



Dynamics of Institutions and Markets in Europe is a network of excellence of social scientists in Europe, working on the economic and social consequences of increasing globalization and the rise of the knowledge economy.
<http://www.dime-eu.org/>

DIME Working Papers on INTELLECTUAL PROPERTY RIGHTS



Sponsored by the
6th Framework Programme
of the European Union

<http://www.dime-eu.org/working-papers/wp14>

Emerging out of DIME Working Pack:

'The Rules, Norms and Standards on Knowledge Exchange'

Further information on the DIME IPR research and activities:

<http://www.dime-eu.org/wp14>

This working paper is submitted by:

Jong-Seok Kim

Manchester Institute of Innovation Research, Manchester Business School
University of Manchester

Email: jong-seok.kim@dom01.mbs.ac.uk

*Does Rule of Royalties Facilitate Dynamic
Capability of Digital Distribution Management
System?*

**This is Working Paper
No 74 (May 2008)**

The Intellectual Property Rights (IPR) elements of the DIME Network currently focus on research in the area of patents, copyrights and related rights. DIME's IPR research is at the forefront as it addresses and debates current political and controversial IPR issues that affect businesses, nations and societies today. These issues challenge state of the art thinking and the existing analytical frameworks that dominate theoretical IPR literature in the fields of economics, management, politics, law and regulation- theory.

Does Rule of Royalties Facilitate Dynamic Capability of Digital Distribution Management System?

– In the Case of Mobile Telecommunication Industry in South Korea –

Paper to the DIME Conference:
The creative industries and intellectual property
London, May 2008

Contact: JONG-SEOK KIM (Gabriel)
Harold Hankins Bd. Rm 7.09
Manchester Institute of Innovation Research
Manchester Business School
University of Manchester
Tel: +(44)-(0)161-275-5935
E-Mail: jong-seok.kim@dom01.mbs.ac.uk

1.Introduction

Digitalization and digital convergence brought about huge changes in product, business, and industry architectures. Many different industries such as telecommunication industry, content industry, broadcasting industry etc., have come into shaping the place where different economic agents in different industry architectures play together (Miles 1998; Jacobides, Knudsen et al. 2006). But the erosion of boundary of industry architecture does not imply that any existing industry architecture does not subsist. In fact, until different industry architectures become totally consolidated, each industry still remain their own territories, where their formal and informal rules continue to be on effect. The convergence of different industry architectures drives economic agents to cope with different institutional rules and practices. Digital music services are the best exemplar of digital convergence, where economic agents under telecommunication industry, music industry, broadcasting industry, and electronic industry play together. Emergence of digital music services is due to ICT-related innovation trajectories and consequently brings about customized and mass production of digital music services in the context of service industrialization (Miles 2005). Digital music providers, which are not born in traditional music industry, should establish new interactions to negotiate royalties and their conditions with licenses holders in music industry.

North(1990), economic historian, pointed that better institutional structures could facilitate better economic performance, given in limited resources. His arguments can be inferred into that institutional structures could constrain (or facilitate) economic performance, where economic agents optimize and constrain (or facilitate) their behaviors under given institutional structures. Economic agents play their games on the game's rules, conceived by institutional structures. Each industry has unique institutional practice.

The most important economic activities to the firms are 'innovation'. Firms restlessly search new knowledge and collectively organize new innovation processes together with external economic agents (Nelson and Winter 1982; Pavitt 2002; Metcalfe 2005; Fagerberg 2006). Those innovation processes may take place in different institutional structures where firms are not used to be, for example, digital convergence. Furthermore, firm's innovations require dynamic changes in a given institutional structures, consequently demonstrating co-evolutionary processes between technology and institution (North 1990; Nelson 1994; Nelson and Sampat 2001). This study mainly reviewed two literatures of 'dynamic capability' and 'new institutional economics' in order to understand the relationship between 'innovation' and 'institutional structure'. And, this study aimed to demonstrate 'short-term dynamic evolutionary processes of routines'. As a result, this study initially proposed a question of how new institutional rules set up in the convergence of two different industry architectures.

Through the initial question, this research mainly investigated whether new rules-setting processes would constrain innovation processes. New rule-setting processes under the convergence of different industry architecture require new interactions with many different economic agents, consequently inducing dynamic changes in the span of coordination among economic agents along with innovation processes (Pavitt 1998; Pavitt 2002). This is a change of social routine along with a change in physical technology (Nelson and Sampat 2001; Nelson and Nelson 2002; Jacobides and Winter 2005). Changes in social and physical technologies are influenced by institutional strictures.

