Reciprocity of Government Restructuring/Policy Changes and the Convergent Environment in South Korea

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Abstract

This paper takes the approach that industry developments, the structure of governmental decision-making bodies, and policy responses are interdependent and mutually shaped. How ministries and regulatory bodies are designed and put together affects both their policy outlooks and managerial capabilities, in turn affecting their policy output. Governments have also consciously restructured ministries and regulators in order to promote specific policy orientations, or in response to changes in the industry. This three-way interaction is critically important to the responses of governments to the emerging broadband ecosystem. The paper examines four different restructurings in the Korean government, and argues that the identification of a governmental agency as a nodal agency was the result of a new policy orientation, and the response to a change in the industrial environment. Though no two countries are totally similar in terms of their industrial and political environments or policy needs, the paper is based on the premise that the example of South Korea has useful lessons for other countries, as a leading indicator of changes in government regulatory structures in response to convergence and the emergence of the broadband ecosystem.

Introduction

Whereas broadcasting, telecommunications and information technology were once distinct sectors with their own industry characteristics and legal frameworks, technological convergence has resulted in the merger of these sectors into one ?broadband ecosystem.? Governments everywhere are confronting the need to effectively regulate this broadband ecosystem, which does not easily fit into the traditional models of regulation.

This paper takes the approach that policy responses to environmental challenges are at least partially dependent on the structure of governmental decision-making bodies. How ministries and regulatory bodies are designed and put together affect both their policy outlooks and managerial capabilities, in turn affecting their policy output. It is thus important to study the structure of governmental decision-making bodies as they respond to technological convergence. But simultaneously, governments have also consciously restructured ministries and regulators to promote specific policy orientations, or in response to changes in the industry. This three-way interaction is thus critically important to the responses of governments to the emerging broadband ecosystem.

As governments search for operational models of regulation in this new environment, South Korea offers a leading example. Due to the faster deployment of information infrastructures and technologies in South Korea since the 1980s, the country has also confronted the opportunities and challenges of technological convergence sooner than most nations. The government?s policy responses too have been held up as an example in the literature. Accordingly, this paper uses the case study of South Korea to analyse the transformation of government decision-making structures under the challenges of the emergence of the broadband ecosystem.

Specifically, the paper will examine four different restructurings in the Korean government:

- the 1995 establishment of the Ministry of Information and Communication;
- the 2004 reforms that established the Ministry of Science and Technology as the lead ICT agency;
- the 2008 restructuring that among other things established the Korean Communication Commission; and
- the most recent 2013 reforms that created the Ministry of Science, ICT and Future Planning.

The paper argues that in each case, the identification of a governmental agency as a nodal agency was the result of a new policy orientation, and the response to an environmental change.

Though there is an extensive literature on Korean telecommunications, relatively few have examined government restructuring as a critical input into policy formation (see for example, Business Monitor International [BMI], 2014 [5]; Jung, Na, & Yoon, 2013 [6]; Larson & Park, 2014 [7]; Menon, 2011 [8]; Shin & Venkatesh, 2008 [9]; Wu, 2004 [10]). Of these, Larson and Park (2014 [7]) come closest to the purposes of this paper. However, they too examine the consequences of government restructuring on the telecommunications industry, and pay relatively less attention to the reverse relationship, namely the impact of industry changes on the structure of regulatory organisations. By examining the two-way relationship between the emergence of the broadband ecosystem and government restructuring, this paper will contribute to the literature.

The paper concludes with lessons for other countries from the South Korean example. Though no two countries are totally similar in terms of their industrial and political environments or policy needs, the paper is based on the premise that the example of South Korea has useful lessons for other countries, as a leading indicator of changes in government regulatory structures in response to convergence and the emergence of the broadband ecosystem.

Literature Review

As a nation that consistently tops the global rankings for broadband and information infrastructure deployment (OECD, 2016 [11]), South Korea?s telecommunications industry has come in for extensive scrutiny by scholars interested in deriving useful lessons for other countries and regions (Frieden, 2005 [12]; Kim & Park, 2013 [13]; Larson & Park, 2014 [7]; Menon, 2011 [8]; Shin, 2007 [14]; Shin & Kweon, 2011 [15]), as well as by think tanks and government departments.

Several factors have been identified that have contributed to Korea?s leadership in information and communication technologies:

- the tendency of Koreans to be early adopters of new technologies (Kim & Park, 2013 [13]);
- the pro-active role adopted by the Korean government toward the diffusion of broadband (Rhee, 2016 [16]; Larson & Park, 2014 [7]; Shin, 2007 [14]; Shin & Kweon, 2011 [15]);
- the close connections and cooperation between industry and government (Larson & Park, 2014 [7]; Oh & Larson, 2011 [17]) and;
- the creation of partnerships between global technology leaders and local private sector firms, with the active encouragement of the government (Jho, 2007 [18]).

This literature review concentrates on the role of government in fostering the development of the Korean broadband infrastructure, either through adopting proactive and investment-friendly telecommunications policies, or by coordinating ICT deployment through directing the efforts of chaebols, the Korean business conglomerates.

The role of the government in fostering industrial development has been studied extensively, since Chalmers Johnson?s (1982 [19]) seminal work discussed the role of Japan?s Ministry of International Trade and Industry in jump-starting that country?s miraculous post-World War II recovery. Key to the success of this model was the efforts of government to obtain willing (not-coercive) cooperation from the private sector. Johnson identifies these ?market-conforming methods? (Johnson, 1982 [19]: 318):

- the creation of government-controlled financial institutions,
- the design of investment-favourable tax policies,
- robust planning processes,
- creation of numerous consultative bodies between government and industry,
- reliance on public-private partnerships and public corporations,
- the use of ?investment budgeting? separate from the general account budget,
- sponsorship of research and development, etc.

Most of these market conforming methods have also been used by Korea in the telecommunications sector at one time or the other.

However, not all of these market-oriented approaches were in use during any one time in the evolution of the Korean telecommunications industry. On that basis, a number of phases have been identified in the evolution of the Korean telecommunications sector. In general, Larson and Park (2014 [7]) argue that a ?developmental state? that existed until the early 1980s transitioned into what they label the ?network state,? beginning from that period. They critique other scholars who argue for continuity between the two periods, arguing instead that the developmental state declined and transitioned into the network state, as a result of ?technology development, including the shift to digital mobile networks capable of broadband access, the pressure of ongoing international trade negotiations, and a shifting balance of power between the state and chaebol industries? (Larson & Park, 2014 [7]: 5). Larson and Park thus suggest that the public-private cooperation manifest in Japan persists today in Korea even though technology inevitably shaped the regulatory environment with vastly increased power of chaebol groups.

