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# Study on the Innovation of South Korean Mobile Telecommunication Businesses: An Institutional Intervention Perspective

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## ABSTRACT

The objective of our research is to understand the innovation pattern of South Korean mobile telecommunication service. In the paper, the case study about SK Telecom was conducted in order to achieve the goal. Especially, the institutional intervention model was adopted as a conceptual map. Based on our qualitative research, we captured the South Korean government did two major roles, which did drive radical innovation. The role of a navigator and the role of a coordinator were investigated under the research methodology, which was framed by Benbasat et al. (1987). The findings of the research contribute to understand roles of the government in the perspective of the institutional intervention model.

## Keywords (Required)

Telecommunication industry, Korean market, innovation pattern, government intervention

## INTRODUCTION

Academic researchers and practitioners have recognized that innovation is an important activity of corporate renewal (Dougherty, 1992; Danneels, 2002). A mutual fit between firm strategy and given business environments has been suggested as one of the major factors to determine innovation performance (Anderson and Zeithaml, 1984). One of the intriguing findings relating to innovation based on information technology may be the fact that there are peculiar characteristics with the innovation pattern in developing nations (Shih et al., 2008). The governments of developing nations have shown an outstanding institutional role in information technology innovation (Lee et al., 2003). In this study, the institutional intervention model of IT innovation (King et al., 1994) was adopted to study the innovation pattern of Korean mobile telecommunication businesses. The empirical study was conducted using the case study methodology suggested by Benbasat and Mead (1987). After briefly discussing the theoretical background, the analysis of the single case, which mainly focuses on SK Telecom, the leading mobile telecommunication service company in Korea, is presented. Finally, the paper concludes with a discussion and implications.

## THE INSTITUTIONAL INTERVENTION MODEL OF IT INNOVATION

Diffusion depicts “the spread of the capacity to produce and/or use an innovation” (King et al., 1994). Innovation diffusion has been regarded as typical innovative movement with regard to information technology (Swanson and Ramiller, 2004; Ahuja and Thatcher, 2005; Sherif et al., 2006). In particular, *internalization* of innovative features from new information technology may be indispensable for a firm to achieve strategic goals (Swanson and Ramiller, 2004). Diffusion does not

simply mean that some pieces of digital equipment are replaced with new ones, but rather it means a change of assimilation mechanism to a new strategic environment. All related agents – including organization members, customers, and government officers – must also take for granted change by diffusion of new IT in the digital economy (Avgerou and McGrath, 2007). Effectiveness of an innovation process can be determined by design capability of IT diffusion; therefore, it may be true that a planned innovation by a governing institution is crucial for a successful outcome (Nambisan et al., 1999).

	<b>Supply Push</b>	<b>Demand Pull</b>
<b>Influence</b>	<b>I</b>	<b>II</b>
<b>Regulation</b>	<b>III</b>	<b>IV</b>

**Figure 1. Dimension of Institutional Intervention (Source: King et al., 1994, p. 151)**

An institution is, “any standing, social entity that exerts influence and regulation over other social entities as a persistent feature of social life, outlasting the social entities and surviving upheaval in the social order.” (Hughes, 1939; King et al., 1994). Figure 1 shows the dimensions of institutional intervention, which was suggested by King et al., (1994, p. 151). Each role of the institutions that form the dimensions is explained as follows:

- *Influence*: The exerting of persuasive control over the practices, rules, and belief systems of those under the institutions’ sway.
- *Regulation*: The direct or indirect intervention in behavior of those under the institution’s influence, with the specific objective of modifying that behavior through sanction or other affirmative means.

Furthermore, King et al. viewed that two driving forces, or triggers, enable organizations to achieve innovation. Each trigger of innovation that forms the dimensions is described as follows:

- *Supply-push force*: The production of the innovative product or process itself.
- *Demand-pull force*: The willingness of potential users to use the innovation.

