). KT is a privatized company owned 52% by the Korean government and the rest by foreign capital. After early excess competition among five carriers, the mobile telecom industry has been restructured into three main players with the smallest two, Shinseki and Hansol PCS, being

been often forged between network operators and equipment manufactures with a view to winning the standard war (i.e. the coalition formed between NTT DoCoMo and Ericsson for pushing through W-CDMA as the 3G standard). As the ability of Korean handset producers to satisfactorily appropriate from growing market shares was being under intensifying strains due to seemingly unfair licensing terms originally arranged by the supplier of proprietary technology, Qualcomm[6], their incentive to internalise the core technology was being augmented.

2. Institutional Conditions of the Korean Firm

2.1. Financial Conditions

In the wake of the financial crisis that hit the country severely during the years of 1997 and 1998, we have seen the financial system undergoing several waves of reform with very little certainty as to its direction. While some of researchers place a heavy accent on the significance of reciprocal subsidy between the government and the chaebol during early decades of the development process (Kim Seok-Ran, 1998), the ability of the chaebol to finance expensive projects through the internal capital market (retained earnings) is an also important aspect to chaebol financing. For example, rigid growth in the memory chip market dominance enabled Samsung to inject an enormous cash flow into the large-scale in-house R&D. Added to this, cross-subsidization is also a widely-held practice among chaebol companies, which has been possible due to its unique governing structure (a loose constellation of companies across diverse industries with an element of common ownership by family members). Other sources of financing are foreign credits and syndicated loans that often come with preferable terms. Notably, recent years have seen an increasing trend toward utilizing capital markets on the part of the chaebol as well as other firms. However, seemingly untransparent disclosure practice of the chaebol, amongst other factors, often undermines confidence among many investors, especially foreign investors. Related to this, it is sometimes reported in the popular press as to difficulties encountered by foreign investors entering the Korean market due to strong cultural resistance from the management, labor, and sometimes even from the public. Protracted negotiations between a US giant carmaker (GM) and a failing Korean automaker (Daewoo Motor), and between a financially distressed Korean chip-maker (Hynix) and a US chipmaker (Micron) in combination with strong resistance from the union

consolidated into SKT and KTF, respectively. Then the government awarded 3G licenses to SK and KTF for W-CDMA and to LG for cdma2000. Compared to the excessive amounts of licensing fee paid by European carriers, the licensing terms for 3G were said to be quite favorable, thus positively affecting the balance sheets of the companies.

6) Qualcomm collected 5 to 6% of sales in royalties from Samsung and $2 billion has been funneled to Qualcomm by the four Korean CDMA phone producers until 2000.

illustrate this point.

2.2. Employment Conditions

Facing with the growing strategic importance of the high-tech industry to the country from the 1980s onwards, the government designated a selective number of universities as scientific research-based graduate schools between the 1980s and the 1990s. This has proved measurably successful since they have provided the high-tech sector with a large pool of professionally trained scientists and engineers (Kim Lin-Su, 1999). On the supply-side, the government adopted policy measures designed to provide incentives such as exemption from the duty of military service upon entering science graduate institutes. Foreign trained, particularly, US-trained scientists and engineers have been contributing to the rapid learning of many high-tech based industries (Kim Lin-Su, 1999). For example, Samsung has been renowned for its recruiting of high- caliber scientists and engineers trained in the US and effective use of its outpost in Silicon Valley in transferring technology through cross-training, transfer of personnel, and joint R&Ds. Saxenian and Hsu (2001) emphasize the role played by a community of US-trained Taiwanese scientists and engineers of Silicon Valley and the venture valley of Taiwan, Hsinchu Taipei region, in the industrial upgrading of the region. Recently, the government has relaxed its regulatory control in the labor market to tackle the problem of increasing shortages of the IT skilled labor force as the country's IT sector is experiencing exponential growth. In the final analysis, the Korean labor market has been traditionally immobile mainly due to life-time employment practice, similar to that in Japan. While it is being acknowledged that this stability coupled with cultural values of loyalty towards authority and trust-based reciprocal relationships is one of the key contributing factors in expanding the knowledge base of firms, in the west inflexible labor market is considered as stigmatising the economy as it acts as much of a hurdle to the creation of innovations by stifling entrepreneurial creativity. The mushrooming Internet start-up firms in recent years with some financial back-ups from venture capitalists partly imply the shifting labor market trend towards flexibility and mobility.