Menon (2011 [8]) examined the Broadband convergence Network (BcN) program of the Korean government, and arrived at the similar conclusion, stating that the government?s proactive role succeeded in establishing a converged national broadband network, combining the capabilities of broadcasting, telecommunications and information infrastructures. Through analysis of key documents and interviews with various decision-makers and managers in the Korean telecommunications industry, Menon found that the Korean government implemented a well-conceived three-phase plan that among other things established interconnection and net neutrality standards, created a national R&D testbed through the National Grid Project, and coordinated interactions among stakeholders. By providing an open access alternative to the non-converged legacy networks, the BcN has the potential to change the relationship between various industry actors such as content providers, data carriers and backbone providers. Menon thus points to the role of government action in altering the industry structure in Korea.

Along the same lines as Menon (2011 [8]), Shin and Kweon (2011 [15]) study a number of broadband infrastructure policies in Korea since 1999: the Cyber Korea Initiative (1999-2002), the e?Korea Vision (2002-06), the IT839 Strategy (2004-06), the Ubiquitous IT839 Strategy (2006-07), and the still ongoing Cyber Infrastructure initiative (2007-present). All initiatives were based on a significant role for government, in coordinating the actions of stakeholders, providing financial support, generating demand through government purchases of services, implementing favourable tax policies, and otherwise subsidising major manufacturers and service providers. This dominant role for government has created a ?patron-client relationship? (Shin & Kweon, 2011 [15]: 381) between government and industry, with government using broadband policy to encourage electronics and high-technology manufacturing. ?(B)roadband has been developed with a tendency toward technology push-to-market rather than market-pull? (p. 381), with the attendant risk of a misallocation of resources. To summarise, Menon (2011 [8]) and Shin & Kweon (2011 [15]) highlight the potential of government action to alter the environment for private sector actors through proactive policy initiatives and targeted investments.

Shin and Venkatesh (2008 [9]) use actor-network theory to examine how stakeholders? varying interests are reflected in the formation of convergence policy in Korea. An actor-network is ?a heterogeneous network of aligned interests, including people, organisations and standards? (Shin & Venkatesh, 2008 [9]: 25). The formation of a ?technical artefact? like a national broadband network is the result of interactions within the actor-network, based on the complex interactions, power dynamics, persuasive strategies and alliances between the various actors. In the Korean case, Shin and Venkatesh identify the principal state and non-state actors involved in convergence policy, including ministries and regulatory agencies, and private sector actors such as content producers, equipment manufacturers, telecommunications providers and broadcasters. In the view of Shin and Ventakesh (and in actor-network theory in general), policy is the outcome of a structure of interaction, or a particular configuration or institutional arrangement of a decision-making system within with various actors seek to align their interests. Decisions are thus the outcomes of the structure of the regulatory system, and in turn, ?the realisation of the potential of technological innovation depends upon social and economic decisions? (Shin & Venkatesh, 2008 [9]: 36). However, Shin and Venkatesh also admit the possibility that ?convergence challenges existing institutional arrangements? (p. 37). The causal effects run both ways between institutional arrangements, and technological change.

Shin and Venkatesh?s (2008 [9]) approach is congruent to the conceptualisation of complex, large-scale technology projects as socio-technical systems (STS) (Borgman, 2000 [20]; Sawyer, Allen, & Lee, 2003 [21]; Shin & Jung, 2012 [22]). According to Shin and Jung (2012 [22]), ?(a) technological ecosystem, which is a set of technologies, standards, conventions, best practices and social communities, can be de?ned as an adaptive, open socio-technical system with properties of sustainability, public good and scalability? (p. 580). As in the actor-network, a socio-technical system too is based on complex interactions between social and technical factors, and mediated by the conflicting interests and negotiated relationships of various stakeholders. At the same time, socio-technical systems also challenge and change existing patterns of interactions within social communities. ?ICTs and the social and contextual settings in which they are embedded in a relationship of reciprocal shaping? (Shin & Jung, 2012 [22]: 580)

In the next section, we synthesise from these various strands of research a tri-cornered model of ?reciprocal shaping? involving regulatory structures, policy outcomes and technological change.

Model

In the previous section, the literature on the role of the Korean government in the superlative growth and performance of the telecommunications industry was presented. The literature clearly demonstrates that the Korean government?s proactive, programmatic and far-sighted actions helped the growth of the Korean telecommunications and broadband sectors. However, the literature also showed that government decision-making structures themselves were not immune from the influence of the technological and business environment of the telecommunications industry. In addition, policies are the outcome of a specific institutional configuration, while governmental decisions themselves can reshape the institutional environment: for example, by creating new deliberative forums or regulatory bodies, or transferring jurisdiction over an issue from one governmental entity to the other. Finally, policy decisions themselves affect industry structure. To adapt a phrase used by Shin and Jung (2012 [22]), these three elements ? namely regulatory structures, industry changes, and policy ? may be said to be in ?reciprocal shaping,? within the overall context of a telecommunications system. The main argument of this paper is that none of the three can be said to be independent causes, and the others to be the effects.

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Figure 1: Modeling the influence of government on the telecommunications industry

To set the stage for the case study to follow in the next section, we present working definitions of the three terms in the above Figure 1.

Regulatory structure ? The concept of a regulatory structure is based on the theory of institutionalism most effectively articulated by Douglass North (1990 [24], 1991 [25]). They involve ?the humanly devised constraints that structure political, economic and social interaction? North, 1991 [25]: 97), consisting of both ?informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)? (p. 97). Building on the seminal work of North (1990 [24]) on the influence of political institutions on economic development,Levy and Spiller (1996 [26]: 4) outline five elements of a nation?s overall institutional endowments that affect regulatory governance of utilities: legislative and executive institutions, judicial institutions, the customs and informal norms that constrain actions of individuals or institutions, the character of contending social interests and the balance between them, and administrative capabilities.

A working definition of regulatory structure, that incorporates North?s institutionalist orientation but provides more specifics is that the decision-making structure ?encompasses issues relating to the number of decision-makers, the basis of selecting them, the roles accorded to stakeholders, and the regulatory and appeals processes? (Smith, 1997 [27]: online).

In general, the participants in the regulatory structure may include legislative and policy-making bodies, regulators and overseers, and operators. In the early years of telecommunications, many of these functions were combined within publicly-owned telephone and telegraph providers (PTTs), some of which were also ministries within government. After deregulation, the policy-making and oversight roles were separated, and the operators were made into public or private corporations. Further reforms sometimes separated the legislative and policy-making functions (reserved for national legislatures or ministries) and the regulatory function (delegated to specialised sectoral regulatory bodies). The powers of the regulatory bodies might also be different: in some countries, regulatory bodies have multi-sectoral jurisdiction, for example combining broadcasting, telecommunications and information services, while in other countries, separate agencies oversee these industries.