With combinations of four elements, various forms of institutional actions can be explained with regard to innovation processes – each action can be classified from I to IV, as Figure 1 depicts. In this paper, the elements are basically adopted without modification, except for the demand-pull force. In the context of service industry, coproduction between customers and service providers has been argued as an important factor to create a distinctive value stream (Bendapudi and Leone, 2003). As a digital service is capable of providing customers with more opportunities to participate in new service design, value co-creation or on-demand traits of service innovation should be also considered (Cullen, 2008). Therefore, the modified explanation for the demand-pull force is used as follows:

- (*Modification*) *Demand-pull force*: The willingness of potential users to conduct value co-creation.

**EMPIRICAL STUDY METHODOLOGY**

**Case study strategy to service innovation in the telecommunication businesses**

The phenomenon of service innovation in the mobile telecommunication business cannot be easily studied outside of its natural setting. As a service can be copied quickly, after one firm has proven its opportunity for success (Atuahene-Gima, 1996), each event should be treated as a contemporary historical fact. Also, service innovation is a naturally complex phenomenon that can be understood by systematic thinking and with a rich context surrounding it; therefore, control or manipulation of subjects is not necessarily required. Based on the nature of data for this study, we chose the case study methodology suggested by Benbasat et al. (1987) to investigate the phenomenon.

## Investigation questions

To set up analytical directions with data sources, specific investigation questions were prepared prior to the investigation to select a unit of analysis. The basic assumption of the study is that the Korean government played institutional roles in terms of *influence force* and/or *regulation force*. In general, the Korean government invested in the information technology industry to enhance national capability to export value added products (Park and Bae, 1996). For example, Korean electronics companies, such as Samsung Electronics, have been known for successful DRAM manufacturers. The government helped the Korean companies to obtain technical licenses from other high-tech companies, mainly companies from the United States. Furthermore, research and development efforts were controlled by the government sponsored institutes. Its hallmark is that innovation was concentrated on radically improving the efficiency and effectiveness of producing IT products. Therefore, The research focus here is whether the pattern of interventions by the Korean government was different from the cases of previous IT innovation. The following investigation question needs to be answered:

- *Question 1: How did the South Korean government influence the innovation of the Korean mobile telecommunication companies?*

The traditional view of innovation and growth in the developing nations indicates that production factors, such as low labor costs or/and natural resources, are keys to succeed against global competition (Enos, 1962). Two major assumptions can be found in the traditional view: 1) production competency is a firm specific asset of successful companies in developing nations, and 2) firms in developing nations have remote demand because of an inferior situation in the domestic market. These assumptions should be carefully analyzed since services require co-production processes (Bendapudi and Leone, 2003). The human interactive service has four major characteristics: 1) intangibility, 2) inseparability, 3) heterogeneity and 4) perishability (Lovelock, 1983). These characteristics limit the performance of the service to within the competency of the employees to solve customer problems. The telecommunication service requires less human intervention, but service competencies are directly constrained by its rooted technology. In other words, the service experiences of customers can be enhanced or limited by the affordability of technology (Ramasway, 2006). Therefore, it may be reasonable to consider the pattern of technology evolution in the Korean mobile telecommunication industry, service features based on rooted technology and finally the role of the government on the interplay between technology and service. The following investigation question guides the analysis of the case study in the research.

- *Question 2: Why was information technology crucial to the pattern of the institutional intervention by the South Korean government?*

## Unit of analysis

The unit of analysis should be decided prior to investigating selected sites (Benbasat et al., 1987; Dubé and Paré, 2003). The investigation questions cover the level of institutions. The Korean government and business entities (including companies and research institutes) are the main research subjects. This research assumed that each institute may have two-way relationships, individually. If the government announces a new act to place influence on the companies, the effects may be different to each other. In other words, the impact of institutional intervention on the industry can be measured by synthesizing distinct impacts on specific companies. Also, companies may have mutual relationships. Measurable outcomes may come from the dynamics of these relationships. Additionally, the case study began with the assumption of a going concern. The Korean presidential election is conducted every five years. The data range of the study is mainly from the early 1990s to 2008. In total, four distinct governments could be subjects to study; however, the government was treated as a single going concern like other institutions, the companies and the research institutes. Since the fundamental objective to intervene in the mobile telecommunication business has not changed significantly – the objective is consistently to develop and promote information technology industries – a single metric space of dynamics can be assumed.

