

**TV in Your Cell Phone:
The Introduction of Digital Multimedia Broadcasting (DMB) in Korea**

Seungwhan Lee
Ph.D. Candidate

&

Dong Kyun Kwak
Ph.D. Student

Department of Telecommunications
Indiana University
Radio TV Center
1229 E. 7th St.
Bloomington, IN 47405-5501

E-mail: mediastudy@yahoo.com

September 24, 2005

Paper presented at the annual Telecommunications Policy Research Conference
Arlington, VA

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<Abstract>

Currently the world is watching the race that will decide who will become the mobile television leader among DVB-H, MediaFLO, and BCMCS developers, to name just a few. With the development of so-called Digital Multimedia Broadcasting (DMB), the crown for the world's first commercialization of mobile television via cell phones had already gone to Korea when TU Media began its nationwide satellite DMB (S-DMB) service on May 1, 2005. Furthermore, Korea is now planning to start a terrestrial DMB (T-DMB) service in December 2005. The main purpose of this study is to explain how DMB was developed and introduced in Korea and what its regulation issues are.

This paper claims that Korean DMB is the outcome of so-called "blue ocean" strategy of SKT, the leading mobile carrier in Korea, and the Korean government's industrial policy. In a desperate effort to create the next big market in the mobile service industry, SKT has strategically developed S-DMB technology that can be watched via cell phones, whereas Japan has focused on providing mobile television service for vehicles. In addition, it is the Korean government that has played an even more important role in developing T-DMB. The Ministry of Information and Communication suggested the idea of T-DMB using VHF channels, and after the successful development of a working T-DMB system, the Korean government has pushed hard to market T-DMB worldwide with some positive results.

The paper then focuses on two important policy issues that have arisen during the process of the introduction of DMB to Korea: the retransmission of terrestrial television programs via S-DMB and the determination of whether or not to allow pay services for terrestrial DMB. The rationales of the involved parties regarding these two issues are explained and the implications of the two issues are discussed. This paper claims that the two issues are likely to be repeated in other countries, unless clear plans by their governments are prepared in advance of the introduction of new convergence services to the market in the future.

TV in Your Cell Phone: The Introduction of Digital Multimedia Broadcasting (DMB) in Korea

Introduction

Recently Sirius began to provide portable players for its satellite radio users following XM (Day, 2005). This clearly shows that there exists a huge demand for a nationwide multi-channel mobile radio service. But how about mobile television? Currently the world is watching a race that will decide who becomes the mobile television leader among the DVB-H, MediaFLO, and BCMCS developers, to name just a few. However, with the development of so-called Digital Multimedia Broadcasting (DMB), South Korea has become the pioneering country in a new mobile television service that is provided to customers via cell phones.

Korea has developed two versions of DMB: S-DMB and T-DMB. Satellite DMB (S-DMB) service began on May 1, 2005, and the number of subscribers is on the rise. At least 100,000 users subscribed to this pay service in less than three months (*Daily Chosun*, 2005), and there were more than 200,000 subscribers in five months (Jun, 2005). As for terrestrial DMB (T-DMB) service, it is expected to begin in December 2005. Japan began portable television service via satellite in October 2004—using the same satellite that is used for Korean S-DMB—but Japan system requires specific portable television receivers, not via cell phones. Accordingly, Korean DMB is the first service in the world that converges mobile phone service and television service. With DMB-built-in cell phones, Korean cell phone users can enjoy video, audio, and data services for the

first time in the world without having to carry around another gadget that is not compatible with cell phones, something that one can't do in Japan.

