

# Comparative Research on Mobile Value Chains among China, Japan, and Korea

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## ABSTRACT

East Asian region, specifically China, Japan, and Korea, is considered as an area of advanced mobile handsets and mobile services. The well-established infrastructure of this region is well known due to rapid introduction of diverse feature-equipped handsets and advanced capabilities of mobile network operators. However, the status of mobile business has rarely been dealt with in previous studies. In this paper, we compare mobile value chains among these three countries. China has adopted open platform for mobile data services while Korea and Japan's mobile network operators control mobile portals for accessing diverse contents and services. We also discuss some possible reasons for the differences among the three countries in terms of value chain structures.

키워드 : Mobile Data Service, Value Chain, Mobile Network Operators

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This work was supported by the National Research Foundation of Korea(NRF) Grant(F01-2008-000-10094-0), the National Natural Science Foundation(#70890082 and #70672007) and MOE Project of Key Research Institute of Humanity and Social Sciences at Universities(08JJD630001).

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2010년 05월 15일 접수, 2010년 06월 15일 심사완료 후 2010년 07월 27일 게재확정.

## 1. Introduction

East Asian companies are leading technology and service providers of mobile Web era. Today, there is a wide variety of services—including news, music, social networking and road navigation—that can be used for social communication and connection, access to information for everyday life, and entertainment. Especially, the arrival of 3G wireless technology made it possible to provide various real-time multimedia services through mobile networks. In Asia, the size of the mobile data market was 20,000 million dollars in 2007 and it was an increase of 15.8% from the previous year[14]. Due to the saturation of the mobile voice market and innovation in mobile data services, the portion of data sales among total sales of MNOs (Mobile Network Operators) has been increasing. In the case of Japan, the market share of mobile data services increased from 28.6% in 2006 to 32.5% in 2007. The portion of data sales in 2008 is around 25% in China and around 20% in Korea.

Due to the differences in technological infrastructures, government policies, competitive landscapes, and cultures, the configurations of mobile value chains vary from different countries. Understanding of the differences in mobile value chains and the reasons for the differences can help minimize the trials-and-errors in the transfer

of mobile services and maximize the benefits of mobile services at the domestic level. Each nation's mobile services and competition environments have already been tackled and discussed in many papers and newspapers[2, 4, 10, 11, 16, 20, 21].

Though there are many interactions among mobile business firms in China, Japan, and Korea, there are few comparisons on mobile businesses among these three nations. However, there have been many studies that investigated the effects of cultural differences on consumer behavior for adopting and utilizing mobile services. They compared perceptions of customers from diverse nations on features of mobile services without considering the infrastructural differences among those countries.

Thus, the goal of the paper is to investigate the similarities and differences of mobile value chains among China, Japan, and Korea. The paper is organized as follows. In section 2, related studies are reviewed. In section 3, we investigate the structure of value chains of three countries. In section 4, the differences and similarities of values structures are analyzed in terms their causes and results. Finally, section 5 presents some conclusion remarks.

## 2. Literature Review

Kawakami[7] compared market structure

of mobile contents business in Japan and Europe. In Japan, the reason why contents business expanded quickly is that MNOs have a strong leadership in cellular phone market. While MNOs, manufacturers of infrastructure and terminals, and CPs stand in a trio in Europe, then the diffusion rate is rather slow. Based on Takachi[18], the ratio of platform function provided by telecommunications carrier (MNO) as vertical integration is rather high in Japan.

There are some papers comparing mobile markets among three countries. Takeishi and Lee[19] compared Japan and Korea's mobile music business in terms of copyright management. Japan's strict copyright management has expanded mobile music market without hurting rights of the copyright owners. However, Korea's weak copyright protection has limited the market growth of mobile music services and caused conflicts between the copyright holders and users. Naruse et al.[12] discussed the kind of services which users preferred for next generation's mobile Internet services based on a field survey conducted in Japan and Korea. They concluded that users in Japan preferred communication functions, while Korean users expected commerce related functions for mobile Internet service. Kim et al.[8] tried to compare the differences of mobile service usages among three countries. The differences among three countries are summaries as follows. First,

in Japan, business usage of mobile phone is more popular than China and Korea. Second, in the consumer segment, there are also significant differences in the categories of applications. In China, mobile services are mainly for the purpose of information sharing and communication, and in Korea, entertainment is the most important application. In Japan, accessing information such as weather forecast, news and public transport connection information is popular as another category of B2C mobile services. Third, usages of mobile data services are divergent among the three countries.