## Single-case of SK Telecom and site selection

Multiple-cases may be reasonable to draw a more general conclusion, but a single case can be useful in providing specific conditions (Yin, 1984; Benbasat et al., 1987; Dubé and Paré, 2003). The innovation of the Korean mobile telecommunication business is revelatory. There was no capability to manufacture a high-tech mobile phone or related device in the early 1990s, however South Korea was taken as a remarkable test market of fast-moving, mobile, add-on services, such as DMB (Digital Multimedia Broadcasting), wired/wireless internet integrated services and broadband, mobile internet, in the early 2000s. Through the radical movement of the Korean mobile telecommunication industry, SK Telecom, the leading mobile communication provider in South Korea, led the innovation. This fact satisfies the condition of adopting a single case strategy, in that SK Telecom represents a critical case for testing previously formulated theories.

## Data collection method

Typically, multiple data collection methods are utilized in case research with a purpose of supporting the research findings (Benbasat et al., 1987). As Table 1 shows, multiple data sources were used. Since many valuable secondary data sources are scattered in various types of periodical, reports, online documents and so on, sets of data sources were grouped according to each investigation question.

Investigation Question	Data Source Type	Data Source Reference
How did the South Korean government influence the innovation of the Korean mobile telecommunication companies?	<ul style="list-style-type: none"> <li>◆ Special reports</li> <li>◆ Research essay</li> <li>◆ Web database</li> <li>◆ Patent material</li> </ul>	<ul style="list-style-type: none"> <li>◆ Korean Information Society Development Institute</li> <li>◆ Electronics and Telecommunications Research Institute</li> <li>◆ Institute for Information Technology Advancement</li> <li>◆ The Korean Intellectual Property Office</li> <li>◆ Korea Knowledge Portal (<a href="http://www.knowledge.go.kr">www.knowledge.go.kr</a>)</li> <li>◆ Song (2005)</li> </ul>
Why was information technology crucial to the pattern of the institutional intervention by the South Korean government?	<ul style="list-style-type: none"> <li>◆ Daily business news</li> <li>◆ Business cases</li> <li>◆ IT news</li> <li>◆ Company reports</li> <li>◆ Web database</li> </ul>	<ul style="list-style-type: none"> <li>◆ The Korea Economic Daily</li> <li>◆ Kim and Lee (2005)</li> <li>◆ Park and Kim (2007)</li> <li>◆ Electronic Times Internet</li> <li>◆ Annual fiscal reports (Samsung Electronics)</li> </ul>

**Table 1. . Source for Data Collection**

## ANALYSIS RESULTS

### The role of a navigator

A car navigator provides information about blocks and turning points so that the driver may reduce the risk that comes from unexpected events. The other important function of the navigator is to give the driver route information. The information affects the decisions of the driver who wants to get the optimal outcome. As a navigator, the South Korean government provided essential information about mobile telecommunication businesses so that SK Telecom could reduce risks.

Historical facts showed that SK Telecom had prepared its own launching of a mobile telecommunication service. The SK Group established a base camp in the US to study the trends of mobile telecommunication, in 1986. Also, small investments to telecommunication service companies – such as Tennessee RSA and Yukronics – were authorized to gather experiences about telecommunication management. As the Korean government announced its plan to restructure the telecommunication industry, in 1990, the SK Group integrated distributed organizations relating to telecommunication businesses, and set up a business launching team. Jonghyun Choi, the entrepreneur of the SK Group, planned to acquire a mobile telecommunication service license from the government, but this plan was disrupted by political conflict among shareholders.