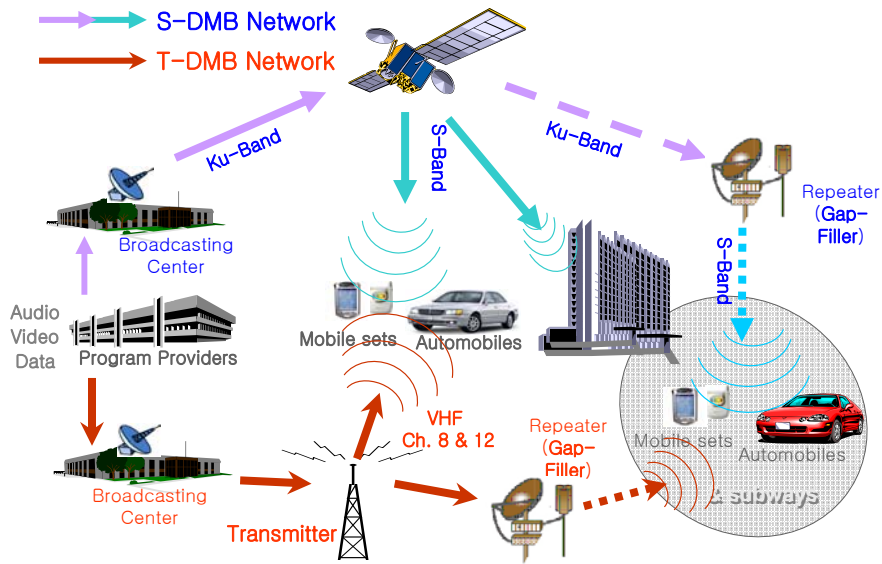
From a technological perspective, Korean DMB—S-DMB at this stage—is a rare example of the convergence of telecommunication and broadcasting that is under way at a full-scale national level. Also, from a business perspective, DMB is important in that it is expected to open a big new market for the already saturated mobile telephony markets in many advanced countries. Television broadcasters are also paying close attention to the future of DMB in an effort not to lose business opportunities to mobile carriers. Who the winner will be in the Korean DMB market is now a hot issue. Accordingly, stiff competition between mobile carriers and broadcasters has raised new regulation problems for this new convergence service.

The main purpose of this study is to explain how DMB was developed and introduced in Korea and what its regulation issues are. The study begins with an overview of DMB technologies. It then claims that Korean DMB is the product of a leading mobile carrier's "blue ocean" strategy and the Korean government's industrial policy. The paper then focuses on two important policy issues, which have continued to provoke debate even after the Korean government has already granted S- and T-DMB licenses: the retransmission of land-based TV programs and whether to give permission to pay services to provide T-DMB. The pros and cons regarding these issues and their potential impact on the adoption of DMB services are also discussed. The paper concludes with the implications of DMB policies for other forms of convergence of telecommunications and broadcasting, for instance IPTV.

What is DMB?

Simply put, DMB is a mobile television service with additional audio and data services that can be viewed on DMB cell phones, portable DMB receivers, or vehicle DMB. However, cell phone users are the primary target market for DMB businesses, and these users triggered the development of DMB in Korea. Figure 1 shows how S- and T-DMB work. Also a comparison of S- and T-DMB, as well as other competing service—DBS—are shown in Table 1.

<Figure 1> How S-DMB and T-DMB Work



<Table 1> Comparison of S-DMB, T-DMB and DBS in Korea

	S-DMB	T-DMB	DBS (SkyLife)
Standard	System E (similar to CDMA)	System A (DAB, Eureka 147 + Video)	DVB-S
Frequency	S-Band (2.630~2.655 GHz) 15 frames/sec	VHF Ch 8 (180~186 MHz) & Ch 12 (204~210 MHz) for Seoul Area 30 frames/sec	Ku-Band (12.214~12.239 GHz)
No. of Channels (Example)*	Video:11 Audio: 26 (~30) Data: (3~5)	Video: (7) Audio: (13) Data: (8)	Video: 140+ Audio: 60+ Data: 20+
Coverage	Nationwide	Seoul Metropolitan Area → Finally All Localities	Nationwide
Business Model	Subscription fee + Ad	Advertising	Subscription fee + Ad + Transaction
Rate	\$13/month	Free	\$20/month
Target Audience	Mobile phone users + vehicles	Mobile phone users + vehicles + home + office	Home users
Strength	Nationwide mobility More channels	Local service Free or cheap service	Many channels
Weakness	Pay service	Geographical restrictions Fewer channels	Mostly home use
Relationship to S-DMB		Complement or substitute	Complement (limited)

* Applicable as of September 15, 2005. The number of channels for S-DMB and T-DMB depends on the compression technologies adopted and a company's future business plan.