Though there are some papers that compare market structures of nations[19], many studies on mobile markets have focused on usages of mobile services and differences on user perceptions among countries[1]. We compare mobile value chains among China, Japan, and Korea in order to find out possible reasons of similarities and differences on mobile service usages.

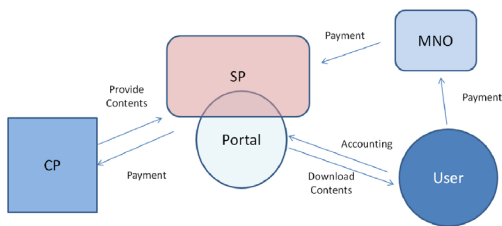
### 3. Value Chain of Mobile Business

#### 3.1 China

After years of speculation and anticipation, the 3G licenses were finally issued in China at the end of 2008, and the government awarded China telecoma license

based on the CDMA2000 standard, China Unicom on WCDMA and China Mobile on China's domestic TD-WCDMA standard. In some sense, competition in China's mobile business markets formally started from 2009. The following description gives a glimpse of the industry status up to 2008.

In the markets of China, the major players include contents providers (CPs), service providers (SPs), MNOs, and end users <Figure 1>. CPs provide their contents for SPs. SPs run their own portal sites and users download the contents on these portal sites. In addition to providing data service traffic, one of the major roles of MNOs is to fulfill the function of payment collection from end users.



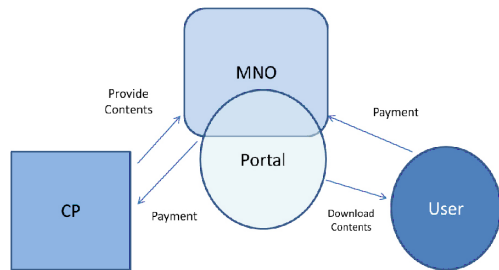
<Figure 1> Mobile value chain in China

In China's mobile business market, the boundary between CPs and SPs is blurred in the sense that most SPs produce their own contents and contents providers mostly provide contents for SPs behind the scene. The market of value added services by SPs has been quite fragmented. In 2006, the largest SP Tom Online's market share

was only 10.8 per cent, and the top three SPs only accounted for 24.1% of the total market. More than 50% of the market consists of small SPs with market share below 0.6%.

### 3.2 Japan

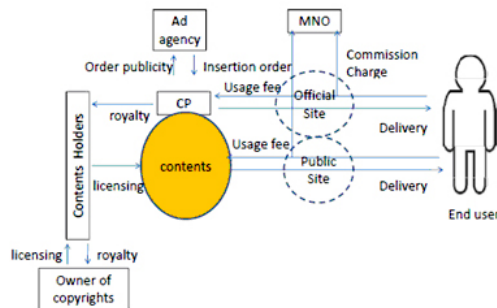
In Japanese mobile value chain, players are CPs, MNOs and users. CPs provide their contents for MNOs. MNOs run their own portal sites and users can download contents on these portal sites. Users pay for MNOs and they pay some for CPs.



<Figure 2> Mobile value chain in Japan

Before starting the service of i-mode, NTT DoCoMo implemented packet exchange network with a huge amount of investment. Then it designed its business model, determined specifications of the system, ordered infrastructure and terminals for equipment manufacturers, and required CPs to change from Web sites to i-mode sites. Given this background, contents business was able to prosper. In this business

model, a MNO is the only contact point with end users, terminal manufacturers and CPs. That is, manufacturers and CPs can have a contact with end users only via MNO[7].



<Figure 3> Business model of CPs (modified by the author based on(5))

<Figure 3> shows information flow and commerce flow by Itoh[5]. Itoh[5] pointed out that there are two trends found in CP's strategy.

- 1) Shift from ringtone to ringnote : Each CP keeps right of master records and then changes its business to have a service for all-you-can-download with fixed fee.
- 2) Acquirement of right for movies : Owing to 3G terminals, it becomes possible to deliver large volumes of video data. Some CPs started to keep rights to use videos and multi-use service of videos.

