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Application of Actor-Network Theory to Network Neutrality in Korea

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Abstract

This research analyzes the debate surrounding the network neutrality in Korea through the lens of Actor-Network Theory (ANT), trying to map the socio-technical network formed around the network neutrality controversy. We intend to reassemble the heterogeneous elements involved in this network and analyze its structure, identifying, describing and characterizing the different positions of the actors involved in the public debate. This paper seeks to demonstrate some of the contradictions in this process and discuss the importance of ANT concepts in the research. Our data is essentially documental, composed of laws, bills, reports and official records of public debates about the net neutrality, including video recordings of seminars and public audiences promoted by the Korean National Assembly. It can be inferred that public debate about network neutrality has been revealing acute internal contradictions between interests groups, placing actors from different levels of this network in disputes which involve a constant rearrangement of positions. The findings in this study suggest that the issue is not only complicated because it is embedded contextually, but also because the respective parties' diverse interests are multifaceted and vague. It is concluded, therefore, that a coherent and consistent approach is an effective way to govern neutrality.

Keywords: Network neutrality, platform neutrality, actor network theory, South Korea

Application of Actor-Network Theory to Network Neutrality in Korea

A debate over net neutrality (NN) has emerged over the last several years, and it has sparked heated discussions about telecommunications policy in South Korea (hereafter Korea) as well as in the rest of world. Although NN is a global issue, developmental typology differs between countries. From its origins in the U.S., NN has evolved differently based on the specific context. Although NN has numerous facets, the basis is that all content and every service throughout a network should be treated without discrimination (Hart, 2011). This principle supports no restrictions by Internet service providers (ISPs) or governments on content, sites, platforms, equipment that may be attached, or modes of communication used (Shin & Han, 2012). Although NN seems ideal, it is actually very complicated because it involves complex and contextual matters. Therefore, research can be enhanced by contextualizing the NN debate to clarify the issues involved (Shin & Han, 2012). In this regard, Kim, Kelly, and Raja (2010) analyzed broadband from an ecological perspective, examining the dynamic relationships between stakeholders with multiple levels of social and environmental perspectives. For this study, the ecological perspective was combined with a interpretive analysis to investigate relationships among stakeholders; thus, essential insights have been provided into the ways that NN has been perceived, discussed, framed, and implemented (Cheng et al., 2012).

This study deploys actor network theory (ANT) as a theoretical lens through which to elucidate the relationship between the technical and social understanding of net neutrality. This relationship, between technology and society, between technical artifact and the discourse that surrounds it, offers important insight into the way networks have been designed, deployed, and developed. This study selected the Korea for the in-depth case study, as the nation has taken the lead in broadband development. Further, they have debated the issue of NN intensely. As NN is a concept that is embedded contextually, analyses through

comparative frames tend to produce important insights that single studies ordinarily miss. Given the paucity of comparative research on socio-political dimensions of NN, the findings may provide policymakers with ideas for improving practices related to nationwide network implementation and development.

While ANT is a good tool for describing the processes of technical and social mechanisms that go into the negotiations preceding agreements (Sarker & Sidorova, 2006), not many studies about ANT on standards or technology selection address the actual process and consequences of creating strategies systematically. Many studies of ANT explore the technical implementation in organizational settings, but only a few studies have used ANT in exploring socio-technological change in such a large-scale, dynamic, and global setting. This study attempts to bridge this gap by focusing on the translation processes actors undertake with one another in making standards and adopting technology by focusing on how actors formulate specific standardization strategies to pursue their own interests and how they relate to other actors to make that possible. It examines the ongoing translations in the context of the Korean government and industry facing the discussion of net neutrality. This study investigates the decision taken by actors as to net neutrality policy and its developmental processes. It sheds light on the Korean government's overall telecom policy mechanism and suggests a better model for future policy governing telecommunications.

On the road to net neutrality, a number of technical, social, and business challenges are being identified. It is necessary to understand the myriad issues that will determine the success of net governance. These issues can best be studied from the socio-technical perspective in order to gain a holistic understanding of the complicated new mobile environment. The premise of ANT is that social and technical systems are interdependent and must both be optimized in order to determine the best overall solution for society and the market. Latour (1987) argues that the actor-network based view of the spread of innovation

applies to anything from goods and artifacts to claims and ideas. ANT seeks to understand why and how a technological solution was created as a carrier of a network of technical and social relations. It seeks to show how a technology embodies the innovators' beliefs, social and economic relations, previous patterns of use, legal limits, and assumptions as to how the artifact is meant to be used. In this paper, the actor-network-based view is used to describe the formation and diffusion of the technical standards that define 4G services.

Following research questions guide this study:

RQ1: How do actors within net neutrality were translated and mobilized into the net neutrality to address the *problematization* brought about by focal actor?

RQ2: How do *problematization*, *interessement*, and *enrollment* play out in the development of net neutrality and adoption as well as the transformation of the industry and services?

RQ3: How do actors build relationships with other industry actors, artifacts, and with the development of net neutrality? What roles do the actors in the creation of net neutrality play?

The findings imply that there is no “one-size-fits-all” solution, as the level of complexity of the problem continues to escalate with cutting-edge technologies. As Marsden (2010) argued, NN has potentially profound consequences that cannot be left entirely to market stakeholders. This point raises the need for a new approach, namely contextual regulation, which broadly refers to smart governance that is based on context. This idea is similar to co-regulation (Marsden, 2010) in that it directs the state toward questions regarding legitimacy, governance, and human rights, thereby opening up more interesting conversations than the one regarding the binary choice of no regulations versus state regulations. Beyond the dichotomy of self- or co-regulation, governance reform is needed to address an increasing

gap between constitutional legitimacy and people's perceptions, highlighting the process by which states, firms, and citizens are developing a new type of power to negotiate over regulatory issues.

2. Theoretical framework: Actor-network theory

Understanding complex policy issues like net neutrality requires a thorough sociotechnical approach. ANT adopts a socio-technical perspective into the design and analysis of technological systems that view the world as networks of technical and social actors. Actor-network refers to heterogeneous network of aligned interests including people, organizations, and standards. Latour (1987) argues that the actor-network based view of the spread of innovation applies to anything from goods and artifacts to claims and ideas. In this paper the view is used to explain the creation and diffusion of technical standards that define wireless services. The core of ANT analysis is to examine the process of *translation* (Callon, 1986; Latour, 1987) where actors align the interests of others with their own. Translation follows three phases. During the first phase, *problematization*, a focal actor frames the problem and defines the identities and interests of other actors that are consistent with its own interests. The focal-actor renders itself indispensable by defining a process under its control that must occur for all actors to achieve their interests. Callon (1986) calls this process an *obligatory passage point* (OPP). The OPP is typically in the direct path of the focal actor in the pursuit of its interests. Other actors may have to overcome some obstacles to pass through the OPP (Callon, 1986).

During the second phase, the focal actor executes these strategies to convince other actors to accept its definition of their interests (*interessement*). The final phase of translation, *enrollment*, is the moment when another actor accepts the interests defined by the focal actor. *Enrollment* also includes the definition of the roles of each actor in the newly created actor-

network. *Inscription* occurs with enrollment when actors in a network embed scripts for future action and behavior in the network.

With ANT, this study analyzes dynamic and critical relationships among actors in three realms as suggested by Lyyntinen and King (2002): the technical system, the social system, and the environment. The technical system is about the evolution and development of technical artifacts. The social system is actor networks comprising the interconnected interests and negotiations which are able to develop new solutions and capabilities over time. During the dynamics in the social system, regulatory authorities influence, direct, or constrain activities in the innovations and interaction. The environment includes a market place of actor networks which produce mobile services or their underlying technologies by exploiting technological capabilities. This framework is to investigate the process whereby the respective interests of different actors are aligned into a social and technological arrangement or artifact.

3. Methods

To carry out a complete actor-network based study of telecom policy, a variety of data collection methods were used in developing the case studies. Data were collected from multiple data collection methods –in-depth interview, telephone interviews, and email exchanges with people associated directly with the discussion of net neutrality from industry players, regulators, consumer groups, academics, and researchers. The interview guide was based on one used in a study of the Korean mobile industries (Yoo et al., 2005). Respondents were asked to explain how/why actors participate in the discussion and describe picture of actor-network relationships and how they develop.