In the case study to follow, the evolution of the Korean regulatory structure will be traced with special attention paid to the identity of key regulatory agencies, the types of stakeholders involved in telecommunications and broadband policy making, and the formal and informal rules and conventions governing their interactions.

Industry changes ? According to authors such as Larson and Park (2014 [7]) changes in the telecommunications environment, and specifically changes in technology and convergence, inevitably lead to changes in the regulatory environment. At the same time, Menon (2011 [8]) and Shin and Kweon (2011 [15]) have also argued that proactive actions by the government in creating a national information infrastructure have resulted in changes to industry structure and organisation. In many countries, technological convergence and the consequent cross-media entry has made obsolete the previous silo-models of regulation. It is therefore reasonable to expect ?reciprocal shaping? between industry changes and regulatory structures. Industry changes may include the emergence of new technologies, vertical and horizontal integration, multi-platform competition, convergence and cross-platform competition.

Decisions ? Regulatory systems, through negotiations involving various stakeholders, periodically arrive at decisions: some decisions address substantive issues related to specific industrial sectors, while others address procedural issues related to the processes by which the regulatory system arrives at decisions. While policies related to interconnection or access pricing are examples of the former, the creation of new regulatory agencies or the transfer of jurisdiction over an industrial sector from one agency to the other are examples of the latter. Decisions may also be differentiated based on their breadth and applicability. While some decisions are narrowly tailored to a specific issue (for example, e911), others have much broader applicability spanning multiple sectors of the economy (competition policy, industrial policy or merger guidelines). Finally, decisions also have two aspects ? the specific provisions in the regulation itself, and the general ideological or philosophical motivations behind the policy. The latter is not immediately apparent, and has to be surmised from the pronouncements of decision-makers, or from the tone and tenor of the debates surrounding major policy decisions. It is the general motivation that sets the context for the specific provisions, and the general motivation is conditioned by the regulatory structure.

In this paper, only a subset of the decisions taken by the Korean regulatory system will be considered. Day-to-day policy making, with its focus on specific issues and problems, will not be extensively discussed since they have little relevance to the objectives of the paper, namely the long-term responses of the Korean telecommunications system to the challenge of convergence and broadband. The decisions discussed in detail include legislation or policy decisions with broad and long-term applicability, and procedural changes such as the creation or merger of regulatory agencies.

In Section 4 below, the critical markers of the regulatory system, industry changes and decisions identified in this section will be observed for the Korean telecommunication system from the 1990s to the present.

Chronology of developments in Korean telecom, 1990s-present

In this section, we discuss the major changes in the industrial environment, changes in regulatory structure, and changes in policies, from the 1990s to the present. As stated in the introduction and in Section 3: Model, our objective is to demonstrate the ?reciprocal shaping? between these three in each period of Korean telecommunications history. We show, based on the evidence in the following sections, that there were four periods into which these historical developments could be divided, each with a dominant trend or characteristic:

- Period 1 (1995-2004, state-owned oligopoly);
- Period 2 (2004-2008, inter-platform competition);
- Period 3 (2008-2013, mergers and consolidation), and
- Period 4 (2013-present, ubiquitous networking).

To set the context, a summary of the key industry characteristics during each period is provided below (Table 1).

Table 1: Change of Internet and mobile phone users over periods

			Broadband households	Internet users	Mobile phone subscribers	Smartphone subscribers
Period 1	State-owned oligopoly	(1995-2004)	19951.38 (1998)	37	164	-
			2000387	1,904	2,632	-
Period 2	Inter-platform competition	(2004-2008)	20051,219	3,301	3,834	22.5 (2008)
Period 3	Mergers and consolidation	(2008-2013)	20101,722	3,701	5,077	721
			20131,874	4,008	5,468	3,752
Period 4	Ubiquitous networking	(2013-present)	20141,942*	4,112**	5,800***	4,167

*98.5% of total households ** 83.6% of the population ***108.9% of the population

Source: NIA (2015 [28])

The three subsections below discuss major changes in the industrial environment, changes in regulatory structure, and changes in policies, in that order. Thereafter Section 5 discusses the main thesis of this paper: the ?reciprocal shaping? of these elements within each period.

Changes in industry

The growth of the mobile and broadband infrastructure has been a core agenda for the government and industry in the 1990s and the 2000s. While the government has been proactively intervening in ICT and telecommunication development since the 1980s by employing well-educated technocrats and investing massively in think tanks, the real seeds of the current ICT environment Korea were sown in the 1990s. Both the mobile and broadband infrastructure are expanded in a solid manner (Larson & Park, 2014 [7]; Jung et al., 2013 [6]). In the early 1990s, Korea broke new ground in the world?s mobile communications market by commercialising CDMA-based digital mobile technology for the first time in the world. In the later 1990s, the world?s fastest Internet service was available in Korea thanks to a high-speed Internet infrastructure constructed nationwide. The information networks undergirding the Korean economy underwent a dramatic transformation in the late 1990s.

Though growth was not as dramatic or explosive as in the 1990s, progress continued in the 2000s. In particular, the development and use of information services improved significantly both in quality and quantity. While the 1990s were spent in building a foundation for information service use, the 2000s saw dramatic expansion in information services. The service-related achievements in the 2000s can be largely categorised into four areas:

- E?government development (early 2000s);
- ubiquitous strategy mainly represented by IT839 and u-Korea (2004 and 2006, respectively);
- convergence, which emerged as a pet project of the Lee Myung-Bak administration in 2008 (NIA, 2010); and
- creative economy, which emphasises ICT advancement and entrepreneurship by the most recent Park Geun-hye administration.

Growth of broadband

Broadband Internet services were launched in Korea in July 1998 by the cable provider Thrunet, based on cable modem technology. A year later, in April 1999, Hanaro Telecom too entered the broadband market by offering the world?s first Asymmetric Digital Subscriber Line (ADSL) service. Hanaro started as a competitive fixed-line telephony provider but ran into several obstacles in extending its market share against the incumbent, KT. There was no number portability at the time and high switching costs discouraged users from changing to another provider. Users going back to KT from Hanaro were forced to pay large reconnection fees. Facing tough competition in fixed lines, Hanaro changed its focus from fixed-line telephony to broadband. This strategic change was particularly successful given KT?s reluctance to deploy ADSL due to its high investment in Integrated Services Digital Networks (ISDNs) then. However, when the advantage of the ADSL service became apparent due to speeds 60 times faster than ISDN, KT quickly responded and began offering its own service in June 1999 (Kim, Jeon, & Bae, 2008 [29]; ITU, 2005 [30]).