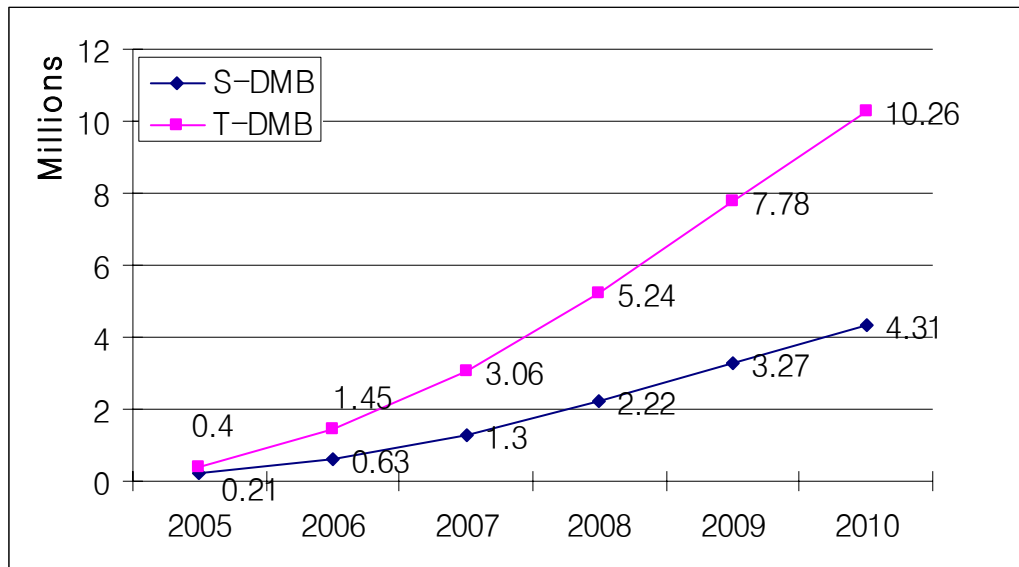
S-DMB uses a satellite and S-Band for nationwide service. TU Media (www.tu4u.com), founded by the leading mobile carrier SK Telecom (SKT), received the only S-DMB license from the Korean Broadcasting Commission (KBC) in December 2004, and eventually ran an experimental service in January 2005. TU Media started full S-DMB service with 7 video and 20 audio channels on May 1, 2005. A data service for S-DMB is expected in 2006. Currently S-DMB subscribers have to pay \$13 in addition to a one-time activation fee of \$20 (TU Media, 2005a; 2005b).

T-DMB for the Seoul metropolitan area, the first T-DMB service area in the nation, currently uses heretofore the unused VHF channels 8 and 12. On March 28, 2005, the KBC awarded six T-DMB tickets after a competition for them, including three leading terrestrial broadcasters, and a cable TV network and electronics makers. In the case of S-DMB case, TU Media was the only candidate and was approved by the KBC. Six T-DMB consortiums were chosen because each VHF channel can be divided into three blocks, each of which can be used by a T-DMB service provider. There are plans for other T-DMB companies to provide for other local areas. These companies will be chosen in 2006.

Both S- and T-DMB provide screens as large as 7" with VCD quality. S-DMB provides 15 frames/sec and T-DMB provides 30 frames/sec. Technologically, T-DMB is better for the fast scenes one sees in sports, but the difference is reported to be minimal to the viewers. Moreover, though the screens are small, their quality is good enough to enjoy sports broadcasting. With regard to the future of DMB, the Electronics and Telecommunications Research Institute (ETRI), a non-profit government-funded research

organization, estimated that T-DMB will attract more subscribers than S-DMB, as is shown in Figure 2.

<Figure 2> ETRI Estimation of the Number of DMB Subscribers



Source: ETRI (www.etri.re.kr)

Background on the Introduction of Korean DMB

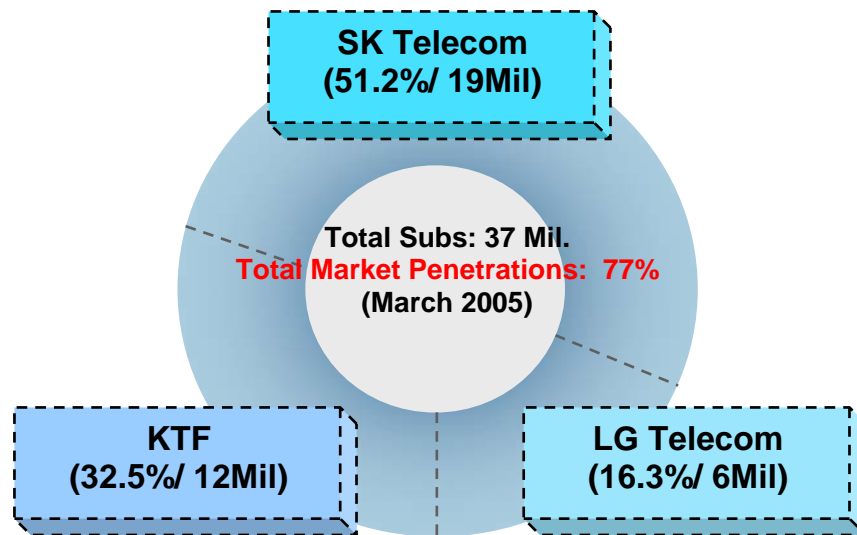
How was Korea able to launch the world's first mobile television service via cell phone? This paper has two answers for that question: the "blue ocean" strategy of a leading mobile carrier and the Korean government's industrial policy.