2. Evolution of Digital Music Services in South Korea

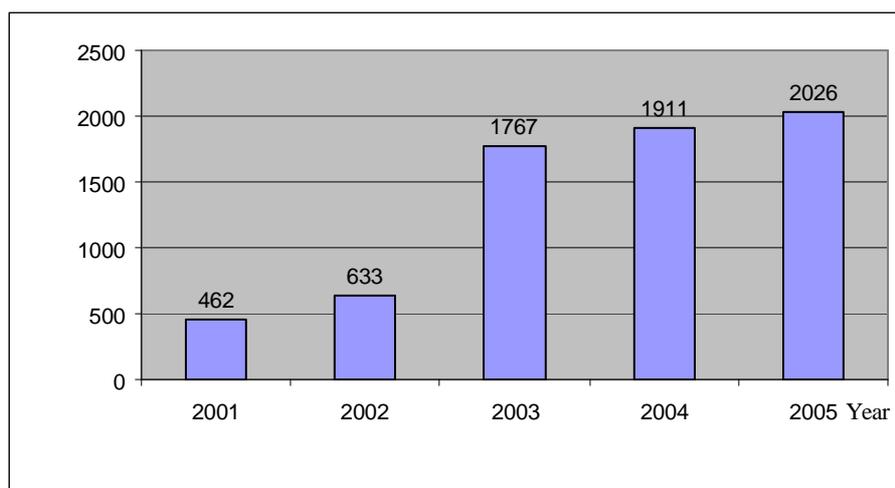
Mobile operators in South Korea advanced mobile networks from 1st to 3rd generation, which enables subscribers to download digital contents or to browse websites through the Internet. The evolution of mobile network and handset has stimulated variation of digital music services from ringtones to radio services (OECD 2005). Mobile operators have expanded the size of digital music market in South Korea. Ringtones/tunes and ring-back tones demonstrated revenue sources, which license holders and mobile operators recognized, while unauthorized music services and illegal music sharing have still been prevailed. Many online music services providers have not charged usages of music files, which consequently have attracted consumers to surf their websites. Those online music service providers make a profit from online advertisements and network traffic. Except ringtones/tunes and ring-back tones, it has been hard for online music providers to establish profitable business models. Furthermore, their business were very fragile due to many legal disputes of copyright.

Ringtones (*Bellsori* in South Korea) have been very popular music services, which begun in the Asia Market. Ringtones were first launched in Japan on NTT DoCoMo's I-Mode System in December 1999, and in Korea in the summer of 2000 (Takeishi and LEE 2005). Ringtone could customize the bell sounds, when a call is received. Initially, mobile phone manufacturers provided monophonic ringtones to users. The sounds in mobile phones caught consumer's attention, because of easy and distinctive recognitions of calls. In mobile phones, the music processing chip's capacity has rapidly advanced from simple 1-3 chords through 16-40 chords to the current 64 chords, which can replay sound quality close to CD records (Takeishi and LEE 2005). As capacity of mobile phones has been developed to sophisticatedly manage audio-sounds (signals), simple ringtones become polyphonic tunes. Despite simplicities of ringtones, content providers still need to grapple with some technical issues to maintain a quality of ringtone sounds, because each mobile phone have different technical requirements.

Ringtunes (*Live Bell* in South Korea) are advanced services from ringtones, due to advanced capacity of mobile phones and networks. In South Korea, in November 2002, ringtunes were launched. Snippets of actual music recordings or music performances that can be downloaded through mobile networks are used for mobile phone sounds. Unlike ringtones, ringtunes are actual music clips of original sound recordings, performed by the original artists such as singers, music bands, and musical performances, etc. Ringtunes are quickly diffused to young people; because they want to differentiate themselves from the others, sometimes, eager to catch an attention from other peoples. On ringtunes and ringtones, consumer's attitude to music is not just 'consuming goods to listen' but 'decorating goods to express themselves.' Compared to ringtones, ringtunes started to challenge a 'reasonable rates for royalties'.

<Figure1> Korean Ringtone/tones and Ring-Back Tones Services

Unit: 100 Million (Korean Won)



Source: (KIPA 2007)

There were four ways to use ringtunes sounds on consumer's mobile phones or devices(JUNG and CHEA 2004). First, mobile phone manufacturers in South Korea such as Samsung Electronics and LG Electronics, etc stored midi-types of sounds in mobile handset. After consumers purchased their mobile phones, they can select one of their mobile sounds, already saved into mobile memory chips. Second, there are many websites, which offer consumers with music sounds (files) without charging any fees of downloads. If consumers have their accessibility to the Internet, consumers can easily download music files for ringtunes sounds. By using mobile memory devices such as USB or directly connecting mobile phones to their computers, users can decorate their phones. Third, through mobile networks, users can

download music files and saved them into mobile phones. Most mobile operators courted music content providers onto their own mobile platforms. Lastly, consumers can copy music files from compact disc (CD), which they purchased. There are digital converters, which make it possible to modify music files in CD into MP3-formated music files. Consumers use music files for their ringtones sounds and disseminate them through the Internet by e-mail or uploading music files on the websites, where other people can easily share the music files.

After commercializing ringtones/tunes and ringbacks tones (*Coloring* in South Korea) was first developed by SK Telecom in South Korea around in 2002. This service allows the consumer to decorate music sounds, which callers hear before the phone is answered (OECD 2005). Regarding ring-back tones, the residential location of music sounds is in network servers, managed by mobile operators. In mean time, music clips in ringtones are located in the local server by content providers, and then consumers can download music files through the network by paying small fees of network traffic. Commercial applications of ringbacks tones are diverse, because music contents for ring-backs tones include not only music sounds, but also jokes, clips of celebrity voices, and even commercial advertisements.

Since ringtones/tunes and ring-back tones are launched in the year 2000, there have been dramatic market growths in South Korea (see above <Figure1>). Ringtones/ringtones services increased up to 462 billion Korean won at the year 2001. Between the year 2002 and 2003, the size of market had become triple. At the year 2003, the market recorded 1,767 billion Korean won. JUNG and CHEA (2004) conducted the market survey by interviewing wide range of sample. The results indicated that the young generation more likely to purchase music clips from ringtones/tunes and ring-back tones, in order to express themselves to other people by decorating music songs on mobile phones.

Those music services to mobile operators initially were additional services, which were one item of their service packages. There had not been much differentiations of those music services among mobile operators. But the dramatic increases of revenue in those music services led three mobile operators to systematically respond new demands of those services.