However, Japanese MNOs have many business partners (BPs) that provide their

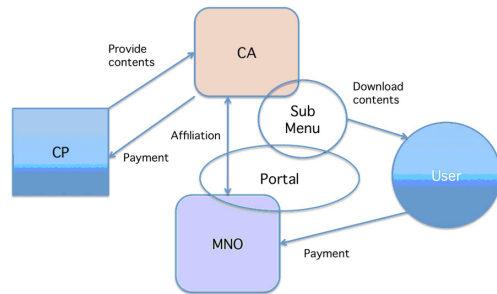
own content to their mobile portals. Different from SPs of China market, BPs run their content menus inside the MNOs' portals with their own charge plans and responsibility of running their menus. Thus, the MNOs provide all technical infrastructures to deliver mobile data services to customers. BPs are only in-charge of providing content and managing their customers. Since Japanese MNOs have lead mobile data services, mobile commerce including mobile auctions, mobile payments, mobile advertising, and mobile broadcasting services (one-seg) are very popular[15]. Japanese handset manufacturers such as NEC and Toshiba usually focused on Japanese market instead of going abroad. Thus, they have close connections with the MNOs to introduce specialized phones to diverse target users and with new features. NTT Do CoMo and AU have introduced cell phones for kids which have GPS systems that allow parents to identify their children's locations[15]. Furthermore, increasing variations of mobile phones for use by elderly people are appearing which have larger keypads and displays.

### 3.3 Korea

CPs, content aggregators (CAs), mobile portals, and MNOs are key entities of the value chain in Korea. Three Korean MNOs operate their own mobile portal such as

Nate by SK Telecom (SKT), SHOW by KT (KT), and ez-i by LG Telecom (LGT). The role of CA is most important in the mobile market of Korea. CA or master CP means the company mediates between the operators and various CPs. However, content aggregation such as packaging and distributing are mostly depended on the MNOs. Packaging is important in the point of sourcing and brand preference, and the MNOs have very high level of entry barrier. Because of these industrial characteristics, mobile business initiatives mostly depend on the MNOs. Since the MNOs dominate the market structure and manage the value chain, many CPs and CAs have developed mobile services by the rules of the operators. Recently, the MNOs merged many content creators for securing their content services. SKT merged a big music label, an entertainment management company for making movies and TV series, and diverse media distribution channels such as satellite broadcasting and regional cable TV. Following SKT's investments, KT also has invested on an entertainment company and media broadcasting companies including IPTV and satellite channels.

In Korean mobile service market, the MNOs have dominated the market and they integrated many companies in mobile service value chain backwardly. Thus, they have built the walled garden around Korean mobile business market as <Figure 4>.



<Figure 4> Mobile value chain in Korea

Customers should access the mobile portal of their MNO to use mobile data services and contents. Widely used services and contents in mobile portal include downloading wallpapers, ringtones, and ring-back tones[9]. On the contrary, searching information, checking e-mail, and using real-time messengers are the most popular services in China and Japan[9]. In addition, the ratio of data ARPU in total ARPU is around 10 to 20% in South Korea[13].

CPs which are not on-portal can be accessed through entering their specific URLs or through organized sub-menu inside of mobile portals, called Open-i and OpenNet according to a mobile portal. Still, mobile portals have privileges to organize lists of off-portal CPs. In 2008, LGT opened their network to access WWW with fixed monthly data plan around \$5. Customers of LGT can access virtually any web pages instead of accessing designated mobile web pages by LGT and its CAs. And other MNOs have also launched monthly data