Mobile Carrier's Push: the Blue Ocean Strategy

Like many countries around the world, Korean mobile carriers face the problem of slow growth. With more than half the market share (51.2%), SK Telecom (SKT) is the leading mobile carrier in Korea, followed by KTF (32.5%) and LG Telecom (16.3%), as

is shown in Figure 3. Because cell phone use has reached 77% of the Korean population, finding the next big revenue source has resulted in a desperate marketing strategy by all three mobile carriers. Among the three, SKT, supported by its biggest earnings in many years among the three, has adopted a drastic new approach: creating a new market that does not yet exist—a blue ocean.

<Figure 3> Korean mobile telephony market structure



Source: SKT (<http://www.sktelecom.com>)

The “blue ocean” strategy (Kim & Mauborgne, 2004; 2005) has become one of the most popular business strategies in the world. It is a strategy that many industries now use in order to avoid harsh competition and thus pioneer new business ventures. SKT’s move to embrace DMB is a good example of the blue ocean strategy. The current Korean mobile telephony industry is a “red ocean,” in which the market has reached a saturation point and competition is stiff. In the spring of 2001, SKT attempted to reconstruct market boundaries and create a “blue ocean”—that is to say, a new, uncontested market, by

providing mobile television via cell phone, a service that had heretofore existed only as a future convergence service.

In fact, Japan was the first country to develop mobile television service via satellite. In 1997, MBCo, a Toshiba subsidiary company, was developing a mobile television service. However, MBCo focused primarily on mobile television for vehicles because car navigation systems were then widely used in Japan. In fact, SKT asked MBCo about the possibility of putting mobile television on cell phones and received a positive answer: mobile television via cell phones was indeed technologically possible (P. Lee, 2005). Finally, TU Media came to an agreement with MBCo to cooperate in the development of DMB, including the sharing of a satellite (TU Media, 34.66% and MBCo, 65.34%), though MBCo ended up with a non-cell phone DMB service.

Furthermore, SKT played a key role in developing DMB cell phones themselves by requesting that Samsung Electronics develop the world's first DMB cell phone (P. Lee, 2005), as shown in Picture 1.

<Picture 1> First Models of DMB Phone and DMB Receiver



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Later, when TU Media was founded by SKT in December 2003, TU Media also played a key role in arguing that the National Assembly revise the Broadcasting Law (March 2004) so as to provide a legal basis for Digital Multimedia Broadcasting.

Government Push: Industrial Policy

As was explained earlier, SKT played a crucial role in developing the idea and technology of S-DMB. How, then, was T-DMB started? This paper answers this question by looking at the Korean government's industrial policy. In fact, the origin of the Korean government's involvement in T-DMB is related to the hotly debated issue of setting standards for Korean digital television (DTV).

In 1997, the Ministry of Information and Communication (MIC) chose the American ATSC as the Korean standard for DTV. However, the ATSC began to be known for its weak signal reception in a mobile situation, so there was opposition to the ATSC, led by the Korean Broadcasting Engineers and Technicians Association, as well as the labor unions of broadcasting stations. This opposition became a national issue. The leaders of this opposition protested against the ATSC for a more than five months, and MBC aired a national program comparing the strengths and weaknesses of the ATSC with European standards. After four years of debate, a grand compromise was finally reached by two representatives from the Korean government and two from the broadcasting industry. These representatives were the Minister of Information and Communication (MIC) who governs frequencies and all mobile business, the chairman of the KBC, the president of KBS (national public television), and the president of the Korean Labor Union of the Press. As for the compromise, in an exchange for the

broadcasting industry's acceptance of the ATSC, the MIC suggested a plan to develop a new digital mobile television service to supplement the ATSC's weak mobility (Woo, 2004).