The interviewees were thoughtfully selected and a total of 29 in-depth interviews along with 35 telephone interviews were conducted. All interviews were transcribed and

analyzed by multiple researchers for inter-coder reliability. Due to constraints such as the scope and timeframe of this research, a sample of key stakeholders and participants, identified from background research of the case, were selected. All interviews used a combination of structured and unstructured stimulus items.

Identifying interviewees followed a method of snowballing strategy that was suggested by actor network approach (Latour, 1987). Interviews started with the focal actors (MIC, Electronics and Telecommunications Research Institute; ETRI, the government R&D institute). Then, initial interviewees indicate next interviewees. This snowballing strategy (or network tracing) helped this study to discover the range of actors that had to be enrolled to enable the delivery of broadband wireless data services. Using this method, this study identified actors in each of the institutional domains and acquired a rich description of actor-networks.

Archival materials such as the industry report, government publications, and technical reports were collected and analyzed, and any materials pertaining to the net neutrality development were examined. Such archival materials were useful to obtain factual data such as figures and statistics of broadband subscribers. From the archival data, a total of 172 events related to net neutrality of Korea were collected. Finally, informal supplementary data were collected through phone calls, emails, casual talks, and faxes to clarify and follow-up. The data collected by these different means were cross-validated before use. The data collection took place between January and September 2014.

4. Net neutrality as a socio-technical process

From next section, net neutrality is described in each subsystem in the order of technology, market, industry, and policy. Then, the relation among each subsystem is explained from a socio-technical ensemble perspective.

4.1. What is net neutrality and what are they key issues?

Although NN is a term that is widely accepted, a clear definition has not been established (Kim, Chung, & Kim, 2011; Strover, 2010). Though most of the NN debates address network interconnection, access, and discrimination (e.g., Economides, 2008), there is no clear-cut division between what is neutral and what is not. Thus, scholars from a diverse range of backgrounds have addressed concerns about NN. Since Wu (2003) raised the issue, legal considerations have dominated NN discussions. Philip Weiser and Kai Zhu have been particularly vocal in this arena. Law scholars have examined NN issues in light of the politics, policies, and practices of network management (Blevins & Shade, 2010; Yoo, 2005).

On the other hand, a group of economists who have attempted to find solutions through economic modeling have conducted research on NN. Schewick (2006) and Peha (2007) used economic modeling and pricing analysis to evaluate NN issues. Economides and Tag (2012) disagreed with Caves (2012) over the validity of a two-sided market analysis for NN. Similarly, Cheng, Bandyopadhyay, and Guo (2011) expressed their support for the use of an economic model involving a financial arrangement between content providers and ISPs. Researchers such as Choi & Kim (2010) and Baranes (2014) analyzed NN from the viewpoint of investment incentives for ISPs and content providers. Further, Schewick (2012) analyzed NN from a proposed quality of service (QoS) perspective. She maintained that a user-controlled QoS should be permissible as long as the network provides appropriate baseline QoS.

Additionally, the NN issue can be understood from the perspective of public policy. Until the U.S. Supreme Court ruled that the digital subscriber line and cable modem services were not telecom services but, rather, information services, Internet connection services applied general rules of common carrier service (Strover, 2010). Afterwards, the Supreme

Court declared that content and application service providers could no longer depend on the common carrier regulation for guaranteed delivery of contents to the other end of the network. Numerous researchers have pointed out the public utility characteristics of NN from the perspective of public interest (Wilson, 2008; Zhu, 2007; Shin & Han, 2012).

Often, technical solutions associated with NN have been focused on resolving network sharing. Zhu (2007) reviewed the technical aspects of NN and argued that some of the issues should be viewed from a technological standpoint. Similarly, Yoo (2010) claimed that illegal NN regulations in some countries (i.e., ISP requirements regarding traffic management and regulations on illegal activities) do not reflect the technological evolution of the Internet. In this light, he raised the need for a technical approach to traffic and congestion management.

Recently, the concept of platform neutrality has been introduced to NN discussions. The concept of platform neutrality implies that web platforms (YouTube, Spotify and the Apple Store; Korean examples can be Naver and Daum) do not abuse their position to the detriment of other stakeholders. Lin (2013) proposed the notion of platform neutrality in a multi-screen TV regulatory scheme focused on regulations for classification of content for convergent audiovisual media. Platform neutrality supports light-touch regulation on innovative TV services that must be developed further to compete in international and domestic markets. Similarly, the Australian Law Reform Commission (2012) highlighted platform neutrality in its white report, "Classification-Content Regulation and Convergent Media."

While there are various approaches toward NN, no approach is perfect, and every approach has its pros and cons. Findings from this study suggest that the discussion should be centered on user interests since public users should be the eventual beneficiaries. Therefore, this study approaches NN from the people's perspective (i.e., user-centered policy design),

which is based on user-centered policy evaluation (Jaeger, 2008). According to Jaeger and Bertot (2010), policy design as well as policy evaluation should be performed by users. Such evaluations tend to increase policy capacity by involving people who are often left out of the policymaking process. As the convergence of ICTs has transformed the ICT environment, evaluation of the networked environment has grown increasingly important. User-centered evaluations play a formative role in refining and updating policies, and they are useful for ascertaining whether policy goals and objectives are being met (Thompson, McClure, & Jaeger, 2003). Given the public nature and magnitude of NN, it is beneficial to consider user-centeredness as a perspective that is needed especially when things become more complicated, as in the case of Korea.

While numerous studies have focused on Internet governance and the impact of access to the Internet on innovation and consequent growth, NN arguments are often couched in rather theoretical terms so that ordinary people cannot truly understand the debate (Quail & Larabie, 2010). Ly, MacDonald, and Toze (2012) observed that related discussions often reflect polarization, and the respective parties appear combative and distracted by politicized goals. Thus, it is difficult to contextualize NN in a particular local environment where it is applied in everyday lives; furthermore, NN conditions differ depending on the nation and/or region. For example, competition in Korea's telecom market differs from that in the European market. To create appropriate policies for each case, it is vital to look closely at the specific local situation of NN in each country, including its aboriginal language.

Generally, NN implies that all packets transmitted over the Internet will be treated equally, but NN in the Korean context has been discussed mostly within the frame of conflicting values between public interests and policies regarding competition (Shin & Choo, 2011). For the most part, the Korean economy has been driven by the business-government collusion structure, and the debate over NN has sparked discussions related to creating an

industry structure that safeguards public interests and enhances competition. With these two principles in focus, the Korean dialogue has focused on the fact that those who own the networks do not control their content. Thus, a major part of the NN debate in Korea is the concentration of ownership within the broadband industry; it is important to determine if network owners remain neutral in the flow of information. Furthermore, NN debates in Korea concern issues beyond network sharing, including complicated issues such as industry structure, social justice, and economic equality. This type of debate is similar to Anderson's discussion (2009), which emphasizes that NN is rooted in common carriage, a concept that has governed Korea's telecommunications history. In the context of the Internet, the idea of common carriage ensures that "Internet service providers [do] not discriminate based on source, ownership, or destination" (Anderson, 2009, p. 8). Because of the unique nature of the Korean industry structure, the NN issue has been more contentious and controversial compared in Korea than in other countries. It is obvious that this debate will develop differently than it has in other countries, partly because of cultural differences and partly because Korea already possesses one of the world's most extensive digital networks

4.2. Historical background: Korean broadband policy

The Korean government has been heavily involved in fostering broadband adoption, and it has provided several key characteristics with respect to regulatory regimes, infrastructure supply, demand, and institutional configurations conducive to policy execution (Shin & Jung, 2012). Since 1996, the Korean government has established a series of master plans for the development of an information society (Table x).

Table x

Korea's broadband initiatives

Year	Initiative	Enactment & Effect
1996–2000	First National Informatization Promotion Plan	Yes, but the effect was limited due to financial crisis in 1998 and the subsequent economic slowdown.
1999–2002	Cyber Korea 21	Yes. The effect was positive as it is
2002–2006	e-Korea Vision 2006	continued to e-Korea Vision
2003–2007	Broadband IT Korea Vision 2007	The vision was announced and the
2006–2015	U-Korea Master Plan	plan was merged to U-Korea Plan
2006–2010	Phase 1	Total of 34.1 trillion won (US\$24.6
2011–2015	Phase 2	billion) has been invested.

Technically speaking, broadband growth in Korea has been impressive. Indeed, the country has seen a significant transformation from less than one Internet user per 100 inhabitants in 1995 to one of the world's most highly penetrated broadband markets. By June 2011, fixed broadband penetration was 51% and market penetration of 4G services was 62 subscribers per 100 inhabitants (Shin & Jung, 2012).