These popularities of ringtones/tunes and ring-back tones turned mobile operator's attention to the possibilities of digital music services. Mobile phone manufacturers started to recognize the huge potentials of digital music market by looking into growing market of MP3 players. Mobile phone manufacturers converged the functions of music player into mobile phones. In terms of speed and width of network capacity, transition from 2nd to 3rd generation network made it possible to transmit data faster and wider.

Consequently, SK Telecom launched new digital music services on convergent networks, called '*Mellon*'. After SK Telecom launched *Mellon* music services, LG Telecom and KTF respectively developed similar types of digital music services. LG Telecom launched *MUSIC-*

On service in November 2004. KTF opened *Dosirak* service in May, 2005.

Three mobile operators developed new business model on convergent networks. New business model is called as 'portable subscription downloads', which is new subscription services of digital music. Using DRM technologies allow users to have the portable access of subscription. Consumers obtain rights to listen (or download) music by subscribing into mobile operator's services. After subscribers download music files through fixed network at the home, they can save music files on their mobile phones or any music players, which they choose, and then they can listen to their music sounds on their mobile devices by synchronizing their rights along with network servers, managed by mobile operators. In reverse, subscribers can download (or stream) music sounds on their mobile phones through mobile networks. Going back to their computers at anywhere or home, they can automatically stream music files, which they selected outside by synchronizing their membership through fixed network along with network servers, managed by mobile operators. Once consumer has a membership on each service, consumer can stream or download music files whichever wants to listen on contract-period.

In addition, three mobile operators have provided 'a la carte' download service. Downloading individual music files means that consumers can acquire various rights to use digital music sounds. Therefore, consumers can literally (permanently) possess music files, which they have downloaded. Three mobile operators have also provided streaming services of music files, based on a technology for transferring data on a steady and continuous stream. With streaming technology, the client browser or plug-in can start displaying the data before the entire file has been transmitted. For streaming to work, the client side receiving the data must be able to collect the data and send it as a steady stream to the application that is processing the data and converting it to music.

Three digital music services such as *Mellon*, *Dosirak*, and *Music-On* caught a consumer's attention. Three digital music services have expanded authorized market growth to those digital music services. After three digital music services, SK Telecom and KTF provides a wide range of genre-specific radio streams in exchange for a monthly subscription fee. This is one-way audio transmission from radio stations on two mobile operators.

The emerging and growing market of digital music services brought about the mix of economics agents under different industry architectures. The central issues on mix of economic agents under different industry architectures are copyright along with the growth of digital music services. In order to delivery digital music services, firms need to clear royalties, to protect copyright from any illegal usages or impingement and to meet user's right and conditions. Key managerial tasks are right clearances and royalties according to various business models of different digital music services. Contracting and sourcing music contents

from copyright holders would lie with payment's system. Therefore, clearing sound recordings for digital distribution can involve very complex business considerations with a variety of economic agents.

Copyright, as institution, shapes the rules of the game in music industry, or more formally are the humanly devised constraints that have an impact on economic agent's interaction (North 1990). Copyrights provide both the legal and commercial foundations for the music industry, broadly creative industry.

3. Theoretical Discussions

3.1. Organizational Capability: Routine

This research refers organizational capabilities to the way things are done in the firm, or what might be referred to as its 'routines', or patterns of current practice (Jorde and Teece 1990; Becker 2004). Organizational capability is a composite of social routine (technology) and physical routine (technology) (Nelson and Sampat 2001). The notion of 'social technologies' in some ways are similar to 'physical technologies', but which involve patterned human interactions rather than physical engineering (Nelson and Sampat 2001). Institutionalized practices are a kind of social routines. There are social routines for setting prices, ordering new inventory, hiring new workers, deciding whether or not to promote them, etc(Nelson and Nelson 2002).

Generally, a routine involves a collection of procedures which, taken together, result in a predictable and specifiable outcomes (Nelson and Sampat 2001). A routine carries out a specific task as it is automatically programmed. Routines could demonstrate certain predictable patterns of their practices (Becker 2004; Becker, Lazaric et al. 2005). Recurrence is a key characteristic of routines (Becker 2004). Promptly pop-up or something just happened only once couldn't be called as a routine. Routines are organized to achieve a specific purpose. Nelson mentioned that the term 'skill' to the individual level becomes a single routine and the term 'routines' to organizational levels become collective processes, organized to achieve a specific purpose (Nelson and Winter 1982). Therefore, routines can be interpreted into collective procedures.

Routines as collective procedures are depository of organizational memories (or specialized knowledges) (Nelson and Winter 1982; Becker 2004). Specific routines have been stored into specific knowledge, given the context in which it is employed. In other word, single routine could represent a successful solution to particular single problem (Nickerson and Zenger 2004). Through trial and errors or learning processes, knowledge have been developed, stored and used in order to solve a specific problem.

Due to the nature of collectiveness, routines involve multiple actors, which means that carrying out one routine might take place in different locations by different actors (Becker 2004). Distributedness of routines means that different organizational units can carry out routines. This distributedness of routines requires managerial functions of coordination and integration. Because many different organizational units or individual actors are involved, coordinating activities are essential and recurring functions (Grant 1996; Becker 2004). Integrating the knowledge of many different individuals in the production process is a key managerial process, because firm's production requires input of a wide range of specialized knowledge (Grant 1996). Integration of specialized knowledge to perform a discrete productive task is the essence of social routines (Grant 1996; Nelson and Sampat 2001).