The MIC chose the ETRI, in order to develop a mobile television system that uses current television frequencies. After the ETRI successfully developed a new system known as T-DMB, the MIC began to aggressively promote the T-DMB system around the world (Galbraith, 2005). Though the Korean government has not officially pronounced its industrial policy regarding DMB, it wants to use the world's first terrestrial mobile television system—T-DMB—as a means to boost Korea's economy in the electronics and information sectors. Indeed, the choice of DAB—which is the European standard for audio broadcasting—as a base technology for T-DMB by the ETRI was a deliberate one, since it aimed at a world standard for the future (ETRI, 2004). There are already some signs of success: the Korean T-DMB system was accepted as the European mobile television standard in December 2004, and Germany is planning to introduce the Korean T-DMB system during the 2006 FIFA World Cup in Germany (ETRI, 2004).

DMB and Regulatory Issues

In Korea, as in the case of existing broadcasting such as television, cable TV, and DBS, the KBC has the authority to grant licenses for both S-DMB and T-DMB. The introduction of DMB service to Korea is not without severe conflict among the participants in DMB. Even now, after S-DMB service has begun and T-DMB companies

are preparing to provide their services, two hot issues are yet to be resolved: the retransmission of terrestrial television programs and the problem of whether T-DMB should be a pay service or not. Every party involved in these two issues is trying to justify support for its position. The KBC, however, has not been successful in handling this conflict. This paper will thus focus on how these two issues arose in the process of introducing DMB to Korea.

Retransmission Issue for S-DMB

First of all, allowing retransmission of land-based television programs to S-DMB has constituted the first puzzle for the KBC. As expected, the sole S-DMB broadcaster, TU Media, argued strongly for retransmission of existing network television programs to its S-DMB subscribers in order to attract more subscribers. Moreover, several newspaper reports pointed out that there is a strong need for cell phone users to be able to watch network television programs. For TU Media, retransmission is critical for its survival in a market where watching terrestrial television still dominates cable TV and DBS. It is well known, for instance, that TU Media would have had to give up its S-DMB business before its official service began if the KBC had not guaranteed retransmission (P. Lee, 2005).

In contrast, the existing television networks, including KBS, MBC, and SBS, which were all given T-DMB licenses, opposed the retransmission of their programs on S-DMB. The situation is more complicated internally for television networks. Except for KBS, both MBC and SBS—semi-public television and commercial television respectively—invested in TU Media strategically, as minor share-holders, in order to

prepare for the mobile television age (TU Media, 2005b). Logically, these two television networks do not seem to have a good reason for their opposition to retransmission.

However, the labor unions of all three networks strongly opposed retransmission because of a fear of the erosion of the television market by a giant telecom company. They also worried that the proliferation of S-DMB would decrease ratings for the original transmission of their programs, ultimately a potential threat to their jobs. Thus, they frequently protested inside the KBC building.

Meanwhile, the position of the KBC has been quite vague, so it has been criticized for doing nothing regarding the retransmission issue. Actually, the KBC could not decide whether or not to allow the retransmission of network programs even after TU Media had began a trial run in January 2005. On April 19, 2005—after the KBC granted six T-DMB licenses on March 28, 2005—it finally worked out a compromise—namely, to let the retransmission issue be decided by contract between TU Media and the television networks. However, still facing strong opposition from labor unions, the CEOs of the three television networks officially agreed that they would not sign retransmission contracts until their T-DMB services became stable in the mobile television market in competition with S-DMB.

In order to understand the retransmission conflict in Korea, Benkler's three layer model of communication will be helpful. Benkler (2000) claims that today's digital media environment can be understood by looking at the three layers of communication in our society: the content layer, the logical layer, and the physical infrastructure layer. With regard to S-DMB regulations, the KBC has not been clear in its position concerning whether access to satellite frequencies and access to content should be given to the same

S-DMB service provider. Indeed, this unclear position results in the complaints from S-DMB users. Even after one month of commercial S-DMB service, the biggest complaint of its users was that they could not watch terrestrial television programs via S-DMB phones. Most S-DMB subscribers still hope to be able to watch network television programs through their DMB phones (W. Lee, 2005), but they have not yet been clearly informed whether or not they will ultimately be able to see terrestrial television programs via S-DMB phones as a part of their subscription to S-DMB.