Kim, Kelly, and Raja (2010) suggested that Korea's practices in approaching broadband as an ecosystem were among the best, noting that Korea has been highly successful in spurring broadband's rapid growth. Korea's exceptional success in developing broadband and ICT reflects a unique mix of highly competitive private-led markets and government leadership, use, support, and regulation. This situation reflects a unique balance between cooperation and governance. The Korean government has intervened in many ways in the broadband market in a focused and strategic manner. The government's actions have been critically important for triggering or guiding private sector development and tying it to the administration's objectives and the country's conditions.

Moreover, the Korean government's holistic approach to broadband development has

been particularly effective. A number of factors have contributed to the successful promotion of broadband in Korea, including (1) the government's long-term strategic planning, (2) liberalization of the telecom market and the creation of a highly competitive environment, and (3) demand (e.g., for low broadband pricing).

The Korean government's regulatory policies have also been successful, particularly in terms of increasing competition in the broadband market. Interestingly, this issue has not been addressed in the NN debate. The Korean government's position toward NN remains obscure and sometimes confusing.

4.2. Actors in net neutrality

A familiarity with the actors (stakeholders) who have a variety of interests in any regulatory deliberations on net neutrality is useful in understanding the net neutrality debate. The actors in the debate can be broadly categorized into the following groups: the government (KCC), network operators (KT, LG Powercom, and Hanaro Telecom, which later merged to SK Broadband), ISPs, cable operators, content providers, and users (see Figure 1). The common goal of these stakeholders is for Korea to become a world leader in IT by promoting competition in the IT industry and to become a broadband utopia by establishing the next generation network, Gigabit Internet. For this common goal, these players work collectively to promote the IT industry through settling on standards, policies, and business models that can help lead to the best possible outcome for all actors. Yet there were rather different interests and varying approaches in achieving the common goal. To KCC, net neutrality was a step-up opportunity to advance Korea as one of the leading countries in broadband worldwide. KCC is pushing to build Gigabit Internet (what it calls an Ultra Broadband convergence Network--UBcN), which is a unified communications infrastructure for telephone broadcasting.

Internet users and their advocates generally favor net neutrality, while telecom companies see it as a potential threat to the use of their own property. Cable companies and ISPs are on the telecom companies' side, opposed to net neutrality because, without the ability to tier Internet services, industry would not have an incentive to invest in new equipment and technologies. On the other hand, content providers favor net neutrality because they do not want to be discriminated against. Overall, proponents of net neutrality argue that it protects freedom of speech and encourages innovation by content providers. Opponents argue that net neutrality principles inhibit freedom of contract between companies. This debate is becoming more intense as more and more new technologies are introduced, such as smart TV, and as new business models launch, such as the mobile virtual network operator (MVNO). Pressure is mounting for regulators to decide how they will or will not regulate the industry.

-The government (KCC)

Historically, something approximating net neutrality has been a part of Korea's efforts to build a modern telephone network starting in 1980. The experience with a massive telephone service backlog and the social divisions it exacerbated made the goal of universal, equal service for all Korean citizens a non-debatable issue. From the beginning, Korea set out to build an "information welfare society" in which services and their tolls would be the same for residents of farming and fishing villages as for the residents of Seoul.

These efforts have continued in recent broadband development. The Korean government has led the development of broadband since 2000. The government's strategic ICT plans continued as the ICT Promotion Plan (1996), Cyber Korea 21 (1999), e-Korea Vision 2006 (2002), Broadband IT Korea vision 2007 (2003), and the recent IT839 Plan (Shin, 2007). Wu (2004) explains that the development of a strong broadband service was

largely due to the fact that over half the network is fiber optic and ready to provide advanced services. Thus, government was able to find huge financial resources in developing the network. The government provided active funding to the broadband rollout. Specifically, this occurred largely through the Korea Information Infrastructure Plan, completed in 2005 (Shin, 2007). The plans led to Korea being one of the most advanced countries in broadband usage. Industries are taking the lead more than before, though the government's strategic decision still plays a significant role in the investment decision making companies. ISPs are assured of the future demand of broadband services because the government is at the forefront of maneuvering the new market.

Through the series of broadband projects, the KCC has been a key player. As a statutory independent body of the government and the nation's top telecom regulator, the KCC is in charge of telecommunications, information, and communication policies. The KCC has been credited with establishing the unified regulatory frameworks and guiding the commercial launch of next-generation services, such as IPTV. Since its inception, the KCC's consistent goal has been enhancing fair competition in telecom markets and increasing public welfare. In 2010, the KCC announced, "KCC's top policy focus is to loosen the rules of telecom policy and to introduce new telecom operators as consumer-friendly measures. Such schemes will help users utilize related services with further discounted prices, as more players mean more competition" (KCC, 2010). Though it is not explicitly stated, this strategic frame is in line with net neutrality, and the KCC has considered the net neutrality option to reduce consumers' telecom expenditure because net neutrality has been considered to be one compelling tool for achieving this goal (Jeong, 2010). Under government protection, three incumbent carriers have dominated the telecom arena for decades, but the new government administration seems determined to lower entry barriers into the market in a bid to fuel competition and price cuts (Kim, 2009). Under the Gigabit Internet project, the government

plans to force incumbent carriers to lease their networks to new entrants that offer telecom services without the need for owning a spectrum license or infrastructure. In this context, the KCC's future goal to introduce net neutrality is to stimulate market competition and to generate new revenue streams through the creation of an open network. To encourage competitiveness for improving the content market structure, the KCC revamps the open mobile Internet network and galvanizes the wireless resale. However, the KCC should also be also cautious that an execution of net neutrality that is too abrupt could discourage network operators and ISPs from participating and investing in the Gigabit Internet. To the KCC, government-private partnership is essential in building such large-scale networks. In terms of net neutrality, a major dilemma for the KCC is the fact that a consistent approach has not been adopted; instead, the KCC has taken a case-by-case approach.

-Consumers

As consumers expand their use of the Internet and as new multimedia services become more commonplace, control over network quality also becomes an issue. This is truer to Korean consumers who have been seen to be both technology innovators and IT prosumers who produce many of their own contents and services. The innovative nature of consumers works well with net neutrality, which aims to build an open network. In addition, as multimedia services are increasing, the best effort delivery method is not enough for these multimedia services. The quality of service needed for the delivery of the most popular uses, such as video, online gaming, and voice service, and the need for uninterrupted streams of data becomes important. As the demand for such services continues to expand, network broadband operators are moving to prioritize network traffic to ensure the quality of these services. Consumer groups argue that, without net neutrality, consumers' favorite Websites and online services will not be in the fast lane, which means service may be unreliable or blocked. Net

neutrality policies are important for empowering Korean users by preventing telecom companies from restricting access to blogs, wikis, and independent podcasts.

-Internet content provider vs. ISP

The Korean Internet service market has been dominated by three telecom companies that maintain a backbone Internet network: Korea Telecom (KT), LG Powercom, and SK Telecom (SKT). They are aggressively pushing new business lines that can be easily linked to the Internet access service with undue influence. Unlike ISPs, companies that produce content are relatively smaller than network backbone operators. NHN and Daum represent the largest Internet portals in Korea, as Google and Yahoo do in the U.S. However, the market values and the revenues of NHN and Daum are not comparable to those of KT. CJ Media Group and OnMedia are also known to be major media groups, but the market value of OnMedia in 2008 was less than 3% of that of KT. In this situation, the bargaining power seems to exist between content providers and network operators. KT has enjoyed being the significant market player for a long time, before and after the deregulation of the Korean telecom market. KT was privatized in 2002 and recently began to acquire content production companies. Such a strategic move is considered a vertical expansion effort to penetrate into the content provider industry. Given the aggressive move, net neutrality will become a more significant issue once KT begins to provide content via its own network. Along with KT, ISPs want to charge Internet content providers for enhanced services, while content providers argue that regulations are needed to prevent abuse by ISPs.

-Network operators

There are three network operators in Korea: SKT, KT, and LG Telecom. These network operators are the mother companies of the three incumbent ISPs. KT Cook, SK

Broadband, and LG Powercom are the subsidiary companies of KT, SKT, and LG Telecom, respectively. This subsidiary system represents vertically integrated structure in the Korean telecom and Internet market. Naturally, these network operators are vehemently against net neutrality in supporting their subsidiary companies. Companies that own the physical pipes of the Internet argue that they have the right to control the use of those pipes in a way that is most profitable to them. The telecom companies also complain that government regulation may hinder return on investments, deterring them from expanding the broadband infrastructure.