Meanwhile, the Ministry of Information and Communication planned and executed integrated projects to spawn the Korean mobile communication industry, in 1991. There were two basic options: the first option was to use analog mobile phone systems that were already implemented, but not successful in South Korea, and the second option was to introduce or develop a digital mobile phone system, an entirely new concept to the Korean market. At that time, the mobile phone industry was dominated by companies from developed nations, like the United States and Japan – the mobile phone market was dominated by Motorola, who had an approximate 42% share of the Korean market. Accepting a proven standard of mobile telecommunication meant importing infrastructure systems and devices to implement mobile telecommunication services. As the Korean automobile industry spawned related sets of businesses, the Korean government, however, wanted to obtain the same result by executing its new plan for mobile telecommunication. Therefore, the strategic choice was to invest huge amounts in CDMA technology, which was a new standard of mobile telecommunication made by Qualcomm. The CDMA technology had not been proven in terms of commercialization. Even though the technical foundation was devised, other technologies to implement it should be researched and developed.

Korea Mobile Communication (i.e., KMC) was a public enterprise directly controlled by the Korean government. KMC introduced the first mobile telephone service in 1984, based on AMPS (Advanced Mobile Phone Service), which was developed by AT&T. The company was the only one that had accumulated business experiences with mobile telecommunication in South Korea, until the second mobile telecommunication business license was ratified by the government. The SK Group bought KMC in 1994. Even though KMC had an undesirable organization culture to be a competitive company in itself – as a public enterprise was not strong enough to feel and sense rapid market changes, Jonghyun Choi decided to reform KMC while absorbing the knowledge embedded in KMC. It seems that the decision to acquire KMC was strongly affected by the government, although the final decision was ultimately up to Choi.

Dr. Jungwook Seo, who took charge of the CDMA project, was appointed as the new CEO of KMC in 1995. While the SK Group actively participated in the CDMA project, the company began to concentrate its efforts on Research and Development. As Figure 2 shows, SK Telecom has obtained approved patents at the speed of exponential growth. The H04 class in the International Patent Classification represents electric communication technology. 3,081 patents were included in the H04 class, which means “electric communication technique,” out of 3,649 (i.e., about 84 percent). The G06 class, which reads “computing; calculating, counting,” accounts for the remaining majority – with a total of 422 cases accounting for about 12 percent.

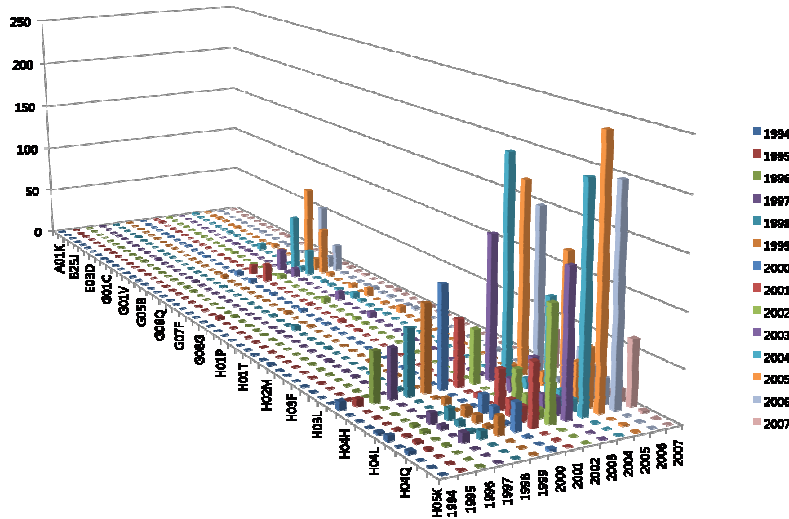


Figure 2. Approved Patents of SK Telecom (IPC and Year)

The curve regression technique was adopted to ascertain whether the longitudinal data showed growth patterns (see, Table 2). The analysis results exhibit that both classes fit well into the growth model; therefore, SK Telecom has expanded its firm-specific assets to research and develop mobile communication technology. This fact illustrates that the role of the Korean government was to ignite a new industry in the beginning, although private firms soon began to accumulate knowledge to survive by themselves.