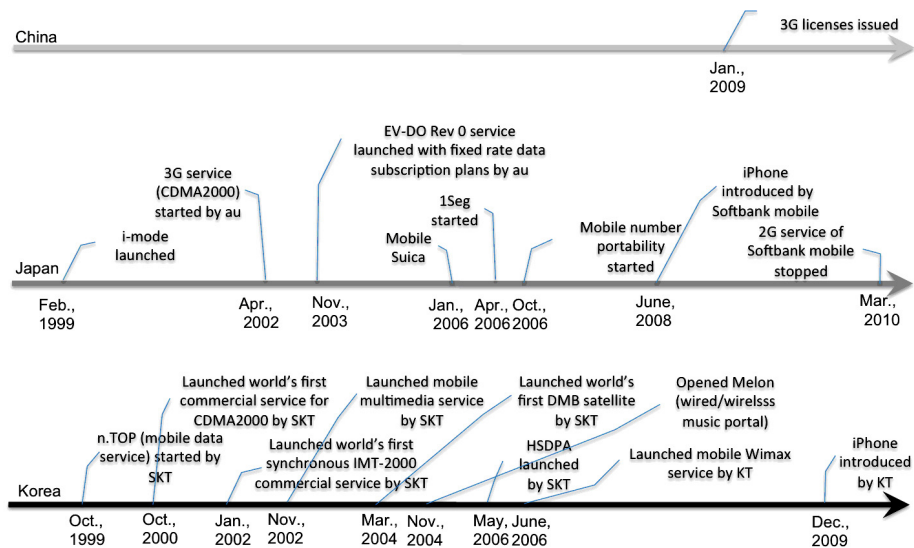
plan. From April 2009, with the enforcement of WIPI (Wireless Internet Platform for Interoperability) policy, a middleware platform used in South Korea that allows mobile phones, regardless of manufacturer or carrier, to run applications, was abolished. Thus, any phones and smart phones that are not applied WIPI previously such as iPhone and Google Android based phones can be introduced in South Korea. This will boost data usage for visiting web pages and utilizing web-based applications. Since iPhone debuted in Korea on December 2009 as introduced by KT, iPhone is the first-mobile device that has no direct menu button to Korean MNOs' mobile portals. Korean MNOs are trying to change mobile value chain into open platform because iPhone has successfully debuted in Korean market

[6]. SKT and KT opened their application store for their customers in 2009 while Samsung Electronics and LG Electronics want to introduce many Android based smart phones in 2010 for Korean market.

Important events and milestones of three nations' mobile business are summarized in <Figure 5>.

### 4. Discussion

Roles of participants in mobile value chain are different in the three countries. China has CPs, SPs and MNOs, and SPs run mobile portals for providing content to customers. Japan has CPs and MNOs, and MNOs run their own portals. Korea has a similar structure with Japan and has addi-



<Figure 5> Important events and milestones of three nations' mobile businesses

tional role CAs operate sub-menus of mobile portals. While China has fierce competitions among SPs for providing content accessing services, competitions among mobile portals in Japan and Korea virtually rely on number of subscribers of their MNOs. We list up some key issues related to the differences of mobile value chains based on our analysis and the interviews of mobile service managers in the three countries.

#### 4.1 Role of MNOs

The differences among the three countries' value chain structures to some extent are reflected in the roles of their MNOs. In China, MNOs' major roles are to provide backbone traffic and serve as payment collectors, and they need to rely on SPs/CPs to provide contents. With the three mobile operators starting to compete on a full scale, it is anticipated that combating over controlling of portals and contents will become the new centre of competition in China's mobile business market. However, the MNOs of Japan and Korea run their own portals. Contents flood over the MNOs' check and the MNOs should build and maintain many WAP pages and menus. Thus, Korean MNOs outsourced these implementation and maintenance efforts to diverse CAs. Since the Korean MNOs dominate the market structure in Korea and manage the value chain, many CPs and

CAs have developed mobile services by the rules of the operators. Some CAs and CPs are affiliated firms of the MNOs such as loen entertainment and widerthen of SKT that operate music streaming services. Korea has only three mobile portals and these content and menu structure are similar. The MNOs have thought of providing exclusive services and content as the best way of differentiation with other mobile portals. CPs should contract with one MNO to provide services or contents exclusively for a certain period. Recently, the MNOs have merged many content creators for securing their content services. Japanese MNOs execute major roles of running a mobile portal including running and maintaining services. They built a technical infrastructure to provide mobile data services and CPs or BPs are the only in charge of managing their menus inside of the MNOs' mobile portal. We can summarize the reasons for the differences in the roles of MNOs among the three countries with the following three important aspects.