From 2000 to 2005, broadband services in Korea were largely based on ADSL, but the trend shifted toward very high bit-rate digital subscriber lines (VDSL) when the subscription market for ADSL service became saturated (Lau et al., 2005 [31]). VDSL technology can reach transmission speeds of 52 Mbps. Broadband service in Korea is typically fast enough for two-way streaming of a high-resolution HDTV image onto a computer screen (Shin & Kweon, 2011 [15]). In the Korean broadband market, xDSL is readily available to 98.5% of Korean households with a fixed telephone line (NIA, 2015 [28]). More than 50% of Korean homes subscribed to cable television, which provides them with another broadband option through hybrid fibre coaxial (HFC) or cable modem (ITU, 2010 [30]). Additionally, apartment LANs (Local Area Networks) created new platforms for broadband, since more than 50% of the Korean population lives in an apartment building.

South Korea has consistently been the global leader in broadband deployment since 1999. In the last ten years, the Korean government has pursued several strategies for its broadband infrastructure. The Broadband Convergence Network (BcN) is Korea?s high-speed Internet infrastructure project and is envisioned as a robust high-speed conduit through which broadband services, applications, and content will flow. This project was started in 2004 by a consortium that included the now-defunct Ministry of Information and Communication, and private sector telecommunication and cable firms such as KT, Hanaro, and others. The BcN was launched as a three-phase project. The first phase extended from 2004 through 2005, the second from 2006 through 2007, and the third from 2008 through 2010. The objectives of the BcN are three-fold: media convergence; ubiquitous connectivity or access; and coordination among the network stakeholders (Menon, 2011 [8]).

Korea completed its government-led BcN project in 2010, six years after it commenced in 2004. The number of BcN subscribers using a connection faster than 50Mbps now exceeds 14.82 million, overachieving the original goal of 12 million by more than 20%. The BcN project has enabled practically all cities, towns and rural communities to use 50-100Mbps Fibre-To-The-Home (FTTH) and HFC-based broadband Internet services. For small farming and fishing villages with fewer than 50 households, for which access to broadband Internet service was not commercially practical, the farming and fishing village broadband subscriber network promotion project has been available since 2010. The FTTH-based broadband networks were implemented for about 38% of villages (5,002 of 13,217) by December 2012. Also, the Giga Internet project, launched in 2009, will be ten times faster than BcN, offering speeds between 100Mbps and 1Gbps. Aiming at more than 90% of Giga coverage across the country by 2017, Korea is now developing and demonstrating technologies for enhancing next-generation subscriber networks, such as Giga Wi-Fi, 10GE-PON and the RF Overlay-based Giga Internet (KISA, 2013 [32]; NIA, 2014 [33]).

A total of 77 commercial Internet services, including Kornet (KT), Boranet (LG U+), B-Net (SK Broadband), LG U+ and Dreammax (Dreamline), receive IP addresses from KISA, and provide services such as leased lines and high-speed connectivity for institutions and individuals (KISDI, 2015 [34]). Kornet, short for ?KORea-telecom-interNET,? is a high-speed information network operated by KT that has from June 1994 until now installed 2.5G-10Gbps high-speed networks in 90 or so locations across the country, and built 20 or so international lines including the 140Gbps line connecting with the US. Boranet is the Internet communication network of LG U+. It launched a service to lease Internet lines for enterprises in October 1994, and then extended the service to home users. It also provides high-speed Internet customers with triple play service, i.e. voice, Internet and broadcasting. B-Net is owned by SK Broadband. It launched commercial service in April 1999, introduced Korea?s first IPTV service (Btv) in July 2006, and then released the first TPS product in Korea (B Set) in January 2007. Currently 130 or so nodes are accommodating subscriber traffic around the country, and B-Net is connected to numerous foreign and Korean service providers to provide high-quality Internet service (KISA, 2013 [32]).

According to the ?statistics on wired and wireless communication service subscribers? by the MSIP, the number of wireless Internet subscribers in Korea was 59.41 million in 2015, which was up 17% over 2010 (50.77 million). With increasing smartphone penetration, the number of wireless Internet users has also been increasing. Moreover, according to ?broadband Internet subscribers? data, as of December 2015, the number of domestic broadband Internet subscribers was 19.98 million, with KT having the largest number of subscribers (approx. 8.31 million, 44.0%), followed by SK Broadband (approx. 4.39 million, 24.1%), System operator (approx. 2.96 million, 16.2%), and LG U+ (approx. 2.74 million, 15.0%) (KISDI, 2015 [34]).

Platform competition

Early platform competition between KT?s DSL broadband and Thrunet and Hanaro?s cable broadband networks contributed signi?cantly to the growth of broadband markets in Korea (Fransman, 2006 [35]). However, although Local Loop Unbundling (LLU) was only introduced in 2002, Thrunet and Hanaro have bene?ted from the separation of ownership, operation, and programming functions in the Korean cable business (Wu, 2004). Platform competition in the Korean market led to rapidly decreasing prices of broadband, which furthered broadband adoption. Lower prices were also the result of competition with KT, which was enjoyed a cost advantage as the incumbent and therefore could afford to lower prices with less concern about cost (Chung, 2006 [36]). When LLU was introduced in 2002, the MIC forced KT not only to provide all kinds of LLU to competitors, but also to do so at prices below costs. Two reasons motivated the MIC to do this: to discourage competition in facilities construction which might result in too much capacity and to intensify competition in rural areas where cable system coverage was low (Chung, 2006 [36]).

The standard broadband technologies in Korea are DSL and cable modems. Newer technologies in use include very high bit-rate digital subscriber lines (VDSL), and optical fibre connections in both telephone and cable plants. Fibre-to-the-premises and fibre-to-the-curb schemes have recently become more common. Korea is among the leading countries in the list of fibre-based broadband internet service subscribers (OECD, 2016 [11]).

Wireless broadband (Wi-Bro) is a portable wireless broadband internet technology developed by the Korean mobile industry that was adapted as the world standard in 2008. Users can freely access high-speed internet cheaply, at any place and anytime, even while driving at speeds up to 70?80 miles/hour. Its speed is fast enough to download dozens of MP3 files a minute. The technology also offers a high quality of service, allowing Wi-Bro to stream video content and other loss-sensitive data reliably. Services are becoming the centrepiece of the broadband ecosystem (Shin & Kweon, 2011 [15]).

Converged services

While the 2012 output of broadcasting services and telecommunications services showed a similar level of production as in 2011, converged services grew at a rate of 11.5% in 2011-12. Converged services showed strong long-term growth as well, at compound annual growth rates of 16.3% during 2008-2012, and were expected to surpass the production scale of the broadcasting services shortly (KCC, 2012 [37]).

IPTV, exemplifying the convergence of broadcasting and telecommunications, had about 6.31 million subscribers in 2012, having grown at a CAGR of 169% during the years 2008-2012. As the number of subscribers exceeded 7 million in May 2013, IPTV has become a cash cow for the industry. Furthermore, IPTV expanded the range of consumer experience beyond what is available on broadcast and cable TV, by adding new features such as Video on Demand (VoD) and multi-angle viewing (KCC, 2012 [37]). Currently Korean IPTV accounts for 6.7% of the global IPTV market (KISA, 2013 [32]).