-Cable operators

In general, cable operators in Korea are conservative about net neutrality. Cable operators have been preparing for the digitization of broadcasting content, but they have a short history of providing Internet and other information services. Only a few merger and acquisition deals have been realized. Cable operators act as local retail ISPs and they have accepted transit relations with backbone providers with minimal resistance except for an increasing fee. Cable operators constitute one of the members in the local ISP market, but they are not at all influential in the Internet backbone provider market. In 2006, cable companies and the new broadband provider, Powercom, have blocked an estimated three million customers from watching broadband video from HanaTV, a new service from Hanaro Telecom. More than 60,000 customers signed up for the service (which requires a set-top box) in its first three months.

-Internet platform provider (Naver, Daum, and Nate)

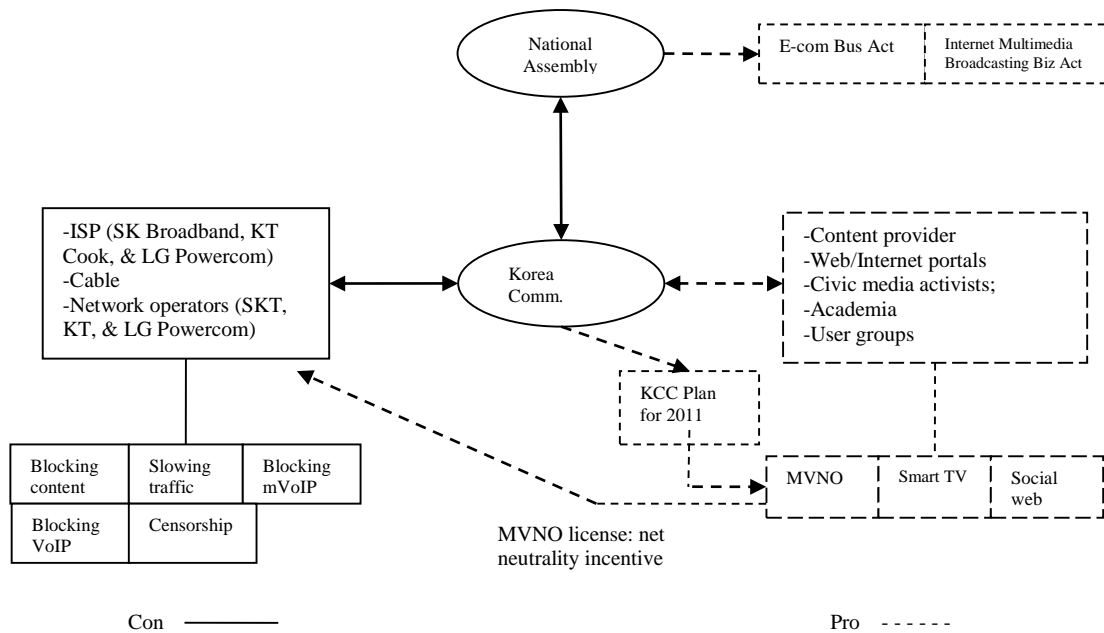


Figure 1. Actors in net neutrality

The four moments of translation in this story are problematization, interessement, enrollment, and mobilization.

4.3. *Problematization and translation*

A focal actor identifies potential issues during a *problematization* stage. Preliminary decisions concerning what will be addressed as well as how it should be resolved are made at this stage. *Translations* refer to a variety of ways by which actors seek to persuade others and enroll them into an irreversible alignment with an existing or prospective network. Through *translations*, actors attempt to create a forum, a central network in which all the actors agree that the network is worth building (Callon, 1986).

As the network and the Internet are increasingly becoming the dominant platform, NN has been considered as the basis of a fair competitive market and the basis of democracy, by which a community should decide what to do. In particular, Korean network industries traditionally have been protected by the government. That is, they have been birthed and

handled by government protection, artificial market dominance and a market segment that has an inelastic demand for their services. In response to the walled garden of the Korean industry, NN has emerged as an alternative paradigm to bring healthy and effective competition into the oligopoly market (Kim, 2011). So far KCC has not announced any official position for NN policy. KCC has been extremely cautious trying to avoid hasty commitments whenever asked to express its opinion towards NN (Kim, 2012). This was probably because they knew how immense the effects this issue would potentially have on the future of Korea's communications industry in the long term, if not in the short term.

Over recent years, NN had suddenly turned from an important but long-term issue to an urgent current issue. It led to the operation of the Network Neutrality Forum hosted by KISDI (Korea Information Society Development Institute) and supported by KCC. This forum was the first case in Korea officially publicizing the NN issue. Through the forum, various opinions and perspectives have been gathered and reflected in the formulation of the policy. The forum consisted of members from various backgrounds and interests, including the professors of law, economics, engineering, and the executives of telcos and on-line service providers as well as the experts from KISDI and KCC (Kim, 2012). Spurred by the forum, the Korean National Assembly is preparing to address NN in the near future as the debate begins to intensify. The new NN bill is garnering more attention in the public sphere than previous legislation attempts and could signal a new battle between NN proponents and opponents.

Recently, KCC also creates an alliance of mobile carriers and content providers with the aim of settling differences over NN. According to the KCC, under the supervision of the regulator, the Smart Network Business Association is inaugurated in December 2012. KCC is attempting to resolve matters between network operators and content providers, while planning to initiate joint investment and projects on transmission technology.

-Incidents

In February 2012, KT, Korea's No. 1 fixed-line operator, announced that it would restrict the usage of smart TVs as they consume five to 15 times more data and, in the case of real-time streaming, hundreds of times more data. KT argued that blocking smart TV traffic is inevitable in order to protect Internet users and maintain market order. Samsung, a smart TV manufacturer, countered that KT's blocking is in violation of the principle of network neutrality (NN), which says that Internet service providers (ISP) should not discriminate between Internet traffic, and there needs to be an objective verification into its allegations that smart TVs cause excessive data traffic. A similar incidence occurred in June 2012 when Kakao, a mobile messenger provider, began a free mobile VoIP service using a wireless network. This move sparked vehement oppositions from mobile carriers who fear the increase in data traffic and loss of profits, which would likely occur from the widespread adoption by Kakao Talk's existing 46 million users. These worries are manifesting themselves in a regulatory dispute between mobile service providers like SK, KT, and LG U+ on one side, and providers of mobile VoIP services like Daum's MyPeople and Kakao VoiceTalk on the other.

It seems that the debate on platform neutrality (algorithms, transparency, etc.) has been looming on top of the traditional net neutrality discussions. In the beginning of NN debate, Naver and Daum caused heavy traffic but the government did not regulate those big companies by limiting their service or demanding them extra fee, while they target KakaoTalk almost exclusively. But now Naver and Daum become a target in the name of platform neutrality. It has been said that Korean internet firms particularly Naver the platforms maintain their dominant position in platform by three main operations: acquisition, diversification and exclusion. Naver started growing its presence in early 2000, with its

'Knowledge search' service, where users can ask any kind of questions and get the answers from other users. Naver knowledge service quickly gained popularity and grossed up to 1000 questions uploaded a day, making Naver THE site to visit when having very specific questions. However, the Knowledge search service alone cannot explain why Naver was able to rule over Google, which currently has 3.5% PC search share or Yahoo, which closed down its Korean operation two years ago. A key reason behind the dominance lies in platform. Naver provides a platform where users can consume contents- comics (webtoon) and novels (webnovel). Every day, more than 20 webtoons get updated on Naver. Famous webtoons regularly gather close to 30,000 ratings and more than 10,000 reviews from readers in less than 12 hours. Naver hires promising webtoonists through various sources including their own open webtoon platform (Challenge webtoon), where amateur webtoonists can upload their work and get evaluated by Naver's 40 million portal users. Naver also recently launched a Webnovel service. Popular webnovelists from Naver make over 10,000USD a month for the preview service, where users can access the new chapter a week before.

