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How Some Regulatory Policies can Undermine the Success of a New Technology: A Case Study of Digital Multimedia Broadcasting in South Korea[1]

By Seunghye SOHN*

This research discusses the validity and impact of regulatory policies in rapidly changing media industries, with the case of satellite and terrestrial digital multimedia broadcasting (DMB) in South Korea. In spite of their innovativeness, it is difficult to state that both DMB services have been successful in the market as had been expected, especially facing the explosion of smart-phones which enable the reception of various audio and video services. Many argue that one of the main reasons for such weak performance of DMB services is the inconsistency of regulatory policies. In the Korean DMB case, satellite DMB and terrestrial DMB have been regulated under different conditions in terms of content and coverage, as well as cost systems in spite of their functional similarity. Such asymmetric regulation has proven to be ineffective in this case and, thus ultimately, has resulted in the instability or failure for both services. The findings of this research highlight the significance of the relationship between competition and innovation in the media industry as well as the conditions of fair competition for new convergence technologies.

Key words: DMB, South Korea, regulatory policies, asymmetric regulation

Introduction: lessons from the South Korean DMB

Amid dramatic change in the broadcasting environment with the introduction of various new digital media technologies and services, Digital Multimedia Broadcasting (DMB) emerged as a promising example of convergence technology between broadcasting and telecommunication in South Korea. DMB is a broadcasting service which allows the subscribers to watch or listen to multichannel audio and video channels through mobile phones and other portable receivers, enabling mobile and personalized services for broadcasting.

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The service started with the securing of Digital Audio Broadcasting (DAB) frequency during the process of radio digitalization, but was later turned into DMB with the expectation of higher demand of video services than audio during the late 1990s. The industry and the consumers had anticipated DMB to become an innovative convergence service and technology even before its introduction to the market. However, after 8 years of operation, both satellite DMB (S-DMB) and terrestrial DMB (T-DMB) have suffered from serious setbacks in terms of financial outcomes as well as providing competitive content.

S-DMB, a joint service of SK Telecom with Japan's *MBCo*,[2] launched its satellite in 2004, and started its multi-channel pay broadcasting in May 2005 as the world's first S-DMB service. Despite its diverse content, S-DMB provider *TU Media* failed in maintaining the original subscription business model and was merged with one of the subsidiaries of the main investor, SK Telecom in 2010 in order to substitute the losses. Ultimately, SK officially terminated its service in August 2012 with a huge financial loss, which marked the largest failure in the shortest time throughout the South Korean communication history. T-DMB, the competitor, launched its service in December 2005 starting in Seoul and the metropolitan areas. T-DMB took a favorable position with free services available via most mobile phones, though it was difficult to assess the actual viewing rate of the services. However, it could not find profit-making business model except advertising, resulting in weak financial outcomes. In addition, T-DMB was not successful in developing and providing its own competitive content other than the retransmission of incumbent terrestrial broadcasting channels, KBS, MBC and SBS.

Numerous political, economic, and social factors affected such setbacks of the DMB industry. Obviously, the most significant factor is the explosive diffusion of smart-phones which enable television viewing through their applications. However, researchers and service providers have criticized the inconsistent DMB policies which hampered the expansion of market and the development of competitive content for the DMB industry before the entrance of smart-phones in South Korea (Cho, 2012; Choi, Lee, & Chung, 2000; Shin, 2006).

South Korean S-DMB and T-DMB related policies were established and executed through the former Korean Broadcasting Commission (KBC) and the former Ministry of Information and Communication (MIC), eventually combined into the Korea Communication Commission (KCC). Although these institutions recognized the importance of DMB in providing subscribers with mobility in broadcasting, they did not hold enough discussion and preparation in the policy-making process. Consequently, DMB services were launched without clear positioning as a new entrant of the market as well as the appropriate conditions for competition with each other.

Thus, this research aims to examine the principles of regulatory policies in converging markets of broadcasting and telecommunication, and discuss the

impact of regulation on service providers and subscribers in the introduction and expansion of new medium. The argument is that DMB could have gained a better position before facing the competition against smart-phones, had the appropriate regulatory policies been applied. The purpose of this research is to provide a theoretical and practical understanding of effective and efficient regulatory policies for future broadcasting and telecommunication markets.