3.2. Dynamic Capability: Innovation Process

Technological and market changes drive firms to innovate their capabilities. This research defines dynamic capability as an on-going innovation process (Nelson 1995; Teece, Pisano et al. 1997; Verona and Ravasi 2003; Winter 2003; Tidd, Bessant et al. 2005; Trott 2005). In other words, dynamic capability is a high-order managerial capability to produce new capabilities (Teece, Pisano et al. 1997; Winter 2003; Tidd, Bessant et al. 2005). Dynamic capability has characteristics of evolutionary processes. Teece, Pisano et al (1997) are laid out three roles of organizational processes: coordination/integration (a static concept), learning (a dynamic concept) and reconfiguration (a transformational concept). Along with technological and market change, those three organizational processes are continuously circulated along with a life cycle of capability (Helfat and Peteraf 2003).

Keith Pavitt (2006) divides innovation into three, particularly overlapping processes, (1) production of knowledges (2) translation of knowledges into working artifacts (3) responding to and influencing market demands. Due to industrial revolutions, knowledge production has been specialized. Searching and selecting functions of specialized knowledge as well as market knowledge have become more important on innovation processes, due to production of specialized knowledge on divers evolutions of science and technology (Pavitt 1998; Pavitt 2002; Tidd, Bessant et al. 2005). By searching and selecting knowledges of market and technology, firms translate those knowledges into physical routines. Innovation process does not have liner processes like searching-selecting (designing)-implementing processes. Those processes are overlapped each other. Through innovation processes, firms produce new physical routines (working artifacts). Production of new physical routines can be partitioned into multi-projects by multi-organizational units (Hippel 1990).

Regarding production of new physical technology, firms as a dynamic integrator, modify the scope and degree of coordination among multiple actors and organizational units, in order to

integrate dispersed new knowledge. Old institutional practices on innovation processes are changed. There are different coordinating mechanisms, based on different institutional structures of production. The scope and degree of coordinating is necessarily in accordance with the scope and degree of learning. Product and knowledge are two sides of a coin (Wernerfelt 1984). Product complexity appears in knowledge complexity of products. Those knowledge complexities are being deployed into specialization in production of knowledge. An important and relatively recent manifestation of the increasing specialization in knowledge production has been emphasized on external coordination, designed to exchange knowledge in order to innovate physical routines (Pavitt 2002). Because of the continuously increasing number of technological fields that firms should monitor and master from specialization of knowledge production, firms have increased not only with the division of labor in the production of knowledge, but also with the division of labour in the production of goods and services (Pavitt 2002). Those division of labor in production of knowledge as well as in production of good and services are required coordinating tasks, which are institutionalized coordination mechanism. Innovation processes bring about institutionalized coordination mechanisms, which are influenced by institutional structure of each industry.

3.3. New Institutional Economics

The regulative coordination mechanisms cast a fundamental question of make-or-buy decisions. The question has raised an intellectual dispute of the firm's boundary. Ronald Coase (1937) argued that firms internalize their market transactions when transaction costs of economic exchange through market coordination is higher than costs of governance structure under hierarchical coordination. Williamson elaborated more by adding up two conditions of transactions: 1) bounded rationality is confronted by uncertainty and complexity, 2) due to asset specificity, individual opportunism is coupled with the absence of alternative exchange partners (Williamson 1991; Williamson 2002). Coase and Williamson have formulated contractual approach by economizing transaction and production cost; if a firm does not choose the boundaries of the firm correctly, the firm may suffer severe transaction and production costs (Hodgson 1998; Foss 2001). However, North (1990) argued that those transactions would be incomplete and would require higher cost to enforce contract unless a country has low-cost contract enforcement and protection. North (1990) emphasizes on understanding of the costs of third-party enforcement in his analysis of the dynamics of institutional change and the differential performance of economies across time and space. His emphasis on institutional framework, which prevents individual property from illegal usage, has a clear implication of relationship between innovation and institutional change. As Hadfield (2005) mentioned, the evolution of digital music services shift the focus into the need

to develop institutional mechanism to secure contractual commitment – notably for the problems of identification, security, and verification in electronic transactions that in many ways recapitulate the problems of institutional vacuum facing traders in the 12th Century.

In creative industry, specially, music industry, economic agent has experienced rapid and continuous evolution of technologies, which require changes in institutions of copyright. Copyright law and regulations are the most important factor of the institutional environment setting rules of the game because it presents the legal mechanism for protecting right-holders of contracts and enforcing contractual commitments (Andersen, Kozul-Wright et al. 2007). But in music industry, rules for rent creation and distribution from commercial usages of music sounds, protected by copyright laws and regulation are settled down along with economic agents such as firms, collective societies (organizations), composer, performer, musicians, publishers, broadcasters, legal authorities, and public organizations. Andersen, Kozul-Wright et al (2007) argued that the nature of interaction between economic agents for revenue and rent creation and distribution from music copyright can be termed ‘the play of the game’. Royalty management for collective licensing sets in a complicated institutional process where economic agents play together.

4. Research Design and Approach

This research investigated whether (or how) rule-setting process under the convergence of different industry architectures would constrain innovation process. This research defined dynamic capability as a continuous innovation process to produce new physical routines. Production of physical routines requires changes in the scope and degree of coordination mechanism; more importantly routines are influenced by institutional structures.

In order to develop new digital music services, firms require dealing with economic agents in copyright institution of music industry. Firms, which have not belonged into music industry, need to establish and interact with economic agents in music industry, because those firms should conduct right clearances and manage royalty distributions among economic agents in copyright institution in order to legally commercialize new digital music services. By setting up rules of royalty distributions and contractual conditions of copyrights, music service providers can legitimate their digital music services; furthermore, those can commercially launch their services. If music service providers lag in rule-setting processes of new digital music services, firms’ innovation processes could be constrained. Otherwise, if music service providers successfully settle down rule-setting processes, firm’s innovation processes could be facilitated.