2.3. Regulatory Conditions

Our focus here is on those aspects closely linked to the mobile telecom sector; that is, the nature of regulatory policy framework in the sector with reference to the government's role in liberalization and the intellectual property regime. The role of the government as a regulator extends from awarding licenses to mobile phone service providers to overseeing anticompetitive behavior to safeguard the public interests. The telecommunications industry is where comprehensive and detailed service regulations have been imposed on, and this pattern remained intact even after the privatization and liberalization of the industry. This renders the decision-making processes within the telecom sector fundamentally political albeit with considerable economic reasoning behind. Hong Sung-Gul (1998) documents at length the intrinsically political nature of the recent liberalization process of the telecom sector with an emphasis on the pivotal

and decisive parts played by bureaucrats of the MIC. He points that the Korean government took the initiative to direct the liberalization process from the very beginning, and exercised full discretion in shaping the market structure of the industry[7]. He also offers a detailed explanation of how the enhanced power base of the MIC in inter-departmental politics came about after a series of government reorganizations and contributed to the swift reform process. With respect to intellectual property rights (IPR), innovation literature argues that the tight intellectual property framework is necessary since it allows innovators to appropriate from their endeavors (Hong Sung-Gul, 1998). Yet, Lee Keun and Lim Chai-Sung (2001) point that latecomers do not necessarily benefit from the tight appropriability regime, since their pre-eminent concern is to catch-up by assimilating and adapting to the existing technology by means of imitating. As South Korea emerges as an IT strong nation, the increasing importance to tighten local IPR regime has prompted the MIC to take more active initiatives, as evidenced by the creation of the government committee in charge of overseeing violations of IPRs.