Government policy has also supported the growth of services. The government?s so-called Future Strategy for IT Korea, which coordinates the ICT policy directives of the Ministry of Knowledge and Economics and of the KCC, identifies a set of industries that will bene?t the most from technological convergence, emphasising the role of the software industry as a vehicle for industrial competitiveness. The policy priority also includes the security and speed of Internet service. The shift of emphasis from network infrastructure to the applications of ICT is likely to bring important changes in the regulatory regime of the network industry and requires a comprehensive assessment of the source and impact of technological convergence (Jung, Na, & Yoon, 2013 [6]).

Changes in regulatory structure

During the 1990s and the 2000s, the main regulatory agencies were the Ministry of Information and Communication (MIC), the Korean Broadcasting Commission (KBC), the Ministry of Culture and Tourism (MCT), and the Ministry of Commerce, Industry and Energy (MCIE). Each is associated with industries ? telecommunication, broadcasting, cultural industries, and equipment manufacturers (Shin & Venkatesh, 2008 [9]). The MIC governed telecom markets under the authority granted to it by the Framework Act on Telecommunication, 1983. The Act has undergone numerous subsequent amendments via ministerial and presidential decrees. In addition to telecommunications policy, The MIC was also in charge of allocating broadcast channels and managing the broadcast spectrum, which overlapped with KBC?s jurisdiction.

Convergence required a re-evaluation of the fundamental basis of regulation across broadcasting and telecommunications. As soon as the Lee Myung-Bak administration took power in 2008, the KBC and the MIC were integrated to form a new unified regulatory agency, the Korean Communication Commission (KCC). Previously, there were continuous organisational conflicts between the KBC and the MIC regarding which government organisation would have jurisdiction over regulatory and developmental policies for the broadcasting and telecommunications industries (Rhee, 2016 [16]). The two agencies had repeatedly clashed over the regulation of converged services, as much as involved industries did. The existing MIC was abolished despite opposition from telecommunications business firms, and was divided into other government organisations. The KCC replaced the existing quasi-independent regulatory agency, the Korean Telecommunications Commission (KTC) and the KBC, as well as took over the regulatory policy role of the MIC (Korea ET News, 17 January 2008, cited in Rhee, 2016 [16])

The purposes of the KCC, as the regulator of broadcasting and telecommunications, were to respond to the exigencies of convergence proactively; guarantee freedom of broadcasting and protect the public interest; ensure balanced growth between broadcasting and telecommunications so as to strengthen the international competitiveness of both local industries; protect the rights and interests of the public; and enhance public welfare through maintaining the KCC?s independence (KCC, 2012 [37]). A number of laws apply to the operation of the KCC, including its founding *Act on the Establishment and Operation of the Korea Communications Commission*, the *Framework Act on the Development of Broadcasting and Communications*, the *Broadcasting Act* and the *Korea Educational Broadcasting System Act*, the *Telecommunications Business Act* and the *Act on Promotion of Information and Communications Network Utilisation and Information Protection*, and the *Radio Waves Act*.

In Korea, the privatisation of incumbent telecommunications operator Korea Telecom began in 1993 and concluded in 2002. Simultaneously, the government also reorganised the ownership structures of the cable industry. When cable operations began in 1995, state-owned incumbent telecommunications operator Korea Telecom also owned one of the two largest cable network operators. The owner of the other large cable network was Powercomm, also a government-owned company which operated the communications network for KEPCO, the Korean Electric Power Corporation. But the government kept separate the ownership, operation, and programming functions. KT and Powercomm owned the networks, but were not permitted to provide services over them. Other companies, not permitted to own the underlying infrastructure, provided video and, later on, Internet services, over the cable network. The earliest providers of broadband service in Korea ? Thrunet and Hanaro ? leased cable network from Powercomm.

After the privatisation of KT, the structural separation rules were relaxed and Korea Telecom?s cable network was sold to cable service providers (Lee, 2002 [38]). Due to the presidential election and consequent reorganisation of the government in 2013, the government agencies responsible for overseeing and helping to manage the ICT industry were changed from the KCC, the Ministry of Public Administration and Security (MOPAS) and the Ministry of Knowledge and Economy (MKE) to the KCC, the Ministry of Science, ICT and Future Planning (MSIP), and the Ministry of Security and Public Administration (MSPA). Even though the Korean government established a unified independent regulatory agency, the KCC, the tasks and accountabilities were assigned to multiple parties leading to state-led regulatory governance, again failing to achieve market-led regulatory governance (Rhee, 2016 [16]).

Changes in policies

While Korean efforts to build broadband infrastructure began in the late 1990s, the effort to develop an overarching ground for informatisation and advanced ICTs started much earlier. A legislative basis for Korea?s drive to create an information society was laid by the Basic Act on Informatisation Promotion (BAIP) of 1995. This paved the way for dynamic growth in the information technology sector. In line with the provisions of the Act, a master plan was drawn up for the construction of the Korean Information Infrastructure (KII) (NCA, 1996 [39]).

Korea Information Infrastructure (KII) ? The Korea Information Infrastructure (KII) project may be the most prominent example worldwide for governmental activities in furthering broadband deployment. Since the mid-1990s, Korean policy has been to build a ??knowledge-based society?? based on a high-speed telecommunications infrastructure.

The ??*Framework Act on Informatisation Promotion??* was passed in 1995 to drive the KII project (Picot & Wernick, 2007 [40]). The main objective of the Korea Information Infrastructure-Government (KII-G) project was to construct a backbone network. From 1995 to 2000, a nationwide backbone and ATM switched networks were constructed. An optical transmission network comprising a 155 Mbps ? 40 Gbps backbone network was established in 144 cities, with the goal of eventually upgrading this to Tera-bps (Lee & Chan-Olmsted, 2004 [41]). Facility-based service providers were given funding at preferential rates to build up infrastructure in rural areas and small cities (Choudrie & Lee, 2004 [42]). Another form of provision was the granting of public money in the form of prepayment for public services.

In 1996, the objectives of the KII project were revised as follows. First, the project?s focus shifted from the ?network? to the ?infrastructure.? Second, based on analysis of the outcomes and problems from the implementation during the first year, the Master Plan was placed on a more substantial footing. In order to help the public and industry gain a better understanding of the project, it was reorganised into separate sectors involving construction of the information superhighway, technology development, application services, pilot project and international cooperation. To attract private capital to the KII, some areas of the project were opened to private participation, and the scope of public tenders was expanded. Priority were given to consortia of small and medium enterprises seeking to participate in the project (NCA, 1996 [39]).