These series of incidents concern NN, which is a hotly debated issue subject to regulatory and judicial contention among network users and access providers (Kim, 2012). In fact, the NN debate has emerged over the last several years, but the intensity of the debate has elevated discussion to the political level, where competing conflicts of interests are difficult to resolve. Against the heated debate over NN, Korea is struggling with the rising debate as there has been no consistent framework established yet. For example, in response to Kakao's incidence, the Korea Communications Commission (KCC) made a rule that the authorities have come up with a basic guideline for reasonable network management. However, this new rule would allow Korean telcos to discriminate against not only mVoIP, such as Voice Talk, but also Peer to Peer (P2P) technology that has been widely used in Korea for online broadcasting and downloading software patches. Like this example, until now, the

government has not addressed the issue well, foreshadowing more hurdles with the emergence of NN. This anomie has rendered chaos and confusion among stakeholders, where there has been ongoing debate but deepening the gap among them. In the ongoing struggles, it is imperative for Korea to clarify the issues and resolve possible conflicts before NN is fully applied.

-Korean market

Broadband access in Korea is provided by three national operators—KT, SK Broadband, and LG U+, as well as many local operators, most of which are cable system operators. With these players competing to obtain and maintain subscribers, competition tends to be strong. Considering the growing competition in the market, Korea Communications Commission (KCC) announced in December 2009 that there was no significant market power operator, which led to *ex-ante* price regulations on KT broadband access services being lifted for the first time since 2005. Recently, competition in the market has focused on selling triple play service or quadruple play service with IP/Cable TV, VoIP, and mobile services. The total number of broadband subscribers reached 16.8 million in June 2010. More than 80% of the market shares were dominated by the three national operators—KT (42.8%), SK Broadband (22.6%), and LG U+ (15.7%). The mobile Internet service market has grown rapidly, correlating with the rapid gain in popularity of smartphones since 2011. In fact, KT has reported that only 5% of users are responsible for 50% of the entire traffic on its network, of which 88% is related to P2P file sharing (Kim, 2009). Measured by average broadband monthly price per advertised Mbit/s as of October 2009, broadband prices in Korea are the lowest among OECD countries at USD 1.76.

A constraint to providing broadband access service in Korea is flat rate pricing. The telcos have maintained intact flat rate pricing and have little choice but to keep doing so for

the foreseeable future. A very competitive market environment forces this type of pricing. Additionally, this situation may be attributed to KT's poor experience in its attempt to introduce usage-based pricing back in 2004 and 2005. Broadband users harshly resisted the proposal, and "usage-based Internet pricing" was eliminated in Korea. The aversion for usage-based pricing is linked to the high proportion and significant influence of heavy users in Korea relative to other countries. For instance, a great number of online gamers and middle/high school students watching online lectures have benefited from flat rate pricing. This scenario highlights the strong constraints regarding possible solutions to NN problems in Korea.

The public debate about NN intensified in 2006 when several cable broadband providers blocked traffic from HanaTV, a new Internet video-on-demand service, which they claimed caused excessive traffic. However, many users claimed that the speed of most Korean networks could easily handle the traffic and that the block was motivated by a desire to prevent HanaTV from competing with cable television offerings. The debate intensified in 2012 when KT announced that it would restrict the usage of smart TVs, as they consume 5–15 times more data, and, in the case of real-time streaming, hundreds of times more data than regular TVs. A similar incident occurred in 2013 when Kakao, a mobile messenger provider, began a free mobile VoIP service using a wireless network. This move sparked vehement opposition from mobile carriers.

Demographic factors (e.g., population density or geographic remoteness) have correlated well with broadband adoption (Kim et al., 2010). The higher costs of building broadband networks in the U.S., which is characterized by low population density, contrast with broadband services in Korea, where high population density increases broadband diffusion, improves service, and promotes investment opportunities. In the U.S., broadband services in less densely populated areas are not sustainable without carefully applied and

targeted government subsidies. Broadband Internet speeds in the U.S. are only about one fourth as fast as those in Korea. The U.S. Internet connections are more expensive than those in Korea, and American providers have spent over a trillion dollars in private investments in broadband infrastructure. Korea, however, with low-cost, high-speed broadband, has relied more on direct and indirect government subsidies. This is quite an interesting contrast in that the Korean government takes a hand-off approach to NN (*ex-post*), while the U.S. takes a proactive (*ex-ante*) approach.

4.4. *Interessement*

During the *interessement* phase, the focal actor strives to convince other actors to accept its *problematization* by enacting its strategy. During the interaction among the actors, conflicts concerning net neutrality have occurred. Several incidents characterize Korea's approach toward Internet neutrality. So far, Korea has not established clear regulation of Internet neutrality, nor has it showed a clear stance toward Internet neutrality. This has added confusion to the ongoing issue. Favorable neutrality events occur that give positive signals in establishing neutrality in Korea. It is important to look at the two aspects in a balanced way to evaluate the future of neutrality in Korea.

There are two sides of opinion about the Internet neutrality in Korea. The pro-group include content providers, Internet portals, civic media activists, and users. These groups generally favor the idea of the Internet or network as a commodity. These groups argue that services, like Smart TV and Social Web, should be provided without discrimination upon the network platform. Conversely, con-group, such as large ISPs and network operators, oppose the idea of Internet neutrality. These groups are generally resource-rich organizations and own network infrastructure. Historically, these groups have benefited through the unique

business-government collusion (Chaebol). It is reportedly known that these groups lobby to deter neutrality to KCC.

1) Blocking ISP content

The first breach of net neutrality in Korea occurred in 2006 when Korea's two largest cable ISPs, KT and LG Powercom, began to block subscriber access to an Internet television service, HanaTV, originating from rival ISP, Hanaro Telecom (Burns, 2006). KT and LG Powercom have over three million combined subscribers. Hanaro, second to KT in broadband, signed 60,000 customers for video-on-demand in its first three months. The Korean Cable TV Association maintains that "IPTV is a broadcasting, not a telecommunications service" and is boycotting the Hanaro offering. Cable networks have been fighting a regulatory battle to keep telecom companies out of the TV business. This may be the first large-scale breach of net neutrality for commercial purposes.

KCC intervened in December 2006, and as a result, HanaTV and LG Powercom reached agreement on connection charges and other matters in January 2007. Shortly thereafter, HanaTV's VOD service connection was reopened. However, HanaTV's conflict with KT and other CATV operators has remained at an impasse. In April 2007, KCC announced the "Communications Regulation Policy Roadmap" that called for a team of experts to convene in mid-2007 to examine the issue of "freedom of choice for internet consumers." Net neutrality in Korea was first interpreted as a consumer's free choice for Internet service.

2) Slowing the traffic of other services

Another Korean case involving the blocking of certain sites resulted in a more ambiguous outcome. After resolving the first incident, HanaTV started to provide IPTV

services. However, many network operators, including cable providers Curix, C&M, HCN, and LG Powercom, slowed traffic to it or blocked it altogether. The cable operators claimed HanaTV used excessive bandwidth, while HanaTV countered that those cable providers that were restricting access had their own television services that faced direct competition from HanaTV. The issue was not resolved until KCC found fault with both Hanaro Telecom and LG Powercom and ordered them to renegotiate connection charges. They did so in January 2007. However, the decision's ambiguity means that overall responsibility for satisfying the increased bandwidth demand remains undetermined. In the end, Korean law changed to require nondiscriminatory treatment of broadband customers.

3) Blocking VoIP service

Korea initially did not allow cable providers to provide broadband services. Instead, Thrunet and Hanaro leased space on those networks to provide broadband (Wu, 2004). While that separation between ownership and operation appears on its face to favor neutral networks, Korea has demonstrated a willingness to manage its network in ways that most Western countries would consider violations of net neutrality. For example, Korea allows only authorized companies to provide VoIP service under the Korean Telecommunications Business Act. In mid-2007, Korea forced the American military stationed in Korea to switch to approved Korean VoIP service providers. This decision effectively blocked the US military from using Vonage, which had been the most popular VoIP service. Later, the US government stepped in and brokered a temporary deal to leave service on.

Currently, Korea only allows authorized companies to provide VoIP service under the Korean Telecommunications and Business Act (Wallsten & Hausladen, 2009). According to the KCC report (2011), twelve VoIP companies are now authorized to operate in Korea.

4) Blocking mobile VoIP

The recent advent of mobile VoIP retrigger the debate of net neutrality in Korea. Mobile VoIP is a major concern to operators due to the anticipated presence of free riders benefiting from net neutrality. The regulatory bodies are facing bottlenecks over the issue, as 3G and WiMax are new technologies. Hence, regulators are concerned about IP calls originating from the 3G data and WiMax without any restrictions. With KCC taking a strong initiative to boost the smartphone market, KCC is considering issuing guidelines concerning net neutrality to allow mobile VoIP over smartphones. There are no control mechanisms or regulations in place yet to monitor such calls.