Consistent with the research question, an exploratory and qualitative approach was used

(Denzin and Lincoln 2000). The retrospective longitudinal focus made it possible to research changes of copyright, induced by firm's innovation. This research designed a case study of South Korea mobile industry. Regarding the size of music market, South Korea ranked 29th over the world (KOCCA 2006). South Korea market is very small market, compared to other countries' market size. But in terms of digital music markets, South Korea ranked 4th over the world, after USA (1st), Japan (2nd), and UK(3rd) on IFPI Digital Music Report 2008 (IFPI 2008). IFPI described South Korea as a first country, where digital sales overtook physical sales such as CD, Cassette tapes, etc. It is very notable to look into the growth of digital music market in South Korea, because currently more than 80 % of music sounds are illegally distributed and consumed through various networks and websites (HUR 2007).

<Table 1> Market Size of Music Industry

Unit: 100 Million (Korean Won)

Section	1999	2000	2001	2002	2003	2004	2005
Physical	3,800	4,104	3,733	2,861	1,866	1,338	1,087
Digital		450	911	1,349	1,850	2,112	2,621
Total	3,800	4,554	4,644	4,210	3,716	3,450	3,708

Source: (KOCCA 2006)

Many digital music providers in South Korea have first developed or launched new digital music services, such as ring back-tones services, portable subscription download services on convergent networks etc. In South Korea, due to network convergent services, dominant music services provider are mobile operators, which initiated developments of new digital music services and legally launched digital music services. Three mobile operators in South Korea are all market leaders.

Regarding data collection, data from different sources are collected to underpin the study, in order to secure research validity. First, this research conducted extensive data collections of business documents (regarding copyright, digital music services etc.) and news articles of disputes of royalty distributions on new digital music services and of legal cases. Second, this research rigorously collected 52 interviews from 24 June to 16 September 2007. In order to manage qualitative data, this research used MS-Words and ATLAS.ti, which is a software package for qualitative analysis. Interview data are transcribed and compiled on MS-Words as formatted text-version. After transcription of interview data, electronic documents were stored into software program. However, regarding qualitative analysis, it used a traditional template analysis.

5. Adaptation of Digital Distribution Management System

Evolution of new digital music services from ringtones/tunes and ring-back tones to portable subscription services in South Korea mobile industry required adapting Digital Distribution Management System (DDMS), because those services are customized and mass productions of services. DDMS conducts several key functions as followings:

- Contracting and sourcing music contents from producers (or copyright holders)
- Protecting copyright from illegal usages or impingement
- Securing reliable distribution on different digital music services
- Making payment systems according to different digital music services

Digital distribution management system (DDMS) deals with critical issues such as copyright protection, its enforcement, and royalty management. Mobile operators create new routines of three important functions on the evolution of digital music services. The most important issues of digital copyright distribution management system are that firms need (1) to contract and source music contents from license holders, (2) to protect copyright from any illegal usages or impingement on digital distribution, and (3) to settle accounts of royalties for copyright holders. DDMS replaces offline copyright management processes. Recording companies (or collective societies) in music industry have conducted royalty managements on the volume of CD sales. Contracts for royalties among copyright holders have made on case by case (or production of CD). There has been consensus of royalty rates among copyright holders, sometimes, even though commercial popularities would lead to different negotiations among copyright holders. Regarding protection and enforcement mechanism of copyright, collective societies have intermitted illegal commerce of CDs and individual piracy of music contents, which they continuously monitor on the market. Monitoring works in the off-line world are relatively easier than doing them in cyberspace (or converged networks). On digital music services, offline copyright management system has not been worked out effectively. It is due to customized and mass production of services, which there has been disturbance transformation form physical products in CDs to information services in digital music (Miles 2005).

Three mobile operators in South Korea operated very limited system of digital distribution management on ringtones/tunes and ring-back tones. Ringtones/tunes and ring-back tones were provided to only mobile subscribers, which have memberships to use one of three mobile networks. Mobile subscribers accessed the mobile operator portals through mobile networks. When mobile subscribers entered the mobile operator portals, they can choose (or select) music contents, which content providers are able to offer. Music files can be downloaded into

their mobile phones (or devices). Particularly, in terms of ring-back tones, music contents, which are stored into network servers, cannot be downloaded into their mobile phones. However, callers can listen to music sounds, which subscribers choose, before receivers answer the calls. Three mobile operators in South Korea adopted walled-garden strategy, where only appointed content providers are able to provide commercial contents into the mobile operator's portals (OECD 2005). On the walled-garden strategy implemented by three mobile operators, there had not been many issues of copyright protection and royalty management. First, by using closed mobile networks, mobile operators did not concern much on copyright protections. There were very limited chances of digital piracy. Second, responsibility of copyright managements (1) to contract and source music contents and (2) to settle accounts of royalties, based on contracts with license holders, are placed on content providers. Content providers mainly conducted contracting process of music contents with various economic agents such as collective organizations, musicians, etc. After clearing out royalties of copyrights, content providers convert music contents into digital-formatted music files, which meets mobile operator's technical requirements. According to the number of usages of music contents on the mobile networks, content providers receive their profits subtracting from network traffic fees. They are charged of distributing royalties to license holders. But many content providers are small and medium enterprises. They don't have any systematic management processes of royalty managements. Furthermore, content providers in South Korea did not recognize the importance of copyright management.