Between July 1998 and April 1999, a number of laws were enacted or revised to create a new environment for the nation?s informatisation, including laws to promote deployment of the public sector informatisation, and accelerate the informatisation of the private sector. Laws were passed on digital signatures and e-commerce, and to require the appointment of Chief Information Officers (CIOs) for each branch of the central and local governments, who would coordinate the implementation state informatisation projects.

The KII-G was accompanied by the Korea Information Infrastructure-Public (KII-P) and the Korea Information Infrastructure-Testbed (KII-T). KII-P is intended for home and business and aims to offer users interactive broadband multimedia information services, while KII-T is utilised by research institutes and universities and jointly invested in by the government and private carriers.

Cyber Korea 21 ? In late 1999, in the backdrop of the Asian Economic Crisis, Korea implemented the Cyber Korea 21 Initiative as the blueprint for a twenty-first information society (Shin & Kweon, 2011 [15]). The main objectives of the project were manifold: to increase the GDP share of knowledge-based industries to the level of OECD member countries, to create an advanced knowledge-based society in Korea by 2002; to reform government, business corporations and the general public through expedited application of the information technology; and last but not least, to overcome the then economic turmoil by expediting the overall restructuring of society, while promoting investment to create sufficient new jobs.

Many of these objectives were not new, since the Cyber Korea 21 plan was a revision of the ?Master Plan Informatisation Promotion? that was first formulated in June 1996. An innovative aspect of the Cyber Korea 21 plan however was the government?s promotional policies to encourage demand for Internet use among the population. These programs target groups that are not usually involved in Internet and include IT literacy and particularly Internet literacy programs (Lee, O?Keefe, & Yun, 2003 [43]). The most prominent example within this context is the ??ten million people Internet Education?? project started in June 2000 (Picot & Wernick, 2007 [40]).

e-Korea Vision 2006 ? After the unsuccessful Cyber Korea 21 initiative, e-Korea Vision 2006 was launched in April 2002 to continue the efforts of shaping the nation's future IT direction. Realising the weakness of the previous plan, e-Korea Vision significantly improved upon Cyber Korea 21. Since March 2001, guidelines were established through the participation of experts and research institutions, as well as the consultation of relevant ministries. The vision focused on promoting national informatisation, advancing the information infrastructure, and strengthening international cooperation. Strategies included building ICT capacity, advancing e-commerce, investing in the public sector, transforming the legal system, ensuring safety and reliability, and promoting the IT industry (Shin & Kweon, 2011 [15]).

According to the e-Korea Vision plan, all households in Korea regardless of income, age, or region, should have access to a super high-speed internet line transmitting at least 1 Mbps. With the advent of fast, universal online access, the program was designed to increase the number of people participating in lifelong learning to the average level of the OECD member states.

Despite the ambitious goal, the strategies for the project were not able to keep pace with changes in the social and cultural environment of IT applications. Both Cyber Korea 21 and e-Korea Vision were deemed as means to boost the economy, and infrastructure was viewed as a simple tool for such an industrial policy goal. The e-Korea Vision program was halted when the Ministry of Information and Communication (MIC) launched a new broadband project, IT839, in 2004.

IT839 Strategy ? Korea had become more aggressive in the planning and designing of IT, telecom, and internet projects by the mid-2000s. In February 2004, the MIC announced a new program called the IT839 Strategy, which was initiated to give new momentum to the economy after broadband (KCC, 2010 [44]). It was the first full-fledged NII project for Korea, since it laid out a roadmap for both the development of a technological infrastructure and for building an information capability. The government came to the realisation that infrastructure would be ineffective without proper applications. In light of this, IT839 called for greater attention to be paid toward developing digital content and services. It is dubbed 839 because within its three pillars, there are eight IT services, three infrastructures, and nine new growth engines. IT839 was designed to allow a myriad of current IT services and products to be consolidated and simplified into eight new services, each having strategic and practical value. The underlying tenet of the IT839 project was to generate investment in major industrial sectors by deploying new infrastructure and applications, in turn helping to develop important new growth engines.

Compared to previous projects, which served as little more than technical roadmaps, IT839 had a more comprehensive view, focusing on interconnectivity among infrastructure, services, and applications. Previous focus has been on simple IT investment, with a strategy centred on the outcomes and benefits of individual projects.

However, IT839 showed a strong inclination towards industrial policy. The program focused on industrial policies targeting specific economic sectors, based on private sector investment and production, with government playing a decisive role. For example, researchers commonly discuss which role of KII could be better regarding market integration or market segregation. This tradition continued with the IT839 project, creating similar problems of over-supply.

Ubiquitous-IT839 Strategy ? In 2006, the IT839 Strategy was partially revised as the ubiquitous- IT839 (u-IT839) Strategy. For instance, internet phone service was excluded, while other services were newly added. U-IT839 referred to an IT and communications environment where people could enjoy access anytime to high-speed networks and enhanced information services, regardless of location, through a ubiquitous computing network. With u-IT839, Korea hoped to become the world's first country to create a genuine ubiquitous information society. However, as with all previous projects, questions remained. Two examples of such questions include whether the resulting infrastructure and applications came out of the contextual relationship with market and society, as opposed to co-evolving with ever-changing contexts, and how IT839 would bring change to the lifestyles of Korean citizens. Unfortunately, at this time, the answers are still missing in the blueprint.

Cyber-Infrastructure ? Toward the end of the decade, Korea began to invest in cyberinfrastructure (CI) as part of a strategy to enhance broadband (Shin & Kweon, 2011 [15]). With the Park administration, the emphasis in government policy changed to the formation of a 'job-oriented creative economy': increasing growth potential and creating good jobs through convergence between industries and new and advanced technologies; creating the ecosystem for a creative economy, reinforcing growth engines for job creation, making Small and Medium Enterprises (SMEs) key players in the creative economy, development of science and technology through ingenuity and innovation, establishment of a disciplined market economic order, and operating the economy to support growth.

Industry changes, regulatory structure and policies

In this section, we return to the main objective of the paper, which was to study the stages in the evolution of the Korean telecommunications system, in terms of the industry changes, regulatory structures and policies that characterised each period. The central argument is that changes in industry, regulatory structure and policies ?reciprocally shape? and affect each other in each period. As long as these three elements are compatible and in balance, the system is stable and continues, but if one of them changes, all three parts will soon become stressed, and a new system comes into place. We illustrate this with the data presented in Section 4.

As shown in Table 1 above, four general periods in the Korean telecommunications system can be identified, the transition points between which are incidentally marked by a change in the regulatory system. We discuss each of these periods in turn. The key points in each period are summarised in Table 2 below.