Class	Accumulated Number	F-value(p-value)	Adjusted R <sup>2</sup>	Constant; p-value (B)	Beta; p-value (beta)
G06	422 (12%)	33.719 (0.000)	0.716	0.004 (-3.24)	0.000 (0.859)
H04	3,081 (84%)	31.182 (0.000)	0.699	0.000 (3.045)	0.000 (0.850)

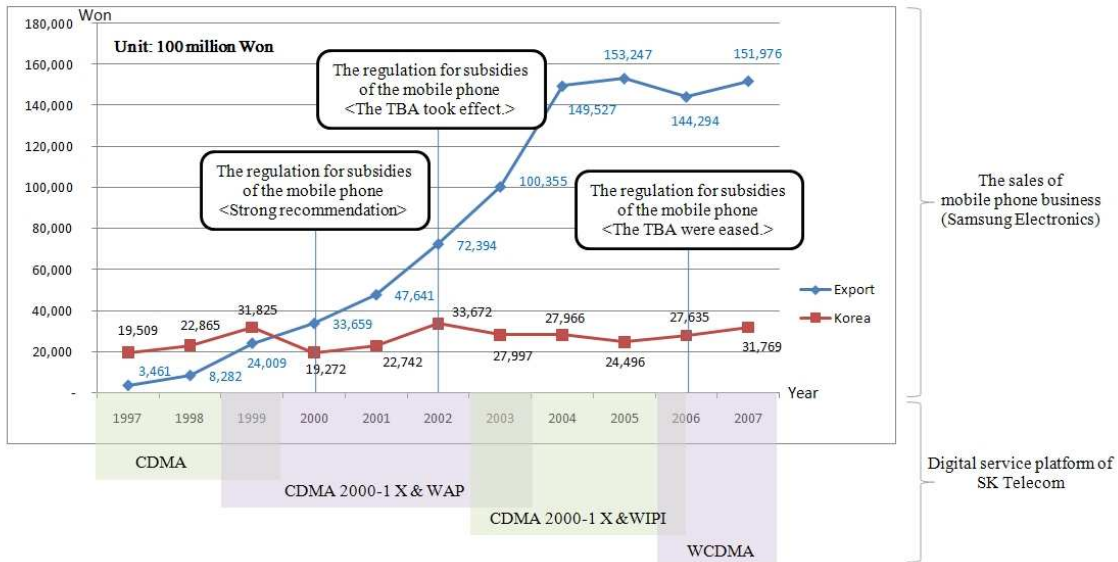
Table 2. The Result of the Curve Regression

**The role of a coordinator**

The diffusion of technology was fast. The agreement about joint development of technology between ETRI and Qualcomm was ratified in 1991. Five years later, South Korean manufacturers produced digital mobile phones that fully supported CDMA. Furthermore, two major companies –SK Telecom and Shinsaeui Telecom – rapidly expanded their market shares. Even though players in the telecommunication industry had heavily invested in the pager industry, they cannibalized pager product lines to enlarge the digital cellular phone market. In 1996, the Korean government made it clear that future investment in mobile telecommunication would focus on CDMA and the successive improvement on it.

The price to obtain mobile devices was crucial to diffusion. As soon as the commercialization of CDMA was to succeed in the market, the Korean government approved three PCS (Personal Communication Service) vendors to enter the market; a total of five players fiercely competed to take a dominant market share. The telecommunication vendors executed huge subsidies in order to lower the price of mobile phones for customers. The government suggested that the subsidy option for a mobile phone in the service agreement should be phased out by 2000 on the ground that subsidies would disrupt fair trade. With the revision of the Telecommunication Business Act in 2002, SK Telecom and other competitors were no longer able to support customers with free mobile phones. The Telecommunication Business Act temporarily halted excessive marketing

promotions, and the act seemed to be effective in protecting mobile device manufacturers, like Samsung Electronics and LG Electronics, by imposing pure prices on customers. However, as Figure 3 shows, the Korean mobile devices market quickly shifted from the domestic market to the global market after 2000.