Launching *Melon*, *Dosirak* and *Music-On* services brought about shifts in the locations of copyright management. Those music services are customized and mass service productions of digital music. Because there are unlimited combinations of digital music sounds, which consumers create on their preferences, it is impossible for mobile operators to manually manage royalty distribution and contacting music with various right-holders. There are different degrees of royalty distributions and conditions, due to the degree of popularities in music or performers. On digital delivery processes from license-holders to consumers, mobile operators need to secure reliable distribution processes of digital content, which is protected any illegal usage from unauthorized consumers. After digital sales, mobile operators distribute royalties to license holders. Therefore, mobile operators adapted digital distribution management system, which manages distribution of digital content from license holders to consumers without infringing contracts of copyright and contract conditions.

Components of digital distribution management system are Intellectual Property Right (IPR) Library, Royalty Payment System, and Digital Right Management System. Individual music (or song) has different but specific information of copyrights, for example, license holders, duration, etc. When mobile operators make contacts with right-holders, mobile operators

need to articulate different rate of royalties and conditions, according to different digital music services. These copyright holders (composers, lyricists, publishers, and sometimes musical arrangers etc.) are entitled to different rates of fee when a piece of music is downloaded or streamed through mobile operator networks. When music files are downloaded (or streamed), usages of music files should be reliably and automatically counted into the system, because mobile operators are forced to report the records of sales in digital music services. In order to deal with those complex procedures of royalty distributions on digital music services, mobile operators built up IPR DB Library and Royalty Payment System.

Mobile operators and license holders want to establish copyright protection mechanism. Mobile operators would like to enforce contracts with users and to control accessibilities of music services on their contracts. Therefore, mobile operators need to address information contracted along with various right-holders on the technical system. If mobile operators provide digital music services on the business model of subscriptions, mobile operators need to manage accessibilities of 'valid duration of subscriptions' when consumers claim their rights to use digital music services. Copyright holders also do not want consumers to use their music without proper payments, if they do not see any benefits of unauthorized usages of their music. Those reasons drove mobile operators to adapt DRM system (Digital Right Management).

Innovations of those components are required rules of royalty distributions and contract conditions, which are translated into physical artifacts, called as digital distribution management system. Rules are settled down through repeated interactions among copyright holders and music service providers in different industries. If rule-setting processes are delayed, consequently innovation processes are lagged. Interesting point is that different economic agents in two different industry architectures should interact each others, which means that, prior to digital music services, each economic agents never come across their industry territories.

6. Rule-Setting Processes of Royalties and their Conditions

Music copyright law (or just copyright) was established in the year 1957. In terms of legal structures and contents, South Korea adopted Japan's law and regulations of copyright. The first copyright law in South Korea was not enough to protect rights of license holders from impingement or piracy of contents as well as create proper institutional arrangements of copyright. Two amendments of copyright law aimed to join in international conventions at the year 1986 and 1995. South Korea modified some codes of copyright laws, in order to adopt international practices of copyright. Emergence of information and communication technology (ICT) enforced to amend copyright laws so as to clarify the right of reproduction,

which is associated with digital transmission of contents. Lastly, in the year 2006, the focus of amendment in South Korea copyright law was to enforce technical requirements of copyright protection to digital content services, because of unauthorized usages and impingements of digital contents through the advanced networks. Legalization of technical protections of digital piracy was compliances of tremendous requests from license holders, which had harsh experiences from digital piracy, particularly, Internet development. License holders looked into unauthorized music services by online music providers.

Copyright laws design institutional arrangements, specially collecting societies. The ambition of modern collecting societies is to enforce a comprehensive 'pay-for-play' principles, that is to monitor each and usages of music in a given territory and collect and distribute fees accordingly (Wallis, Baden-Fuller et al. 1999). By using collecting societies, license holders achieve low-cost contract enforcement and protection. In South Korea, there are three legal collecting societies such as Korea Music Copyright Association (KOMCA), Korea Association of Phonogram Producers (KAPP), Korea Performing Artists Association (KPAA), and other copyright holders such as, recording companies, publishers, singers, etc. Along with the market growth of digital music services, there have been emergences of new intermediary organizations, which deal with copyright management on behalf of copyright (license) holders. They interact each other along with music services providers, in order to set up rules. Eventually, they play the game to increase economic rents on their rights.

Many economic agents have set up formal and informal rules on the evolution of digital music services. Those rule-setting processes are not simple compromised processes, but complex processes where psychological, economical, legal, and technological factors are mingled through repeated interactions among economic agents. As moving on from ringtones/tones and ring-back tunes to portable subscription services, mobile operators required modifying their scope of coordination among license holders by adapting digital distribution management system (DDMS).

Mobile operators encountered fragmented and individual economic agents of copyrights in music industry. License holders in South Korea have not given much credibility to collecting societies such as KOMCA, KAPP, and KPAA. Majority of license holders have not entrusted those three organizations. Some license holders just entrusted intermediary organizations of their rights. Few license holders interact with service providers.

Fragmented and individual economic agents (license holders), which mobile operators should negotiate, made it hard to speed up rule-setting processes, consequently completing innovation processes of DDMS. It takes a time for mobile operators to establish new and many interactions along with license holders. More seriously, economic agents in music industry have failed to build up trustful relationship each other, in order to conduct systematic

negotiations. Many economic agents in South Korea music industry prefer individualized practices, rather than cooperative and organized practices through strategic alliance among trusted societies and intermediary organizations. Those organizations have had different business practices on their organizational missions.

Mobile operators had not been familiar with business practices in music industry. In order to increase understandings of business practices in music industry, mobile operators respectively arrange the meetings with experts, who have specialized knowledges of music industry and copyright. It was not easy works for staffs in mobile operators, who had accustomed to use vulgar practices in mobile telecommunication industry.