3. Social Conditions of the Korean Firm

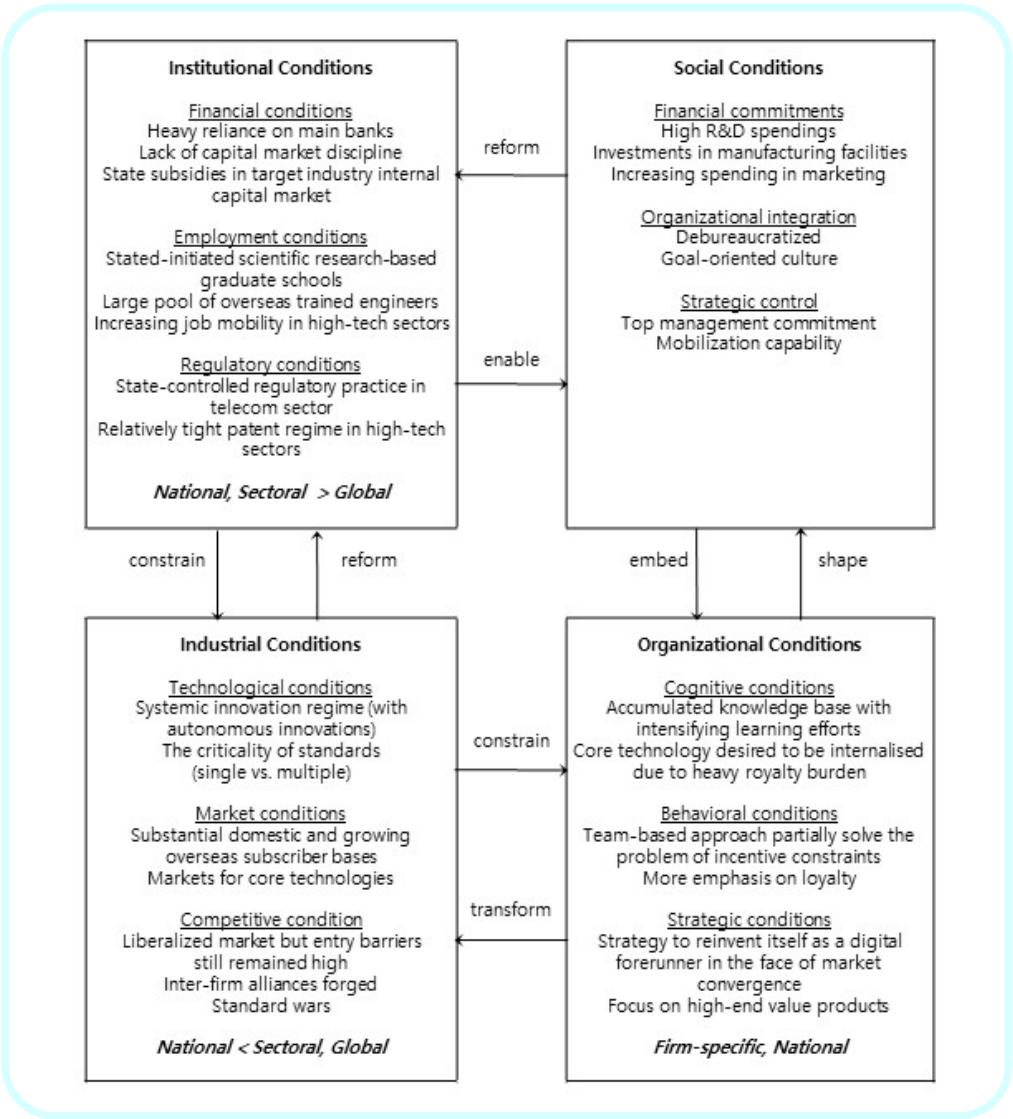
This section depicts the extent to which the organizational conditions of Samsung reflect the prevailing financial, employment and regulatory conditions of the Korean economy and work in tandem with those institutions to create the social conditions that enable it to transform the existing technological and market conditions by generating innovation.

Insofar as Samsung's market prowess can be ascribed to its technological competence, the way in which the company has been accumulating and developing its technological capability and thus knowledge is of the essence. The technological capability of a firm is considered an outcome of the interaction between its existing knowledge base and the intensity of its learning effort (Kim Lin-Su, 1999; Lee Keun and Lim Chai-Sung, 2001). In the context of latecomer firms, absorptive capacity is often said to be the key to the firm's accumulation of the existing knowledge base since latecomers' technological capability is built mostly through imitating foreign technologies adopted. One of the techniques frequently utilized to broaden absorptive capacity of Korean firms is what is termed as crisis creation, which is taken to imply a latecomer firm's intensifying effort to accelerate learning by generating enormous energy from organizational members (Kim Lin-Su, 1999). Moreover, a mastery of technological learning at one stage sets the avenue for the subsequent technological learning, in the case of Samsung, say, from consumer electronics to semiconductor to CDMA. For example, the continuing increase of market shares in the DRAM market is supported by the sustained increase of technological capabilities of consumer electronics.

Unlike the case of memory chips, which exhibit a commodity like property, the end product characteristics of handsets similar to digital consumer electrics demand of the firm to capitalize on brand assets as the amount of

7) For example, the Ministry decided how many entries, how strong these entrants grow to effectively compete with the incumbent carriers, and tried to shape the industrial structure by influencing the way in which companies were engaged in competition through restriction of choices available for competitive strategies (Hong Sung-Gul, 1999).