Telecom operators are vehemently against allowing mobile VoIP. Most mobile operators have prohibited the use of mobile VoIP over their cellular networks, with some imposing a surcharge to avoid cannibalization of their circuit-switched voice revenue streams. Moreover, mobile operators face intense competition from the more popular Web-based VoIP alternatives that are permeating the mass market (Kim et al., 2009). However, smartphone users already use VoIP over smartphone operating systems, such as Symbian or Windows Mobile, as well as Wi-Fi networks in Korea. Korean operators are already challenged by falling voice revenue due to the expansion of mobile VoIP applications. Korean operators are likely to allow it in response to users' demands and policy guidelines, since mobile VoIP is likely to be widespread. A more realistic choice for Korean operators is contracting with mobile VoIP companies to tackle this threat proactively.

5) Government censorship

Ironically, unlike KCC's implicit and often explicit support for net neutrality, government censorship on the Internet is generally considered an inhibitor of net neutrality. Korea's Internet censorship policy is highly political and particularly strong toward

suppressing anonymity in the Korean Internet (Shin, 2007). In 2007, numerous bloggers were censored and their posts deleted by police for expressing criticism of, or even support for, presidential candidates. This has even led to some bloggers' being arrested by the police. In 2009, Google Korea blocked users of the local version of its YouTube video service from uploading material after the government imposed rules requiring contributors to register using their real names, because Korea has made such regulation a matter of first importance. In 2010, Korean police investigators raided Google's Seoul offices on suspicion of illegally gathering personal information for its street mapping service. Google Korea was charged with violating privacy laws with Street View, a map service that includes photographs of streets taken by Google cameras.

6) Naver platform

The concept of platform neutrality implies that web platforms such as YouTube, Spotify and the Apple Store do not abuse their position to the detriment of other stakeholders. In Korea, platform neutrality emerges hot topic as Korean web platforms such as Naver and Daum become dominant platforms. While Naver is low recognition outside of Korea, it dominates the internet in Korea. Naver dominates 70 of Korean internet market like Google.

Civic organizations claim that web portals particularly Naver is so rich and powerful than it can acquire any would-be competitor. Hence, they propose platform neutrality to build an open and sustainable digital environment free from Naver's reaches. In this regard, Shin (2014) argues that it may be necessary to clarify platform neutrality in comparison to net neutrality and to tackle abuses of dominance, either through tough antitrust enforcement or new legislation.

4.5. Enrollment: Government's inscription

In the *enrollment* phase, actors pursue their own strategies and reach an agreement on the scope and content of the net neutrality. In the process the different interests of a range of actors have been translated into the agreement. *Inscription* refers to the way technical artifacts embody patterns of use.

The Korean government enacted the Electronic Communications Business Act in 1999 with the goal of promoting e-commerce. The act defines the broadband service as facility-based. Owners of the facility have the responsibility to share the facility with reasonable fees. The law supersedes the Fair Trade Act, leaving little space for the Fair Trade Commission. Since its inception, the act has served as a basic rule of Internet neutrality. Though the Internet neutrality requirements have been enacted through the act, conflicts from the smaller ISPs and content providers have continued. Conflicts usually occur in the area of pricing and privacy. While the pricing problem stems from negotiation between companies and can eventually be resolved, privacy is a more serious issue that should be given further consideration, because once a problem occurs, the effect remains for a long period.

Realizing the continuing problems, the government enhanced Internet neutrality by introducing another regulation, the Internet Multimedia Broadcasting Business Act. The act passed Congress in 2008 and enables the IPTV operation to define Internet neutrality in a weak form, requiring open access and non-discrimination from the network or platform operator. The act emphasizes fair competition and consumer protection as the policy goal.

While these two acts play roles in establishing Internet neutrality indirectly, a more specific and direct provision of Internet neutrality has been recently introduced. The government is also planning to improve Internet neutrality by requiring telecommunications operators to open their fixed-line and wireless networks further. A component of the *Plans for 2011* (KCC, 2011) includes “activating competition in the communications market by

advancing broadcasting industry, increasing the public functions of broadcasting, preparing political measures for Internet neutrality and converting consumptive marketing expenses to future investment.” This plan provides the base for MVNO and other policies to revive the industry’s vibrancy and ensure fair competition between different platforms.

The KCC has established a guideline in the end of 2011 and established a *Network neutrality policy advisory committee* in early 2012. The committee prepared a draft of *Reasonable traffic management scheme* in 2012 but the draft has not been finalized due to strong opposition of internet companies such as Naver.

In late 2012, the KCC set up rules that prevent a telecom operator from providing service “without justifiable grounds,” such as ensuring network security and stability. Citizen groups and open Internet activists in South Korea have opposed unilateral enactment of the KCC standards because they say the standards go against what presidential candidates at the time wanted and that there was a lack of social consensus on the standards.

The Korean National Assembly is preparing to address Internet neutrality in the near future, as the debate begins to intensify. The new Internet neutrality bill is garnering more attention in the public sphere than previous legislation attempts and could signal a new battle between Internet neutrality proponents and opponents.

4.6. Obligatory passage point

The OPP, broadly refers to a situation that has to occur in order for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass through and by which the focal actor becomes indispensable (Callon, 1986). An OPP can be thought of as the narrow end of a funnel that forces the actors to converge on net neutrality. The OPP thereby becomes a necessary element for the formation of net neutrality.

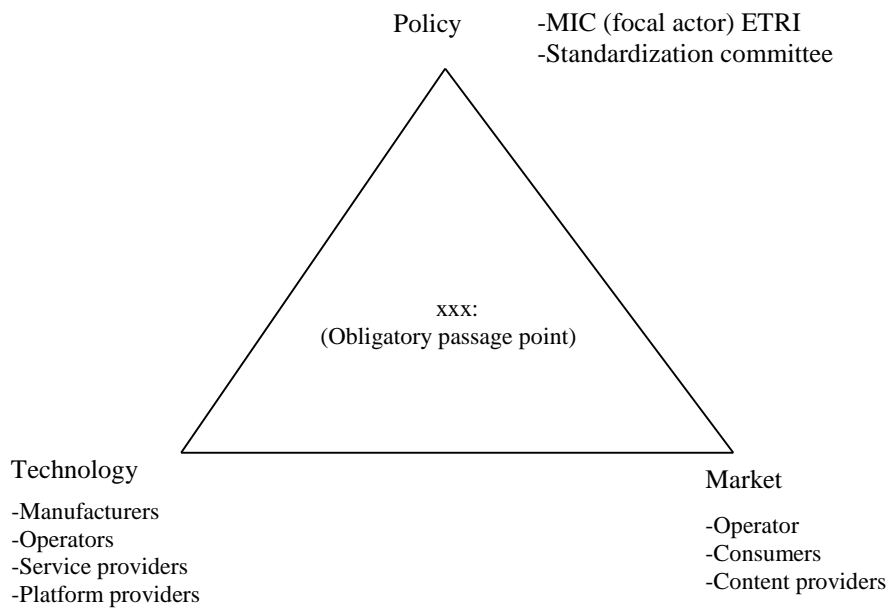


Figure 2. Actor network in the development Korean net neutrality

After all the interactions among the actors, currently there is no specific regulation or stance toward net neutrality. The KCC, as a governmental focal actor, does not pursue the issue any more. The KCC is focused on other issues such as creative economy, which is the main policy stream of the current government. Among the industrial actors, the net neutrality issues seem to be submerged as they are more interested in developing new areas of services such as Internet of Things, big data, and wearable computing. Industry like Samsung and KT have been strategically pursuing technological development such as LTE and wearable devices. Amongst this inactive discussion, net neutrality has stabilized as suggested guidelines and the issue has been dealt in a case-by-case fashion. This situation makes Korea look like hand-off approach or wait-and-see approach in regard to net neutrality issue. Thus, obligatory passage point of net neutrality has been settled *laissez-faire* in Korea as far as for now. While the Korean government has been fairly proactive and interventionist in broadband development, it has been hands-off or *laissez-faire* in the NN debate.