“..We organized many group studies to learn music business and industry, which we have not ever imagined that we will do music business in my company. We spent much times to learn it with partner companies. It feels like the blind man, who is touching elephant.”

Mobile operators follow four steps along with innovation process of DDMS. First, mobile operators referred royalty rates of streaming services. Online music providers already build up rules of royalties. Those rules, which set up by some online music providers, have been references, when new entrants of digital music services design their systems of royalty rates. Mobile operators created new business model of ‘portable subscription service’, which is a simple business model to consumers, but very complex to royalty distribution, because consumers are able to download and listen to any music through convergent networks during a month, if they subscribe service for usage of a month.

“...We thought it had better strategically use previous rule as reference of new rule, because it would take a long time and difficult to create new rule....”

Second, mobile operators shared some knowledge of how online music service providers manage rule-setting processes. In order to negotiate new rules of ‘portable subscription service’ each mobile operator referred old rules, because mobile operators don’t have enough information (or knowledge) of royalty (copyright) and music industry.

“...We just try to follow as much as possible by looking into how online service providers have done, what business practices are in music industry, how economic agents in music industry as well as in online-music industry have used business practices, and how economic agents have followed business practices and rules in

music industry. We did not want to change old rules but try to follow old rules, which have been formulated...”

Third, based on some researches of existing rules, mobile operators negotiated new rules with license holders. On the negotiation processes, mobile operators always worked with partner companies, who later dealt with sourcing and contracting contents on behalf of mobile operators. Mobile operators started to discuss with license holders, because ‘portable subscription service’, which required setting up new rule of royalty. Each mobile operator respectively organized the meeting with license holders. The main focus of the initial meeting was to explain technical concept of ‘portable subscription services’. And then slowly, mobile operators and license holders conducted many official and unofficial meetings. Rule-setting processes were slowly lagged down.

“...It took longer time than what we expected, in order to set up new rules among license holders, because we spent much time to make license holders to understand new technology (new services), and make them to agree to royalty rates of new services....”

Many license holders were unwilling to accept new technology, because they believed that due to the emergence of new technology such as the Internet, new music players, etc., offline market has been squeezed so that they had a difficulty to create economic rents from sales in CD. Digital piracy on the Internet gave negative impressions of new technology. In order to secure their rights from new technology, many license holders have built up some consensus of license contract conditions, (1) technical requirements of copyright protection mechanism and (2) continuous monitoring process. More importantly, on the rule-setting processes with mobile operators, license holders were willing to receive proper rewards of their rights. License holders expected that the life cycle of popular songs would last 2 or 3 years, except some musicians, who are enjoying their popularities. License holder tries to maximize their rents through contracts. Even though rules were agreed among license holders, there had been another approval processes, which should be endorsed by Minister of Culture and Tourism, due to copyright law. It took another time.

Finally, mobile operators designed and developed system of royalty distribution by using agreed rules, negotiated with license holders.

“ In order to develop a technical system of royalty distribution, rules of royalty distribution are critical. First, we just used existing rules in order to develop a technical system of royalty distribution. Eventually, when we gave a birth of new rules along with

license holders, we was able to complete development of system of royalty distribution...”

After mobile operators set up rules of royalty rates, mobile operators realized that it is very hard to change rates of royalty, consequently prices of digital music services become inelastic on the market. In case of that mobile operators want to differentiate prices of digital music services, mobile operators need to re-negotiate royalty rates along with license holders. Variations of digital music services along with different ranges of prices would not be authorized, because new rule setting processes on variations of digital music services take a time.

7. Conclusion

Rule-setting processes of royalty are not simple compromised processes, but complex processes where psychological, economical, legal, and technological factors are mingled through repeated interactions among economic agents. Through innovation processes of digital distribution management system, mobile operators design and develop their physical routines, where rules of royalty are embedded. If there were rules of royalty, which firm can use for their business, firm can speed up their innovation processes. Otherwise, when a firm first develops new service, which requires new rule setting processes (even all products/services are heterogeneous), a firm encounters lagging in rule-setting process.

Uneasiness of rule-setting processes brings about slow evolution of digital music services, because new variations of digital music services require new rule-setting among license holders. But for new entrants (or late comers) in the market of digital music services, it would be easier for them to refer existing rules on their development of digital music service. Through the market of digital music services, the numbers of similar digital music services are increased. The competition would be hard and push digital music service providers to merge each other in order to achieve economies of scale.

Because of the convergence of different industry architectures, different economic agents play together in order to set up rules. Therefore, this research needs to investigate further which (how) factors such as cost (incentives), credibility (trust), and knowledge difference, different identity; market power, etc. have impacts on rule-setting processes.

[References]

- Andersen, B., R. Kozul-Wright, et al. (2007). "Rents, Rights N'Rhythm: Cooperation, Conflict and Capabilities in the Music Industry." Industry and Innovation **14**(5): 513-540.
- Becker, M. C. (2004). "Organizational routines: a review of the literature." Industrial and Corporate Change **13**(4): 643-677.
- Becker, M. C., N. Lazaric, et al. (2005). "Applying organizational routines in understanding organizational change." Industrial and Corporate Change **14**(5): 775-791.
- Coase, R. (1937). "The Nature of the Firm." Economica **4**(16): 386-405.
- Denzin, N. K. and Y. S. Lincoln (2000). Handbook of Qualitative Research Thousand Oaks, Sage Publications.
- Fagerberg, J. (2006). Innovation: A guide to the literature. The Oxford Handbook of Innovation. J. Fagerberg, D. C. Mowery and R. R. Nelson. New York, Oxford University Press: 1-26.
- Foss, N. J. (2001). The Boundary School. Rethinking Strategy. H. W. Volberda and T. Elfring. London, SAGE Publications Ltd: 97-115.
- Grant, R. M. (1996). "Prospering in Dynamically-competitive Environments: Organizational Capability as Knowledge Intergration." Organization Science **7**(4): 375-387.
- Grant, R. M. (1996). "Toward a Knowledge-Based Theory of the Firm." Strategic Management Journal **17**(Special Issue: Knowledge and the Firm): 109-122.
- Hadfield, G. K. (2005). The Many Legal Institutions that Support Contractual Commitments. Handbook of New Institutional Economics. C. Menard and M. M. Shirley. Dordrecht, Springer.
- Helfat, C. E. and M. A. Peteraf (2003). "The Dynamic Resource-Based View: Capability