Fig. 4. Social Conditions of the Innovative Firm in Korea



economic rents available to appropriate from innovation hinges equally on its position in terms of complementary assets such as marketing capability. The company's focus on the more profitable high-end segments of the mobile phone market, and its accelerated spending in marketing endeavor reflect the strategic determination and financial commitment by the top management. In sum, strategic choice made to move swiftly into the digital market supported by corresponding financial commitment enabled the company to utilize its accumulated technological knowledge in search of innovative products, coupled with continuous pursuit for further learning.

In parallel, company-wide efforts have been

made at Samsung in an attempt to rationalize organizational routines more in harmony with the new requirements of dynamic technological and market environments. For example, Samsung has enjoyed the benefits reaped from the success of organizational restructurings that was initiated in the late 1990s by the then newly inaugurated CEO, who began his career at Samsung as a graduate trainee 20 years ago. By debureacratizing internal decision-making structures, Samsung's organizational efficiency was claimed to be improving vastly, as partly testified to by all-time high customer satisfaction rates and its slogan of paperless office. Furthermore, the formation of project teams was widely practised at the company.

Of particular importance to latecomers is the ability to access the external knowledge base and markets. Kock and Guillén (2001) call this the capability to leverage contacts, and highlight its importance especially at the early stage of the chaebol formation. The effective and efficient project execution capability for organizing necessary manufacturing arrangements (Amsden and Hikino, 1994) turned out to be also critical since sources of economic rents reside in the ability to devote a timely financial resources in manufacturing facilities. To put differently, the organizational structure and corporate governance of the chaebol allows for a swift mobilisation of resources, financial and human, to undertake the innovative project. Recent years, however, have seen highly publicized and politicized movements in demand of a more transparent management and partial dissolution of the family owned structure of the chaebol, both from political and civil fronts (See Fig. 4).

Ⅳ. Conclusion

This paper has sought to provide a contextual understanding of the success of the Korean mobile handset maker, Samsung, based on Lazonick's (2001) theory of social conditions of innovative enterprise. Integrated into this perspective is the influence of the state as a both direct and indirect agent in the economic governance of the Korean mobile telecommunication industry. We started our examination by looking at sector-specific characteristics of the industrial conditions of the mobile communications industry, and illustrated how technological and market conditions work together to constrain or expand the scope of choices available to firms. By so doing, we have demonstrated how firms, embedded in the existing institutional conditions, are also enabled to generate innovation through a combination of financial commitment, organizational integration and strategic control, each of which reflects their prevailing organizational conditions.

This study is distinguished from the extant studies on the evolutionary path of latecomer firms in industrializing economies in that it has attempted to reconceptualize the firm as an outcome of dynamic interactions between itself and institutional environments where it is embedded. Based on this reconceptualization of the firm as a social construct, we have set out to take account of the industrial, institutional and organizational conditions of the firm that are likely to enable and inhibit its ability and incentive to generate innovations. Although this paper is intended to shed light on one specific case, Lazonick's theory seems general enough to be applied to other empirical settings. That way, the capacity of Lazonick's

framework as a genuine alternative to other dominant paradigms can be evaluated further.

The limitations of this study lies in its relative neglect of the issues associated with the emergence of varying forms of organization within or across the boundaries of the industry, particularly, in the environments characterized by high velocity and fluidity. Narrowing our focus on one single organizational form (the chaebol) most prevalent in the country, we might have run the risk of conveying a static view of the Korean economy and the mode of its economic governance. Yet, ICT sector is where a rapidly growing number of start-up firms have emerged in Korea. There certainly exist numerous small players in the mobile telecom business, and some are rapidly expanding with solid ground of innovative technologies while others are going under due to short-term financial difficulties, the inadequacy of business model, lack of management skills and complementary assets, etc. This study will benefit by further research on the nature of the small firms (both successful and failing) as an alternative organizational form to the entrenched large conglomerate, the social conditions of innovation for these firms, and their impact on incumbents as well as industry structure.

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