Period 1 (1995 - 2004)

In 1995, the Korean telecommunication system was dominated by an oligopoly of mostly state-owned telecommunications operators. The Public Switched Telecommunications Network (PSTN) was dominated by KT, Hanaro Telecom and LG Dacom. KT and Powercomm, another state-owned telecom operator, were the largest cable system operators; however, these were banned from offering services to customers, resulting in companies such as Hanaro and Thrunet becoming the largest cable-based content and service providers. The regulator and policy-maker were a government ministry, the MIC. Although the Korean Telecommunications Commission (KTC) as a quasi-independent regulatory agency existed since 1996, it was guided and controlled by the ministry. Thus, the MIC continued to retain centralised regulatory authority and discretion in business licensing as well as merger approval (Rhee, 2016 [16]).

The policies during this period were mostly aimed at infrastructure deployment. The closed oligopoly system, and the government ownership of carriers, enabled the government to implement a number of separate schemes to increase network penetration: the Korea Information Infrastructure plan, and the Cyber Korea 21 plan were both implemented during this period, and were illustrative of this emphasis on network deployment and demand stimulation. Demonstrating the reciprocal nature of policy and environment, the lack of convergence and inter-platform competition at the beginning of this period helped the government to implement its infrastructure deployment plans, since the state-owned carriers had greater investible surpluses. In fact, it might be argued that it was only the lack of competition (an industry condition) that permitted specific policies, such as infrastructure investment, even in low-population density parts of the country where the immediate returns on investments were not expected to be positive.

But by the end of the period, the compatibility and balance between industry conditions, regulatory structure and policies had been eroded. The privatisation of KT, initiated during the Asian Economic Crisis, deprived the government of a vital instrument of its infrastructure deployment plans. Moreover, technological platforms of access such as DSL, cable modem, Ethernet-LANs (for apartments), Broadband Wireless Local Loop (BWLL), FTTH, Satellite, Wireless LAN, Power Line Communication (PLC), High Speed Downlink Packet Access (HSDPA), WiBro, and Long Term Evolution (LTE) had proliferated, competing away the investible surpluses from all carriers. An additional factor was the very success of infrastructure growth: with Internet users exceeding 30 million (or 70% of the national population) and Korea achieving no. 1 status in per capita broadband penetration in the 2001 OECD rankings, the rationale for infrastructure deployment as a government policy goal was no longer as important or pressing.

It is significant that there was a subtle change of emphasis in the broadband plans announced by the government in the latter part of this period. The e-Korea Vision 2006 document (2002), the BcN pilot project (2002), and the Broadband IT Korea Vision 2007 plan (2003) were all formulated in the latter part of this period. All three moved away from network deployment as a sole policy goal, additionally emphasising the development of ICT capabilities, informatisation of public and private entities, and competitiveness. In a clear instance of ?reciprocal shaping,? the successful implementation of a policy (namely network investments), resulted in a change in the industrial environment (widespread broadband availability), leading to a recalibration of policy objectives towards ICT capabilities and informatisation.

Period 2 (2004 - 2008)

The critical marker of this period was the proliferation and enormous growth in access technologies, such as BWLL, FTTH, Satellite, Wireless LAN, PLC, HSDPA, WiBro, and LTE. IP-based services too grew enormously, with nine facilities-based service providers given a license for VoIP services in 2005-2006. It is also indicative of this period that WiBro, a home-grown wireless broadband standard received IEEE certification in 2005, making a Korean innovation the global standard in a key growth area for broadband deployment.

It is therefore unsurprising that the lead agency for ICT policy during this period was the Ministry of Science and Technology. The key policy documents produced during this period, such as the ?IT839 Strategy? and the ?u-IT839 Strategy? focused on developing digital content and services, and the synergistic development of infrastructures, services and applications.

Table 2 Periods in Korean Telecommunications

	Industry structure	**Regulatory structure**	**Major/typical policy document**	**What caused crisis/transition to next period?**
Period 1 (1995 ? 2004)	- In the beginning of period, oligopoly in PSTN; cross- ownership of telecom and cable by KT and Hanaro - by the end of the period, privatisation of KT; divestiture of cable properties of KT and Hanaro; enormous growth in broadband; emergence of commercial ISPs, mobile broadband and Mobile Virtual Network Operators (MVNOs)	Ministry of Info & Communication (MIC) (founded in 1994)	1995 - National Information Super Highway master plan - Enactment of Framework Act on Informatisation Promotion 1999 - Development of ? Cyber Korea 21? 2002 - Development of ?e-Korea Vision 2006? - Start of BcN pilot project 2003 - Development of ?Broadband IT Korea Vision 2007?	Achievement of targeted goals for network penetration; privatisation of carriers; emergence of platform competition
Period 2 (2004 ? 2008)	- Interplatform competition - Multiplying broadband platforms: DSL, Cable Modem, Ethernet-LAN, BWLL, FTTH, Satellite, Wireless LAN, PLC, HSDPA, WiBro, LTE - Major M&As result in triangular competition between KT, SK, LG	Ministry of Info & Communication (MIC)/ Ministry of Science and Technology Korean Comm. Commission/	2004 - Development of ? IT839 Strategy? -Prepare BcN implementation plan 2006 - Development of ?u-Korea basic plan? -Development of ? u-IT839 Strategy? 2008 - Establishment of the Korean Communications Commission	- Convergence of broadcasting and telecom; establishment of KCC

Period 3 (2008 ? 2013)	- Phenomenal growth in services (LTE mobile phones, VoIP, value added services and content, MIM, mVoIP)	Ministry of Science, ICT and Future Planning	2011 -Giga Internet commercialisation plan -10 Gbps by 2020	- with industry consolidation, reduction of access services to commodity business; shift of emphasis to services
Period 4 (2013-onwards)	- MIM, mVoIP, SMS fast expanding - Exponential growth of value added content services: Online gaming, online advertising, etc. -The importance of content and IP platforms increasing	Korean Comm. Commission/ Ministry of Science, ICT and Future Planning	2013 - Creative economy: The Park Geun-hye Administration's blueprint for creative economy	- According to the Park Geun-hye administration?s main vision, the Ministry of Science, ICT and Future Planning was established in 2013 for facilitating the collaboration of science technology and Information and Communication Technologies (ICT).

Source: NIA (2015), KISA (2013), KISDI (2012)

However, this period was also marked by rising technological convergence, and increasing tension between the MIC and the KBC, respectively the regulators for telecommunications and broadcasting, over jurisdictional issues. The two agencies repeatedly clashed over the regulation of converged services, as much as involved industries did. Convergence required a re-evaluation of the fundamental basis of regulation across broadcasting and telecommunications. Therefore, by 2008, a new regulator had been established the KCC, with jurisdiction over both telecommunications and broadcasting. The creation of the KCC marked the transition to a new period in Korean telecommunications.