Theoretical Question: Asymmetric regulation over emerging media

When a new technology and service is introduced to the market, especially a convergence medium between broadcasting and telecommunication, various regulatory policies are implemented in order to secure fair competition and to promote consumer welfare. However, the difficulties of defining market boundaries and assessing dominant power over a specific industry often raise the question of feasibility or relevance of such policies.

The original definition of asymmetric regulation often discussed in telecommunication market is the treatment of firms under different conditions with same content and intensity of regulation, or that of firms under the same conditions with different content and intensity of regulation. Therefore, strictly speaking, strong regulation upon market dominant firms or incumbent firms (different condition) cannot be considered as asymmetric regulation. However, asymmetric regulation is used to refer to different levels of regulation on firms of diverse conditions in general (Philippe, 2000; Schankerman,1996).

Asymmetric regulation mainly focuses on intense regulations for firms of advantageous positions, such as market-dominant or incumbent service providers (Chou & Liu, 2006; Lyon & Huang, 1995; Noam & Pogorel, 1994; Perrucci & Cimatoribus, 1997; Petiz, 2005). The firm ground of asymmetric regulation is the antitrust principle, for monopolistic market structure was normally considered inappropriate. In fact, researchers have suggested that asymmetric price regulation promotes the entrance of competing firms (Petiz, 2005) and that Asia's dramatic mobile development and sustainable competition in the market are largely the results of asymmetric regulation (Chou & Liu, 2006; Song, 2009). However, there are also assertions that the counter effects of strong regulatory policies including asymmetric regulation might bring the inefficiency distorting competition conditions of the market (Crandall, Sidak, & Singer, 2002).

In fact, each country has implemented diverse asymmetric regulation policies regarding monopolistic market control of incumbent telecommunication firms (Chou & Liu, 2006; Petiz, 2005). The examples include separating the leading firms' monopolistic sector, forcing first-pitch companies to share core facilities, or applying different fare policies to competing companies.

On the other hand, in the broadcasting industry, different levels of regulation policies were applied not for market control but for public needs and social influence. Unfortunately, broadcasting is generally unclear in its market demarcation, making it hard to define dominant firms. Furthermore, applying asymmetric regulation principle is especially difficult for convergence services and technologies due to the difference in defining market. With the introduction of diverse forms of competitions from new convergence technologies and services, the definition and conditions of fair competition are growing more complicated than before.

The asymmetric regulation applied on S-DMB and T-DMB usually utilized different levels of regulatory policies for the dominant and the following service providers in order to promote competition in the market and to protect consumers. Asymmetric regulation, mainly in the form of market entrance and fare control, has its goal of providing appropriate levels of competition for consumer welfare (Bourreau & Dogan, 2001). On the other hand, it is also argued that such regulatory policies can impede efficient services by creating distorted market conditions (Crandall, Sidak, & Singer, 2002).

As for DMB in South Korea, competition between and among S-DMB, launched by the leading mobile communication service provider SK Telecom, and T-DMB, led by major incumbent terrestrial broadcasters, has constantly raised the issue of unfair competition. Thus, an objective and in-depth analysis of regulatory principles and policy-decisions is required in order to reevaluate the status quo of these services and to suggest the policy directions for future convergence media.

Research Questions and Method

Research Questions

This research set the following research questions:

- Research Question 1: What is the basis of regulatory policies on T-DMB and S-DMB?
- Research Question 2: What regulatory policies have been applied to T-DMB and S-DMB?
  - Research Question 2-1: What have been the regulatory policies on the business models of T-DMB and S-DMB?
  - Research Question 2-2: What have been the content policies of T-DMB and S-DMB?
  - Research Question 2-3: What have been the localism policies of T-DMB and S-DMB?
- Research Questions 3: What have been the results of regulatory policies on T-DMB and S-DMB?

– Research Question 3-1: What have been the acceptance patterns of T-DMB and S-DMB?
– Research Question 3-2: What have been the financial achievements of T-DMB and S-DMB?

Research Method

In order to analyze DMB issues and regulatory policies, this research thoroughly examined diverse documents including conference proceedings, articles, and policy reports from 2003, when DMB discussion grew active. Major documents include Broadcast Act and Enforcement Ordinance, policy reports from the former KBC, MIC, as well as the current KCC, in addition to diverse conference proceedings and media resources.