From this retransmission problem, we see that DMB can serve as an important case for other future convergence television services such as IPTV. For example, Korea already faces a dilemma in IPTV, which will be introduced in 2006. As is the case with DMB, the key issue in the IPTV policy will be whether the programs of terrestrial television networks can be delivered by IPTV service providers. Furthermore, the situation is more complex in the IPTV case in Korea, because potential IPTV providers are broadband ISPs. Broadband ISPs are not under regulation by the KBC but by the MIC, whereas both S- and T-DMB are regulated by the KBC. Currently potential IPTV service providers like KT are under the regulations of the MIC.

In countries like Korea, in which terrestrial television networks dominate television, it is likely that the regulatory agencies try to avoid getting involved directly in the retransmission issue when new convergence video services appear on the market. The fact is, however, that such countries should prepare in advance a better regulatory philosophy regarding retransmission of terrestrial television programs. The lesson of Korean DMB is that a regulatory principle that is not thoroughly thought out is likely to end up in a delay of convergence services and, furthermore, is likely to worsen conflicts

among market participants. At least in Korea, then, it is high time to develop a regulatory philosophy regarding the conflicts between access to channels and access to content for convergence service providers. Otherwise, WiBro—a broadband wireless Internet service for high speed mobility that the Korean government plans to introduce in 2006—is likely to have similar problems.

Pay Service Issue for T-DMB

Whereas S- and T-DMB service providers are fighting over the retransmission issue, T-DMB licensees and the KBC are directly involved in the second policy issue: whether or not to allow T-DMB service providers to have pay-service. This issue is mostly related to who should pay the cost of T-DMB gap-fillers. In the case of S-DMB, this is not an issue because, since S-DMB is a pay service that uses satellite frequencies, the S-DMB subscription fee includes gap-filler expenses for S-DMB. In contrast, T-DMB was first known as free service because it uses VHF frequencies. However, after receiving T-DMB licenses, T-DMB service providers requested of the KBC that they should have a partial pay service because their expected income from advertising alone could not cover the cost of installing gap-fillers, in addition to the other expenses of providing T-DMB service. T-DMB companies thus estimated that \$50 million worth of gap-fillers might be needed in the first stage of gap-filler installation in order to cover major subway lines and other blanketed locations in the Seoul metropolitan area. Accordingly, they suggested a service fee of about \$5 per month for future T-DMB users. They also emphasized that an insufficient number of gap-fillers would result in poor signal reception in many of their service areas, thus resulting in a poor service reputation

for them. Such situation would prevent T-DMB service—which is by nature a more public service than S-DMB—from being adopted by many citizens.

Ironically, however, the very appeal of universal service, which T-DMB companies rely on to justify their being pay services, was a dilemma for the KBC, which announced before granting licensees that T-DMB should be a free service that is introduced to promote audience satisfaction and well-being. One thing was obvious: as a regulatory agency that is supposed to promote universal broadcasting service to all citizens, the KBC was experiencing difficulties in finding wise solutions to the T-DMB cost problems. As in the case of the retransmission issue, the KBC had been criticized for delaying its final decision on the pay service issue. Until the end of August 2005, five months after the T-DMB licenses were chosen, the pay service issue for T-DMB had been the major reason, in addition to the delay in formulating standards for a transmission network for T-DMB, that T-DMB service from the three existing television broadcasters had not been launched in July 2005 as originally scheduled.

Finally, after long public debates, Korea chose an alternative way to solve this pay service issue: shifting the gap-filler costs to the price of T-DMB hand-sets. On August 30, 2005, the KBC, the MIC, the six T-DMB service providers, and five DMB cell phone manufactures in Korea agreed that T-DMB companies and cell phone manufactures would share the cost for T-DMB gap-fillers, which meant a higher purchase price for T-DMB cell phones (Park, 2005). As a result, the partial pay service model for T-DMB service vanished and T-DMB was to remain a free service in the future. However, debates on the pay service model still remains part of T-DMB's agenda, since this issue is closely related to the fundamental issue of who should be responsible

for the huge cost of new digital media in a society. In particular, if a new service relies on traditional public service model, the issue of transition cost or introduction cost could be a serious barrier for a soft landing by a new service, such as T-DMB in Korea.