However, before it could address the primary task that motivated its formation, the KCC was called on to resolve political conflicts within legacy technologies. The ruling party, the Lee Myung Bak administration, passed a controversial media bill despite opposition from non-governmental organisations and other political parties, and relaxed traditional restrictions on newspaper?broadcasting cross-ownership. As a result, KCC granted licenses to the four major conservative newspapers. The ruling party restructured the existing left-oriented structure of terrestrial broadcasting established under previous governments ? the Kim Dae Jung and the Ro Moo Hyun regime and established a right-oriented broadcasting structure that could coincide with government policies (Rhee, 2016 [16]).

Period 3 (2008 - 2013)

The major industry development during this period was a wave of mergers and acquisition activity between the main players in the telecommunications and broadband sector. SK Telecom and Hanaro Telecom merged in 2008, KT and KTF, SK Broadband and SK Network, and LG Telecom, LG Dacom and LG Powercomm in 2009. Due to these mergers, the formerly fragmented broadband industry was consolidated into triangular competition between KT, SK, and LG. Changed in the government?s merger approval policy permitted these mergers to go forward (Rhee, 2016 [16]), another instance where policy choices shaped industry developments.

Increasing competitive pressures due to convergence and interplatform competition may have been instrumental in inducing these mergers, as well as the realisation that access services had been reduced to a commodity business. Indicative of this was the fact that prices for data transport fell remarkably in Korea during this period: price per 1 Mbps of data was only 27% of the OECD average. Profits were instead migrating to value-added services and content. Indeed a dominant characteristic of the industry during this period was the phenomenal growth in value added services and content markets. Services such as Naver, Daum, NCSoft, Gmarket, KakaoTalk, etc. increased 47-fold in the 15 years since 1996, becoming leading engine for network growth. Mobile Instant Messaging (MIM) emerged with the increasing penetration of smartphones: for example, KakaoTalk. Mobile Voice over Internet Protocol (mVoIP) services too emerged, such as VoiceTalk (Kakao), Mypeople (Daum), Line (NHN), Viber, Tango, etc.

The policies announced during this period were generally platform-independent. Policies such as the Mid- Long- Term Broadcasting Communication Network Development Plan, the Mobile Internet Promotion Plan (Phases 1 & 2), and the Cloud Computing Promotion Plan, and the launching of integrated Korea Internet & Security Agency all aimed at the promotion of services and applications, preserving neutrality between platforms. Two explanations for this emphasis on platform-neutrality may be put forward: first, the convergence of technologies leads to platform-neutral regulations (namely, industry developments shaping policy); and second, the establishment of a converged regulator, the KCC, with jurisdiction over both broadcasting and telecommunications led to platform-neutral policies (regulatory structure shaping policy).[i] [45] Interestingly, the formation of the KCC itself was a result of industry developments: the emergence of new technologies and the resulting competition leading to the demand for a new regulatory system (industry developments shaping regulatory structure). The framing of platform-independent policies, was thus the result of the ?reciprocal shaping? of industry developments and regulatory structures, which provides further evidence for the main thesis of this paper.

Period 4 (2013 - date)

With ubiquitous networking and the prerequisites for an information society established, Korea in this period has embarked on the planning stage for a ?creative economy.? Currently, Korea is witnessing exponential growth in value added content services, online gaming and online advertising. Government programs intend to capitalise on these trends to unleash the innovative capacity of SMEs utilising new and advanced information technologies. The KCC focused on broadcasting policy rather than telecommunications policy under the Lee Myung Bak administration (2008?2012). It was criticised as being passive and being ineffective in regulating and developing telecommunications market. Aptly, the Ministry of Science, ICT and Future Planning was created and mandated to deal with both developmental and regulatory policies as a successor to the former MIC under the new Park Geun-Hye administration (Rhee, 2016 [16]). Thus, a duopoly system between a government ministry and the KCC was created in the area of the information and telecommunications industry. A most recent study (Shin, 2016 [46]), however, suggests the MSIP has a considerable influence on existing telecommunication services by licensing common carriers and ISPs, and the KCC plays as ?an acting agency of the MSIP.?

Conclusions and lessons

This paper was based on the premise that the industrial environment (specifically the technological and business changes), regulatory structures and policies reciprocally shape each other in a telecommunications system. Policy responses to environmental challenges are at least partially dependent on the structure of governmental decision-making bodies, the identities and relative powers of stakeholders, and the formal rules and informal conventions governing their interactions. How ministries and regulatory bodies are designed and put together affect both their policy outlooks and managerial capabilities, in turn affecting their policy output. In turn, policies have the ability to shape firm behaviour and therefore industry structure: for example, mergers and acquisitions guidelines, competition rules and interconnection all have the ability to shape industry structure. To complete the cycle, regulatory structure themselves are conditioned on and reflective of changes in industry ? for example, technological convergence and the resulting blurring of lines between industries creates pressure for the creation of multi-sector regulatory bodies. This ?reciprocal shaping? is thus critically important to the responses of governments to the emerging broadband ecosystem. Indeed, the information in the preceding section demonstrates that in the Korean case, these three factors did influence each other, as expected by the model.

Koreans? affinity for new technologies created more rapid diffusion of many telecoms, causing the Korean government to confront challenges earlier than other countries. But government has also been more pro-active, and anticipatory of changes in the industry. Industrial policy orientation promotes an anticipatory ?planning? model of policy-making, rather than a ?reactive mode? more common in the US. As one seeks to anticipate the contours of the emerging broadband ecosystem in the United States, it is thus instructive to observe similar changes in Korea.

A study of Korea?s responses to convergence and the emergence of the broadband ecosystem reveals the following lessons. First, the Korean government has always regarded its approach to broadband as a part of industrial policy, recognising the potential of broadband to spur economic activity and promote innovation and knowledge development. Second, proactive government policies on the rollout of broadband infrastructures have the potential to speed up penetration, and achieve performance targets in a shorter period of time. Third, the Korean experience also demonstrates, however, that increasing penetration is not sufficient by itself, but a host of other measures including demand stimulation and service development may be necessary to realise the full advantages of broadband. Fourth, another requirement is for enabling legislation in related areas such as digital signatures, privacy protection, and consumer rights. The Korean government, after the initial emphasis on network growth in Period 1, shifted to the promotion of services and applications.

Finally, the Korean government also proved willing to make the necessary course corrections when initiatives or decision processes proved inadequate to the tasks at hand. A key example is the reconstitution of the KBC and the MIC, regulators with authority over broadcasting and telecommunications respectively, into a single regulatory body the KCC, with multisector jurisdiction. Since convergence is obliterating the differences between the previous regulatory and operational ?silos,? it makes more sense to have a unified regulator for the convergent marketplace.

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Endnotes

[i] [57] We thank an anonymous reviewer for pointing out the former possibility.

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