TBA: The Telecommunication Business Act

Figure 3. The Shift of the Major Market, Service Platforms and the Way of Coordination

The Telecommunication Business Act was eased in 2006. Loyal customers of SK Telecom could save between 10~50% on high-end mobile phone lineups from Samsung Electronics. The result of the change of the act on the Korean mobile telecommunication market brought a quick shift in generations of mobile telecommunication services. As Figure 5 shows, there were subsequent shifts of service platforms. SK Telecom has expanded its business area from mobile telecommunication to mobile internet. The first challenge was to introduce n.TOP, which was the first commercially successful mobile portal in Korea. NATE then replaced the strategic position of n.TOP soon after, and WIPI (Wireless Internet Platform for Interoperability) gave opportunities for SK Telecom to expand its service areas significantly from a music store to a game publisher (see Table 3). Meanwhile, the service expansion required more advanced devices, which were equipped with a premium LCD panel, an easy keypad, sufficient flash memory and light weight. Samsung Electronics and LG Electronics could provide high-end mobile phones that sufficed these requirements, although the issue of price still remained. For example, if a customer wanted to play 3D games in GXG, he/she could have three options: 1) buying a brand new device (about 500,000 Won in 2006), 2) exchanging her device with a brand new one (about 350,000 Won in 2006) and 3) changing the service vendor (about 200 Won in 2006). LG Telecom, the third rank mobile telecommunication service vendor in Korea, announced that new LG Telecom customers could receive an Oz phone – which fully supported full-browsing, haptics and the WCDMA feature – at 10,000 Won. The price was more than one thirtieth of the original price.

Year	Brand	Description	Information Technology
1999	n.TOP	Mobile internet portal	WAP(Wireless Application Protocol) CDMA 2000-1X
2000	NATE Drive	The aftermarket telematics device embedded in the mobile phone	GPS(Global Positioning System) CDMA 2000-1 X
2001	NEMO	Digital cash	WAP
	NATE	Wired/wireless integrated mobile portal	CDMA 2000-1X
2002	MoA	Multimedia mobile advertisement service	WAP CDMA 2000-1X

	June	Mobile multimedia content service based on 3G technology	CDMA 2000-1X EV-DO
2003	June	The total number of June customers reached one million, a world first	CDMA 2000-1X EV-DO WIPI(Wireless Internet Platform for Interoperability)
2004	Melon	Wired/wireless integrated music portal	CDMA 2000-1X EV-DO WIPI MP3
2005	Mobile Bookstore	Wired/wireless integrated online bookstore	CDMA 2000-1X EV-DO WIPI NATE platform
	GXG	The mobile 3 dimensional game supporting system and its portal	CDMA 2000-1X EV-DO WIPI Mobile 3D accelerator
2006	T Login	The world's first HSDPA commercial version	HSDPA(High Speed Downlink Packet Access) WCDMA(Wideband Code Division Multiple Access)
	Gifticon	On/offline integrated gift coupon service with cellular phones	CDMA 2000-1 X EV-DO WCDMA
2007	Touch-Bookstore	The customer can read and save book information by scanning it with a WIPI standard mobile phone.	RFID(Radio Frequency Identification) WIPI
	T-money on USIM	T-money, the transportation card, can be issued and stored in the USIM card without visiting stores.	OTA (Over the Air) USIM (Universal Subscriber Identity Module)
	Touch Order	The customer performs a self-service by touching RFID readers embedded in WIPI phones in fast food restaurants.	RFID WIPI
2008	SYNC mail	BlackBerry-like service based on the 3G smart phone	Wireless data security Automatic data sync WCDMA Haptics

**Table 3. SK Telecom Brands on Service IT Platform**

In 2008, the Korean government abolished the regulation on subsidies. Like the early phase of mobile telecommunication diffusion, based on CDMA, the government fell back, allowing the service vendors to engage in free marketing competition. The major difference is that a mobile phone (or device) became a kind of necessity in the daily lives of Koreans. They watch TV programs via DMB service, find information with the 3.5G full-browsing service, scan price tags without the help of staff and complete money transfers regardless of their location. The fact that a mobile phone is a necessity means that the elasticity of demand may be considered low; therefore, reckless price competition may no longer be effective to raise the market share of each service vendor. Following the government's announcement to abolish the regulation on the subsidies, in April 2008, SK Telecom spent about 877 billion Won on subsidizing customers – which amounts to approximately 30% of total sales in the second quarter. However, this trend was not sustained. SK Telecom declared that subsidies would be reduced after the third quarter, and other competitors followed the same path as SK Telecom.