7.1. Legislative efforts in Korea

The Korean government enacted the Electronic Communications Business Act in 1999 with the goal of promoting e-commerce. The act defines broadband service as facility-based. Owners of a facility have the responsibility to share it for reasonable fees. Since its inception, this act has served as a basic rule of NN. Although NN requirements have been enacted through the act, conflicts with smaller ISPs and content providers have continued (Shin & Han, 2012), especially in the areas of pricing and privacy. While pricing problems stem from negotiations between companies and may be resolved eventually, privacy is a more serious issue that should be given further consideration (Ohm, 2010). Because of these recurring problems, the government enhanced NN by introducing the Internet Multimedia Broadcasting Business Act. The act passed the National Assembly in 2008 and introduced IPTV operation to define NN in a weak manner, requiring open access and non-discrimination from the network or platform operator. The act advances fair competition and consumer protection.

A more specific and direct provision of NN was introduced in 2011; the government attempted to improve NN by requiring telecommunications operators to provide greater access to their fixed-line and wireless networks. A provision of the 2011 explains “activating competition in the communications market by advancing broadcasting industry, increasing the public functions of broadcasting, preparing political measures for NN and converting consumptive marketing expenses to future investment.” This plan sets the stage for mobile virtual network operators and other policies to revive industry vibrancy and ensure fair competition between different platforms.

In addition to governmental efforts, the Citizens’ Coalition for Economic Justice, Open Web, and other civic-minded organizations formed the Network Neutrality Forum in May 2013. This forum has been designed to highlight public concerns about the NN policy

debate and represent citizens' voices in the decision-making process. Based on the conclusions of this forum, the corresponding ministry subsequently published NN guidelines. The main contents of the guidelines include user rights, transparency of traffic management, no blocking provisions, prohibition of unreasonable discrimination, and reasonable traffic management. However, the National Assembly is preparing to address NN in the near future because the guidelines have not been working effectively. A new NN bill is garnering more attention in the public sphere than previous legislation attempts, and it could signal a new battle between NN proponents and opponents.

Table

Efforts establishing OPP of NN in Korea

Date	Event/timeline
May 4, 2011	The KCC held the "Launching of net neutrality policy forum."
Dec. 5, 2011	NN guidelines are introduced by KISDI: 1) user rights, 2) transparency, 3) no blocking, 4) no unreasonable discrimination, 5) rational traffic management
Dec. 26, 2011	The KCC announced NN and Internet traffic management guidelines that were neither realistic nor effective for solving blocked VoIP or smart TV blocking problems.
Feb. 10, 2012	KT blocked Samsung Smart TV's connection (before the first discussion by the KCC, which was to be held five days later). Samsung Electronics sought an injunction against KT.
Feb.14,	- KT unblocked the Samsung Smart TV connection.

- 2012 - Samsung Electronics withdrew its injunction.
- Feb. 16, 2012 First NN policy advisory committee was formed.
- 2012
- May 4, 2012 - The KCC warned KT about “violating user agreements and Telecommunications Business Act.”
- The KCC recommended that Samsung actively participate in NN discussions.
- The KCC conditionally allowed the entry of MVNO.
- July 13, 2012 The KCC announced guidelines regarding reasonable management and usage of networks, and the net operator gained leadership of traffic management.
- July 18, 2012 The Open Internet Association opposed the guidelines, which have since been postponed.
- Jan. 25, 2013 - In late 2012, KCC introduced NN guidelines. In 2013, another NN policy advisory committee was formed.
- In 2013, the KCC agreed to form a NN consultative group.
- July 2013 -Public form on platform regulation (asymmetry regulation on Naver and
July 2014 Daum)

9. Discussion

By adopting the ANT framework, this paper reviewed the activities of influential players in determining the shape of the net neutrality policy in Korea. A number of issues suggested by ANT, such as errors in confusing problematization, inconsistent enrollment, and ineffective mobilization, all contributed significantly to the fiasco. One lesson becomes clear: Technology evolution and the path decision related to it requires a long-term assessment

within the socio-technical system, and so the negotiation/decision should be determined by individual carriers on the basis of deciding which technology the carrier can use to maximize its future revenue. *Problematization* is not a one-time activity, but an ongoing process (Sarker & Sidorova, 2006).

Korea has faced NN concerns and problems. They have applied various approaches to resolving problems, thereby experiencing diverse consequences. Their inconsistent approaches, however, have made it difficult to stabilize or resolve the matter. Korea's approach has at times lacked formal and specific rules, and broad authority has been granted to the government by the law. While proactive regulation regarding competition emphasizes the intervening role of government, Korea's approach to NN has been unmanaged at times. Occasional or sporadic problems related to NN could be addressed *ex-post* through competition laws, but this approach may create further problems if conflicts are not resolved in a consistent manner.

Against this point, it is suggested Korea to have more consistency in NN. For example, the U.S. has shown consistent approach by imposing rules *ex-ante* to determine bounds of permissible conduct by IP-based networks. While there are no enforceable non-discrimination rules in the U.S. (FCC, 2014), there is a clear pattern of *ex-ante* efforts there, unlike in Korea where a case-by-case approach includes establishing guidelines of acceptable practices and regulating competition. Also, Korea is recommended to have substantive themes in its approach. For example, the key theme of the U.S. can be (1) free speech and democracy; (2) innovation and investment; (3) competition and market forces; and (4) history and precedent.

By accounting the Korean case with ANT lens, it is becoming clear that the network problem is far too complicated for even the most sophisticated regulator to craft a single set of magical rules to apply a solution. It is unlikely that a single set of *ex-ante* or *ex-post* rules

would address all of the challenges presented by NN without running the risk of over-regulation (Crocioni, 2011). The market must be empowered to constrain behavior in the most economically efficient way. Therefore, a clear statement of acceptable carrier and subscriber behaviors is needed, and it must be facilitated by governmental supervision. However, when competition is imperfect and if users' rights are not ensured, there will be the need for regulatory intervention. Since NN is related to ongoing competition and public interest, efforts to address it should focus on solving the underlying lack of competition rather than solving one-off network traffic management problems. In the same manner, NN should emphasize the *a priori* principle of human rights, not stirring political slogans. This ongoing issue requires a more fundamental long-term solution.

Implications: Managerial and academic implications

This study has practical and theoretical significance. As to the practical implications, the findings provide strategic guidelines to the Korean net neutrality. Our analysis in this study reveals that NN issue is an outcome of contextual interactions involving regulations, broadband, markets, and users. Additionally, NN is not a final deliverable, particular specification, or certain status; it is an ongoing process with a goal of making society and markets equitable and sustainable platforms for competition and innovation. Given its embedded complexity, there is no one-size-fits-all solution to NN. While our analysis confirms this position, the results leave more questions than answers. By remedial government intervention, the Korean government has utilized regulatory restraint and punitive intervention when poor conduct has become visible. It is difficult to make general concepts actionable or enforceable regulations because of the differences in perceptions regarding NN, which are deeply rooted in societal and individual perceptions. Thus, wide variations in the definition of NN create ambiguous notions about effective competition.

Managing competition in harmony with public interest is challenging where there is an entrenched, powerful incumbent as in Korea. This situation leads to politicized rulemaking and even regulatory capture in both countries. In addition, both markets change too quickly for administrative or legislative management, making effective competition the best remedy. Any effective regulatory strategy for NN may comprise a broad spectrum of approaches, including *ex-ante* principles, pre-specified guidelines for acceptable practices, and precompetitive regulations. Regulators should be focused on introducing or reintroducing effective, sustainable competition. Both governments should not view NN from the dichotomy of logic (i.e., competition and regulation); rather, they should seek strategies that create and maintain the Internet ecosystem by encouraging diverse users, more network providers, more service providers, and more content suppliers to join the ecosystem. As the NN debate has brought the battle over the broadband ecology of the smart environment to the surface (Heimann, 2011), the issues require constant and coherent realignment, making NN a long-term project for sustainable ICT ecology.

In addition to practical contributions, this study contributes to ANT literature. As Gao (2005) indicates, ANT has been used mainly in analyzing the process of technology/system implementation and design in organizations. The present study shows that ANT can be used broadly and extended to analyze the formulation of network policy, regulations, and strategy. In addition, the findings of this study show the benefit of ANT by incorporating contextual analysis. The contextual analysis used in this study is valuable, because it emphasizes the interests of actors and their power to influence an inscription, for example, actors' willingness to participate in interest translation and their propensity to resist a translation. When the actor-network approach focus how scenarios develop and actors are enrolled into actor-networks, the contextual approach emphasizes the negotiations between social groups. This study focuses on social relations among actors in order to capture the dynamics of

technological changes in order to link social interaction and technological choices. Future studies may extend these findings beyond the Korean case by comparing telecommunications strategy formulation in different countries.