At the same time, this research conducted a series of in-depth interviews of policy-makers, service providers, and scholars who participated in policy decision and execution process concerning DMB. The total of seven interviewees including two policy-makers at the KCC, one personnel each from the incumbent terrestrial broadcasting affiliated DMB, newly entered DMB-only company and S-DMB as well as two policy researchers. The first series of interviews were conducted in May 2010 and the updating interviews were conducted in September 2011 and July 2012.

Brief History and Current Status of DMB

The discussion on DAB (and later DMB) started during the process of digitalization of the existing terrestrial broadcasting during the 1990s in Korea. The discussion was then accelerated when MIC redefined DAB frequency to DMB to include video distribution in 2002 (MIC, 2002).

South Korean telecommunication service providers have continuously tried to launch their own video distribution services through mobile equipment and propelled S-DMB business as a part of the plan. SK Telecom, the leading mobile telecommunication company, launched its satellite exclusively for DMB in 2004 in cooperation with its Japanese partner, MBCo, and started the subscription-based multichannel DMB on May 1st, 2005.

During the process of digitalization of the incumbent terrestrial broadcasting, T-DMB was introduced in order to solve the problem of mobile reception of HD system which had been selected for Korea's digital terrestrial television standard. For T-DMB which launched its service in December 2005, KBC added three new DMB-only service providers in addition to three incumbent terrestrial broadcasters with a goal of not only retransmitting terrestrial broadcasting through T-DMB but also establishing it as a new mobile broadcasting medium for consumers.

As a result, S-DMB and T-DMB service providers started their services in 2005 as summarized in Table 1.

Table 1: Launch data of S-DMB and T-DMB services in South Korea

	S-DMB	T-DMB
Business operator	TU media	Consortium of 6 broadcasters
Business model	Pay service (monthly subscription+ initiation fee)	Free (advertising based)
Programming	MBC retransmission multi pay channels TU operated channels	KBS, MBC, SBS retransmission & 3 T-DMB only channels (U1, Hankook DMB, YTN DMB)
Coverage	national	regional

The subscribers to S-DMB, *TU*, reached over 2 million and sales surpassed 110 billion won [3] in revenue by the end of 2009 but started to slow down and ultimately decreased radically until the service was terminated in August 2012. T-DMB is provided through approximately 35 million reception devices (in use), mainly mobile phones, by the end of 2011, but advertising revenue has continued to remain weak, resulting in continuous annual losses.

Unlike the initial prediction, S-DMB service provider has experienced difficulty in securing pay subscribers in the competition against free T-DMB services, while T-DMB service providers have experienced their difficulties in genarating advertising revenue in spite of the fast quantitative expansion. Furthermore, both services had to face the competition against smart-phone application services by broadcasters with the introduction of smart-phones in South Korea at the end of 2009. .

Basic principle of regulatory policies on DMB

According to the Broadcast Act and the Broadcast Act Enforcement Ordinance, DMB is defined as "mobile multimedia broadcasting" or "broadcasting which transmits television broadcasting, radio broadcasting, and data broadcasting using multichannel with a purpose of mobile reception." [4] More specifically, the Enforcement Ordinance distinguishes between "terrestrial mobile multimedia broadcasting service" and "satellite mobile multimedia broadcasting service." [5]

Since DMB is classified either as terrestrial or satellite broadcasting, the regulatory policies which have been applied to the incumbent terrestrial and satellite broadcasters have also been applied to these new services, respectively. For example, in terms of ownership, T-DMB is prohibited from receiving foreign investment as is the incumbent terrestrial broadcasting, and the investment of major

national conglomerates are limited up to 10%, although the newly licensed DMB-only service providers have relatively weak financial positions. On the other hand, the ownership regulation on the S-DMB industry follows those of pay services with less strict rules (49%) on the national conglomerates and foreign investment.

In other words, T-DMB is considered as a terrestrial broadcasting which is a universal service focusing on public interest, using public resources, and emphasizing its social influence, while S-DMB follows the regulatory principle of incumbent satellite broadcasting which is a multichannel pay service aiming to make profit.

Thus, the basic foundation of the asymmetric regulation and policy decisions mainly come from the two services' fundamental differences in their conceived identity; S-DMB is considered essentially as a commercial service of a convergence technology between broadcasting and communication, and the regulatory policies are applied accordingly, while T-DMB, competing against it, is regarded a public service as an extension of public terrestrial broadcasting which require higher level of regulation on their business models and content.