From the Korean case, it should be pointed out that the pay service issue of T-DMB sprang from the fact that T-DMB uses VHF frequencies. In most countries, VHF frequencies have been reserved for terrestrial television broadcasting, which is free of charge to broadcasters. Commercial television broadcasters, of course, assume the responsibility of investing in a reasonable quality of transmission within their designated broadcasting areas in exchange for the income they get from their advertising. However, T-DMB in Korea has raised another question: Who is responsible for the cost of a new convergence television service that uses public frequencies. If Korean T-DMB service is used widely around the world in the future, broadcasting regulatory agencies are likely to face similar claims by Korean T-DMB service providers.

Implications of Korean DMB

The crown for the world's first commercialization of mobile television via cell phones went to Korea when TU Media began its nationwide satellite DMB service on May 1, 2005. Furthermore, Korea is now planning to start a terrestrial DMB service in December 2005. This paper claims that Korean DMB is the product of SKT's blue ocean strategy and the government's industrial policy. In a desperate effort to create the next big market in the mobile industry, SKT in Korea has strategically developed an S-DMB technology that can be watched via cell phones, whereas Japan has focused on providing

mobile television service in vehicles. In addition, the Korean government has played a more important role in developing T-DMB than SKT. The Ministry of Information and Communication in Korea has suggested the idea of T-DMB using VHF frequencies, and after the successful development of a working T-DMB system, the Korean government has also pushed hard to market T-DMB worldwide.

However, the glory of becoming a pioneer in mobile television has not been without its problems. In particular, this paper finds two policy issues that the KBC has been criticized for as regards DMB. First, the retransmission debate will be repeated when Korea introduces another convergence service, such as IPTV. As long as the dominance of terrestrial television programs in Korea continues, future convergence service providers will always argue for allowing retransmission, whereas existing television broadcasters will fight it. More sophisticated studies on the effects of retransmission are thus much needed. So far, the KBC has not been able to provide empirical studies on the effects of retransmission via S-DMB, and it has therefore lost the opportunity to persuade both TU Media and television broadcasters.

The second issue, T-DMB pay service in Korea, provides an opportunity to think about the public use of the television spectrum. In a commercial broadcasting system, television broadcasters are given the right to use the spectrum in exchange for providing free television programs with advertising. As has shown in the case of Korean T-DMB, the introduction of a new convergence service may challenge this public use of the spectrum, which has lasted for a long time. Korean T-DMB will add a data service in 2006 after its initial launch with video and audio channels in 2005. But what if T-DMB service providers want to make money by providing a pay data service? Furthermore, in

addition to the data service, they may want to operate a shopping service, that is, a combined service of M-commerce (mobile commerce) and T-commerce (television commerce). If this is the case, should T-DMB service providers be charged for using the public spectrum? Or should they not be charged at all so that they can be compensated for the cost of constructing additional transmitters and gap-fillers? Without reflecting on scenarios such as this, the Korean government is likely to face other tough challenges from new convergence service providers and public audiences as well. The Korean DMB case, then, re-emphasizes the fact that the lack of a clear regulatory philosophy can only result in confusion, that is, in a situation where many interest groups fight even after a new convergence service is introduced to the market. In the near future, we will see a number of new convergence services of telecommunications and broadcasting, and the country that is first in marketing those services will find it difficult to avoid unprecedented regulatory issues. Such a situation will serve as a lesson to other countries. In other words, the case of Korean DMB will help other countries plan to introduce their own mobile television services, regardless of their choice of mobile television standards.

Finally, it should be pointed out that one reason for the regulatory confusion in the case of Korean DMB is that telecommunications and broadcasting are regulated by different authorities in Korea. Broadcasting is regulated by the KBC, whereas mobile communication is regulated by the MIC. Indeed, this problem is recurring right now regarding the introduction of IPTV in Korea. As a broadband leader in Korea, KT (Korea Telecom) has already developed IPTV technologies, but it is far behind Japan and Hong Kong in the commercialization of IPTV. The point is that Japan and Hong Kong have advanced in IPTV because they have written broadcasting and telecommunications laws

that take into consideration the big picture for new convergence services such as IPTV. In this context, Shin's argument (2005) for creating a unified regulatory authority for broadcasting and telecommunications is more relevant than ever in Korea. Given the fact that the S-DMB has already started, and that T-DMB and IPTV are just around the corner in Korea, such a unified regulatory authority in Korea can handle issues that evolve out of the convergence of broadcasting and telecommunications in a more balanced way.

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