Limitations of the study

Like any other qualitative study, this study has several limitations. The main disadvantage of qualitative approaches is that the findings cannot be extended to wider populations with the same degree of certainty that quantitative analyses can. Bias introduced by the researcher in the collection and analysis of the data limit the findings' generalizability. This study collected data from a limited number of subjects. The number was limited because of a limited budget and study duration. Because the subjects had generally high-level positions in industry and government, collecting first-hand data from these subjects was not easy.

As to the data, data analysis poses another limitation. This study collected data through various methods from multiple sources. To triangulate the disparate data, this study tried to maintain objectivity in the data analysis in order to ensure the reliability and validity of the data. Despite this study's efforts, qualitative studies inherently reflect the limitations of researchers' subjectivity in research design, particularly in data analysis. As a result, all the analyses and arguments are open to criticism. The findings therefore do not allow final conclusions to be drawn on the topic.

Future studies and recommendations

This paper raises a number of future research issues regarding illusive net neutrality and next-generation networks. As stated in the limitations section, future studies further delve into this topic with more subjects and with a wider scope. It is worthwhile to further

investigate how mobile technologies are developed through various mechanisms. Defining and investigating NN has been difficult because diverse actors use different definitions and approaches. In reality, what truly defined, and continues to define, the terms NN is the evolving ICT marketplace. This is why the ANT perspective is imperative to capturing the co-evolving nature of mobile evolution. The definition of what comprises a generation is clear only after the meaning of particular technologies is translated, enrolled, mobilized allied, and fully deployed globally in major marketplaces. This process of definition is currently occurring for network technologies such as wearable computing, big data and Internet of Things. The development of Internet of Things in Korea has been described with the catchphrase “Beyond Technology” but the question is, what exactly does “beyond technology” mean? Does it mean simply by technological advancement? The vague vision and unrealistic plans set by focal actors for the development of Internet of Things reveal many socio-technical challenges that the various stakeholders must overcome. Although many people have proposed visions of the future of technology, most of them unclear, a smooth linear transition on a universal pathway to development seems unlikely.

Korea will be a good resource for future study. It can be the best testing ground for ICT projects and future case studies on the distribution and adoption of emerging mobile technologies. Korea has a well-established infrastructure and the dynamic operations necessary to telecom development, in addition to rapid diffusion and a high service penetration rate. Korea is moving towards an even more advanced next-generation mobile service. Indeed, Korea provides great opportunities for telecom researchers to investigate: What are the driving forces that make Korea one of the best markets for telecom in the world? What sociocultural factors, along with policy factors, have contributed most to the development of telecom? What socio-cultural factors are and are not applicable to other countries?

As to the theoretical advancement of ANT, only a few research studies have investigated interaction among the components of the theory. Much research using the theory investigates its components discretely and thus have neglected taking an integrated perspective in looking at the interactions of the components themselves. Future research will attempt to clarify the interaction of the social and technological factors. For a better understanding of the interaction, future study should investigate technological change. Typical social science research using the socio-technical approach tends to consider technological change a black-box. Instead, future research should seek to explain technological change, that is, how technological change occurs and how new technology evolves. With these suggestions, future research can extend the integrated perspective of the socio-technical system perspective by looking at other emerging technologies.

10. Conclusion

The objective of this research is to highlight the process and consequence of Korea's net neutrality. For this goal, this study does not seek to determine whether net neutrality is actually appropriate for the Korean context or not. The focus is to rather examine the *problematization* that net neutrality proponents developed to *enroll* the other actors, how proponents promoted their knowledge claim, and how it was received by the society. This study shows how net neutrality networks of aligned interests are created through the enrollment of players of allies and the translation of their interests so that they are willing to participate in particular ways of thinking and acting that maintain the network.

The findings reveal fundamental conflicts of the NN debate, shedding light on insights for the next generation of Internet environments. The underlying tensions between fundamental values and regulatory responsibilities that have fuelled the NN debates in Korea are unlikely to disappear or diminish in the near future. The findings show that the concept of

a single focal actor possessing an OPP that allows it to translate the interests of other actors (Callon, 1986) is an ineffective process in this context. By setting net neutrality as OPP, KCC became a powerful focal actor and every actor had to go through it, but the *translation* process of KCC was not successful. The *translation* could have been mutual *interessement* and adjustments to align sufficient elements of actor's imagined futures. KCC is now challenged by their policy on NN, and a criticism is rising that KCC is trying to become a leading IT country at the expense of industry actors. Furthermore, the competition framework that KCC was trying to enforce added more asymmetry in the market. The *problematizations* of KCC were prompted by the emergence of a mobile medium for the delivery of new convergence services. Such disruptions bring together powerful actors, SKT and KTF, that both act as de-facto focal-actors. As a result of the growing power of the two carriers, KCC's aspiration of tripartite competition in the mobile market has been seriously challenged.

In addition, in the process of *problematizations* and *interessement*, the KCC's inconsistent approach added a great amount of confusion to the actors. The lack of transparency in rule making and in Korea's regulatory system continues to be the major problem cited by the actors. KCC exercises a great deal of discretion in applying broadly drafted laws and regulations, resulting in inconsistency in their application and uncertainty among businesses. Compounding this problem is KCC's frequent failure to provide specific and timely notification of planned or actual changes to laws and regulations in telecom policy. In a similar context, a group of researchers express a concern of the Korean government's excessive governmental influence over private operators' selection of technologies and interference in private sector negotiations involving licensing and technology transfers.

In closing, this study concludes that KCC had lacked a socio-technical understanding in the policy formulation: KCC's short-sighted technology assessment on network and thus

enforced ineffective policy decision costing exorbitant financial burden. This problem can be the tip of a huge iceberg the Korean political economy of telecommunications. Unless there is paradigm change in policy in telecommunications, similar problems will likely continue to occur in the future.

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Appendix

Recent NN timetables in Korea

Date	Event/timeline
May 4, 2011	The KCC held the “Launching of net neutrality policy forum.”
Dec. 5, 2011	NN guidelines are introduced by KISDI: 1) user rights, 2) transparency, 3) no blocking, 4) no unreasonable discrimination, 5) rational traffic management
Dec. 26, 2011	The KCC announced NN and Internet traffic management guidelines that were neither realistic nor effective for solving blocked VoIP or smart TV blocking problems.
Feb. 10, 2012	KT blocked Samsung Smart TV’s connection (before the first discussion by the KCC, which was to be held five days later). Samsung Electronics sought an injunction against KT.
Feb.14, 2012	- KT unblocked the Samsung Smart TV connection. - Samsung Electronics withdrew its injunction.
Feb. 16, 2012	First NN policy advisory committee was formed.
May 4, 2012	- The KCC warned KT about “violating user agreements and Telecommunications Business Act.” - The KCC recommended that Samsung actively participate in NN discussions. - The KCC conditionally allowed the entry of MVNO.
July 13,	The KCC announced guidelines regarding reasonable management and

- 2012 usage of networks, and the net operator gained leadership of traffic management.
- July 18, 2012 The Open Internet Association opposed the guidelines, which have since been postponed.
- Jan. 25, 2013 - In late 2012, KCC introduced NN guidelines. In 2013, another NN policy advisory committee was formed.
- In 2013, the KCC agreed to form a NN consultative group.

Recent NN timetables in the U.S.

Date	Event/timeline
May 2005	The FCC made its first move to address NN issues by issuing a Broadband Policy Statement (the Internet Policy Statement).
September 2005	FCC Chairman Genachowski proposed to add two additional rules to its 2005 policy statement (non-discrimination and transparency).
October 2009	The FCC approved a notice of proposed rulemaking on NN.
April 2010	The U.S. Court of Appeals in <i>Comcast Corp. v. FCC</i> ruled that the FCC lacks the authority to force ISPs to keep their networks open to all forms of content.
Dec. 21, 2010	The FCC's Open Internet Order 2010 banned cable television and telephone service providers from preventing access to competitors or certain web sites.
Sep. 23, 2011	The FCC released its final rules for Preserving a Free and Open Internet.
Jan. 14, 2014	A D.C. Circuit Court determined in <i>Verizon Communications Inc. v. FCC</i> that the FCC has no authority to enforce NN.

- Feb. 9, 2014 The FCC announced plans to formulate new rules to enforce NN while complying with court rulings.
- April 23, 2014 The FCC announced the proposed “right to build special lanes” with faster connection speeds for companies willing to pay a higher price.
- May 15, 2014 The FCC announced that it would seek public comments on how best to protect and promote an open Internet.
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