**DISCUSSION**

Lee, O'Keefe, and Yun studied a pattern of innovation in South Korea's broadband internet industry (Lee et al., 2003). They argued that the Korean government promoted planned innovation by imposing a nationwide information society movement. The deregulation and competition policies in the telecommunication sector were key drivers that enabled the planned



innovation (Singh, 2000). In line with Lee, O'Keefe and Yun (2003), our analysis shows that the government actively participated in the innovation processes of mobile telecommunication.

The first investigation question addresses how the South Korean government influenced the innovation of the Korean mobile telecommunication companies. As with the case of broadband internet service, government planning triggered intensive commitment of Korean private companies. However, SK Telecom, the leading company, gathered its own research and development competences. It has been argued that new technologies embedded in service processes only explain a small portion of service innovation (Gadrey and Gallouj, 2002). Hertog et al. (2003) argued that innovation patterns in service innovation should be understood by the evolutionary aspect of technology; that is, technology limits the boundary of service innovation. SK Telecom started its mobile telecommunication business based on the same technology foundation with other competitors. That means service innovation can be quickly imitated by others. After actualizing all the technical capability, a fierce price war may radically reduce profitability. SK Telecom took the option to develop its own firm-specific asset to develop the technical foundation of its service. In that case, the service innovation pattern was not planned by the Korean government.

In the strategic management discipline, it has been argued that innovation pattern starts from the birth of an innovative product. Product-process life cycle theory, which was established by Utterback and Abernathy (1975) and supported by Butler (1988), shows that the innovative product gives the company temporary rent to protect its profit and viability. To prosper based on the product, the company should innovate themselves to manufacture it with a competitive cost structure. The effort evokes subsequent process innovation. Unfortunately, process innovation can be easily disrupted by small differentiation by imitators; therefore, another loop of innovation pattern begins at the product innovation phase (Williams, 1983).

The second investigation question was to understand why information technology was crucial to the pattern of the institutional intervention by the South Korean government. As the findings show, the Korean government adjusted regulation policies several times, and those behaviors were associated with diffusion of new information technology. When the digital mobile phone service was initially introduced, its service area was well defined by the previous concept of analog communication. The rule of competition was to provide a high-quality voice communication service. However, SK Telecom promoted new service concepts based on IMT-2000 technical foundations. The service concept changed from voice communication to digital content delivery. The opportunities for the service business were also expanded by the radical change of information technology platforms from CDMA 2000-1X to WCDMA. The government intervention was crucial to diffuse the innovation, and the relating regulation had been modified flexibly.

The theoretical power of the innovation pattern, which has been claimed by the strategic management discipline, can be richer by considering the role of IT to design service process. With an IT based service, the standardized innovative service platform is like a spawning pool. The natural loop from product to process innovation pattern may be considered as the platform-service life cycle pattern. It should also be noted that institutional intervention can ease the risk bearing of the companies.

## CONCLUSION

This article studied the innovation pattern of South Korean mobile telecommunication businesses based on the institutional intervention model of IT innovation. The primary aim is to identify the institutional roles of the Korean government. We identified two major roles – the role of a navigator and the role of a coordinator – which were important to understand the innovation pattern. As we discussed, the innovation pattern based on IT in the digital service sector requires a new approach. This paper provides such an approach to the institutional theory, as suggested in the IS discipline, as one of the alternatives. Further research may be needed to enrich the theoretical findings of service innovation based on IT when considering various motivation factors.

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