**Relationship between MNOs and handset manufacturers** : China started their mobile service with GSM technology and they allowed using any cell phones in any mobile service providers. Thus Chinese MNOs couldn't control specifications of their customers' cell phones because they should learn and import technologies by cooperating with foreign manufacturers and import



cell phones from foreign countries. It is not possible to provide the integrated mobile portal services by Chinese MNOs in diverse handsets which have no standard. This situation is now a little bit different since China gave the license of 3G technology to three MNOs. They should collaborate with their handset manufacturers and they want to introduce their own mobile portals. However, Japanese and Korean MNOs have close relationships with handset manufacturers in their nations such as Samsung and LG for Korea and Toshiba and Sanyo for Japan. These MNOs developed their own technologies to provide new mobile services to customers and they requested to their handset manufacturers to incorporate these new technologies with their new cell phones. Sometimes, the MNOs assure the amount of sales of the new cell phones for launching new services ahead of other MNOs in their country. Also, the MNOs only allow to use mobile handsets they approved to initiate their mobile services. Thus, the MNOs could control the specifications of their customers' handsets. They can run their own integrated mobile portal service to all of their customers.

**Timing of introducing mobile data services** : Mobile data services introduced in Japan and Korea around the latter part of 1990 and early 2000. At that time, the technologies that provide mobile data services were at the early stage. MNOs which

wanted to provide mobile data services should invest a lot of money to implement the services and integrate new technologies with their handset manufacturers and technology providers. In addition, the MNOs also cultivated new business market since mobile data service market was new to their customers. They had many risks to take in initiating mobile data services and also lack many technologies. Kawakami[7] found out the reason why contents business expanded quickly in Japan and why MNOs had a strong leadership in cellular phone market and mobile data market. Through this strong leadership, NTT DoCoMo pioneered mobile data markets. This was also true in Korea. By the strong leadership of the MNOs, they could start new advanced services at that time such as ringtones, music streaming, banking, and GPS services. SKT made a software platform for running their own services in a mobile phone and SKT distributed it to handset manufacturers. As Shin and Lee[16] explained the introduction of new financial services in Korea, the Korean MNO should resolve many technological issues, regulations, and competitions with financial institutions. Thus, at the early stage of mobile data service, the integrated roles of MNOs contributed positive effects to inaugurate and expand the market itself. However, China started mobile data services later than Japan and Korea. They could already adopt tested and de-

veloped reliable technologies from other foreign countries. They didn't need a strong MNO to lead mobile data service. Strong leadership of MNOs in Japan and Korea have positive effects on implementing innovative services with advanced network technologies. Since small SPs and mobile portal operators focus on content delivery and maintenance of operations, leapfrogging innovation requires huge investments on infrastructure and handsets. MNOs' strong leadership and heavy investment can make these innovations possible.

**Availability of matured content providers** : During the time of introducing mobile data services, there were many matured content providers in China such as Sina.com.cn and Sohu.com. Newly started Chinese MNOs couldn't compete with existing content providers. Thus, Chinese MNOs focused on bridging many CPs through their mobile networks. However, Japan and Korea's situations were different from China's. Though Japan and Korea have similar mobile value chain, the roles of CPs are different. At the early stage of mobile data service, dedicated CPs and SPs in Japan and Korea were very few. However, Japanese MNOs have many business partners (BPs) that provide their own content to their mobile portal such as Bandai and Disney. Bandai is a company that sells toys and makes animations and movies for the youth. These BPs have their own content

and Japanese MNOs provided the infrastructures and places to service these contents to their users. BPs are usually large companies which have their own content and can initiate their own marketing campaign, and are in charge of their mobile services. Japanese customers should subscribe to BPs to use their content with some monthly fees. At the initial stage, Korean MNOs started BP services like Japanese MNOs. However, many large BPs were not available which can provide their own content but rather only small companies which usually focused on sourcing content from small content owners. Thus, services from BPs were very similar and they didn't have any differences. Thus Korean MNOs demolished these BP services and they started to control all menus by themselves. The directories of Japanese mobile portal are based on the lists of BPs such as Bandai and Disney and the directories of Korean mobile portals are based on types of content or services such as Music, News, and Weather. Even though Japan and Korea have similar shapes by looking at the structure of mobile value chains, China and Japan have more similar structure in terms of providing content to users. The difference is whether they are in the umbrella of MNOs (Japan) or not (China).