Lifecycles." Strategic Management Journal **24**(10): 997-1010.

Hippel, E. v. (1990). "Task partitioning: An innovation process variable." Research Policy **19**: 407-418.

Hodgson, G. M. (1998). "Competence and Contract in the Theory of the Firm." Journal of Economic Behavior & Organization, **35**: 179-201.

HUR, M.-S. (2007). ONLINE MUSIC CONTENTS MUST GO ON. Media + Future: 22-35.

IFPI (2008). IFPI Digital Music Report 2008: Revolution Innovation Responsibility. Zurich, IFPI.

Jacobides, M. G., T. Knudsen, et al. (2006). "Benefiting from innovation: Value Creation, value appropriation and the role of industry architectres." Research Policy **35**(8): 1200-1221.

Jacobides, M. G. and S. G. Winter (2005). "The Co-Evolution of Capabilities and Transaction Costs: Explaining the Institutional Structure of Production." Strategic Management Journal **26**: 395-413.

Jorde, T. M. and D. J. Teece (1990). "Innovation and Cooperation: Implications for Competition and Antitrust." The Journal of Economic Perspectives **4**(3): 75-96.

KOCCA (2006). White Paper of Music Industry 2006. Seoul, KOCCA.

Metcalf, J. S. (2005). Innovation, Competition and Enterprise: Foundation for Economic Evolution in Learning Economics, CRIC, University of Manchester: 1-31.

Miles, I. (1998). "Cyberspace as product space Interactive learning about interactive media." Futures **29**(9): 769-789.

Miles, I. (2005). Innovation in Services. The Oxford Handbook of Innovation. J. Fagerberg, D. C. Mowery and R. R. Nelson. Oxford, Oxford University Press.

Nelson, R. R. (1994). "The Co-evolution of Technology, Industrial Structure and Supporting Institutions." Industrial and Corporate Change **3**(1): 47-63.

Nelson, R. R. (1995). Why Do Firms Differ, and How Does It Matter? Foundamental Issues in Strategy. R. R. Rumelt, D. E. Schendel and D. J. Teece. Boston, Harvard Business School Press: 247-269.

Nelson, R. R. and K. Nelson (2002). "Technology, institutions and innovation systems." Research Policy **31**: 265-272.

Nelson, R. R. and B. N. Sampat (2001). "Making sense of institutions as a factor shaping economic performance." Journal of Economic Behavior & Organization, **44**: 31-54.

Nelson, R. R. and S. G. Winter (1982). An evolutionary theory of economic change. London, Belknap Press.

Nickerson, J. A. and T. R. Zenger (2004). "A Knowledge-Based Theory of the Firm - The Problem-Solving Perspective." Organization Science **15**(6): 617-632.

North, D. C. (1990). Institutions, Institutional Change and Economic Performance. 1990, Cambridge University Press.

OECD (2005). Digital Broadband Content: Mobile Content - New Content for New Platforms. Paris, OECD.

Pavitt, K. (1998). "Technologies, Products & Organization in the Innovating Firm: What Adam Smith tells us and Joseph Schumpeter deosn't." Industrial and Corporate Change **7**(3): 433-452.

Pavitt, K. (2002). "Innovating routines in the business firm: what corporate tasks should they be accomplishing?" Industrial and Corporate Change **11**(1): 117-133.

Pavitt, K. (2006). Innovation Processes. The Oxford Handbook of Innovation. J. Fagerberg, D. C. Mowery and R. R. Nelson. Oxford, Oxford University Press.

Teece, D. J., G. Pisano, et al. (1997). "Dynamic Capabilities and Strategic Management." Strategic Management Journal **18**(7): 509–533.

Tidd, J., J. Bessant, et al. (2005). Managing Innovation: Integrating technological, market, and organizational change. West Sussex, John Wiley & Sons Ltd.

Trott, P. (2005). Innovation Management and New Product Development. Essex, Pearson Education Limited.

Verona, G. and D. Ravasi (2003). "Unbundling dynamic capabilities: an exploratory study of continuous product innovation." Industrial and Corporate Change **12**(3): 577–606.

Wallis, R., C. Baden-Fuller, et al. (1999). "Contested Collective Administration of Intellectual Property Rights in Music." European Journal of Communication **15**(5): 5–35.

Wernerfelt, B. (1984). "A Resource-based View of the Firm." Strategic Management Journal **5**: 171–180.

Williamson, O. E. (1991). "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives " Administrative Science Quarterly **36**(2): 269–296.

Williamson, O. E. (2002). "The Theory of the Firm as Governance Structure: From Choice to Contract." The Journal of Economic Perspectives **16**(3): 171–195.

Winter, S. G. (2003). "Understanding dynamic capabilities." Strategic Management Journal **24**(10): 991–995.