Even though strong MNOs have contributed to initiate mobile data service market and enhance technological capabilities at

the early stage of mobile internet, a MNO owned mobile portal has been proliferated in the walled garden protected by its MNO and being a single gateway to connect mobile internet by its customers. This walled garden situation cannot be sustained since there are many smart phones that can connect the Web with wifi and customers' needs to utilize these services.

Mobile value chains in China, Japan, and Korea have evolved based on and by adjusting the participants of mobile value chains such as relationship with their nation's handset manufacturers, capability of content providers, and maturity of mobile data service technologies. Moreover, their future directions are quite different based on MNOs' current capabilities and other factors regarding infrastructure of the value chains.

#### **4.2 Competition Against Internet Portals**

SPs in Chinese mobile value chain include major Internet portals such as Sina.com.cn and Sohu.com. Internet portals in China collaborated with Chinese MNOs for providing mobile data services. A mobile portal operated by a Chinese MNO, such as Monternet by China Mobile, has a role of "providing an easy interactive channel between the service and content providers and the mobile subscribers"[17].

Though there are major Internet portals

in Korea like Naver, Daum, and Yahoo! Korea, two major Korean MNOs have their Internet portals owned by their sister company. SKT provides mobile Nate for a mobile portal while SK Communications runs Nate as an Internet portal. In addition, KT has a relationship with Paran, an Internet portal, run by KTH. They want to build synergy effects with mobile and Internet portals to compete with the incumbents. Thus, Korean MNOs want to control mobile portals and do not allow accessing other Internet portals through mobile devices easily.

#### **4.3 Effects on Customers**

Mobile data markets can be considered a double-sided market. While SPs in China are in charge of providing mobile data services and Chinese MNOs provide access points to these services, MNOs in Japan and Korea control their market. Through fierce competitions between SPs in China, Chinese customers utilize diverse data services with cheaper prices and can access mobile services without limitations of subscribed MNO. The popularity of the mobile instant messaging is mostly due to its free pricing. Though similar services are available in Japan and Korea, customers should pay based on their packet usages. However, there are many SPs and there is no virtual way of checking the content provided by SPs; sometimes a pirated content is deli-

vered through mobile networks.

Japan and Korea's competition between mobile portals are less severe than that of China and mobile data markets are dominated by their MNOs. In Korea, each menu and content provider are being checked by MNOs and displays of menus and content are decided by MNOs. Thus, the approval of a MNO is more important than the competition with other CPs. For users of mobile services, they are limited to use mobile services because they are only accessible to their MNO's mobile portal. Through the rigorous censorship of content and revenue sharing, pirated or illegal contents are not able to transfer through mobile networks.

## 5. Implications and Conclusions

We have reviewed and compared mobile value chains of China, Japan, and Korea. While China formed a competitive market of mobile portals operated by SPs, mobile portals are operated by MNOs in Japan and Korea. Pricing of mobile data plan, MNOs' competition strategies with other MNOs and Internet portals, and introduction timing of mobile Internet have impact on structures of mobile value chains and customers' usage of mobile data services. Japan is the most advanced country in terms of usage and variety of mobile data service.

Japan's average wireless data ARPU is the highest all over the world[3]. Though China started mobile phone operations late, Chinese customers' usage of mobile data service is ranked in a high level. Since China released 3G licenses in 2009, the advance of mobile data market will be hastened. Mobile data market of Korea has not been tapped fully until now due to expensive data fee and controls of MNOs. With the abolishment of WIPI in April 2009, many smartphones that enable to surf Internet can be introduced in Korea. By these introductions, potential users of mobile Internet will be tapped by providing reasonable data plans. Korean MNOs want to integrate mobile WIMAX and their 3G networks to provide mobile Internet services.

Studies on mobile markets have focused on usages of mobile services and differences on user perceptions among countries. However, just comparing usage behavior of customers among different countries can be lack of understanding their actual causes. By considering their mobile value chains and infrastructures of mobile data services, we can enhance our understanding of customer behaviors on mobile data services.

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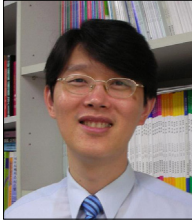
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