DMB policy decisions and execution

Cost and profit model

Generally, the most common implementation method of asymmetric regulation in telecommunication industry is the pricing policy. For example, cost-based access price systems can be imposed to service providers with considerable market control, but not to others, so that they choose different pricing systems (Petiz, 2005).

The pricing policy in the Korean DMB industry took a very unique path. Upon launching, *TU* charged 20,000 won for service initiation and 11,000 for monthly subscription, and adopted individual usage-based rate system which is normally applied in telecommunication market. On the other hand, T-DMB was defined as a free service without subscription fee, whether terrestrial-affiliated or DMB-only, and the cost for program production and distribution as well as the establishment of transmission network for transportation system has been covered solely by advertising revenue. This is an application of free terrestrial broadcasting model based on advertising, unlike S-DMB's telecommunication model.

Nevertheless, it became clear that such definitions of service and revenue models required a significant revision. Although S-DMB arrived at the market first and had the advantage of being multichannel, its subscription and initiation fee served as a limitation in competing against free T-DMB. The number of S-DMB subscribers became stagnant and even decreased after T-DMB expanded its service coverage to nationwide in 2007, but increased back again after they changed their rate system virtually free in 2008 (as shown in <Figure 1>). With its

limitation of smaller screen and mobile-watching condition, pay service proved to have a difficult stand in competing against free service, unlike the rivalry between incumbent free terrestrial and pay cable or satellite service in the broadcasting market.

Meanwhile, T-DMB service providers have experienced difficulty in maintaining free service due to lower advertising revenue and larger infrastructure investment than expected. The dependency of T-DMB solely on the limited advertising market in which the competition was ever increasing has been a major setback for the service providers. Especially, newly licensed DMB-only service providers have continuously requested for other revenue sources including initiation fee or subscription fee, but the current KCC have opposed changes in its regulatory principle of T-DMB as a free universal service for everyone.

We have continuously requested for the initiation fee for the past years; for us, that's the only key for survival now, but unfortunately, the KBC(KCC) seems not to recognize the seriousness of our problem or seems to try to avoid the issue until we decide to finish the service ultimately (interview with the representative manager, The Association of T-DMB).

We are fully aware of the financial difficulties DMB providers are facing but it's almost impossible to change free service to pay service, considering diverse reception equipment for T-DMB service available now (interview with the director of new media policy, KCC).

Thus, for both S-DMB and T-DMB, the difficulties in establishing appropriate revenue models have been a major issue in improving their weak performances. Yet, it will be difficult to argue that the regulatory policies have helped increase the competitiveness of DMB services from the perspective of profit making business models.

Content policy

The regulatory policy on content can have a huge impact on the market competition, and has been an important variable in Korean DMB competition. The core issues of DMB content are the right to retransmit the incumbent terrestrial broadcasting services and the institutional support for developing new content for DMB services.

TU [6], until the termination of its service, provided 22 video channels, 20 audio channels, plus one adult channel, but couldn't find the core content which appeals to the disappearing subscribers. On the other hand, T-DMB service providers consist of three terrestrial-affiliated broadcasters, mainly retransmitting existing terrestrial content, and three DMB-only service providers (U1, Hankook Media, YTN Media) with original content and programs from other pay broadcasters.

The first issue on DMB content was the retransmission of incumbent terrestrial broadcasting (KBS, MBC, and SBS); while S-DMB was prohibited from retransmitting incumbent terrestrial broadcasting at the launching, T-DMB has been retransmitting all of them. The difference was mainly due to the early decision of SK Telecom to request for the exemption of delivering Must Carry channels including KBS1 and EBS. However, during the following discussion of launching free T-DMB business, the former KBC decided not to allow *TU*'s retransmission of any terrestrial broadcasting temporarily.

The logical ground was simple. For one, if TU establishes its business based on the retransmission of terrestrial broadcasting, the significance of DMB as a new medium will be weakened and the late comer, T-DMB, will not be able to have a fair competition. Also, if TU, inevitably covering nation-wide, retransmits terrestrial broadcasting, it will go against the regulatory principle of localism which we have pursued consistently (interview with the policy researcher of the former KBC).

After T-DMB was introduced six months later, KBC decided that *TU* and the incumbent terrestrial broadcasters solve the retransmission issue with individual contracts, but it was obvious that the incumbent terrestrial broadcasters, already retransmitting their channels through T-DMB service, would not be active in the negotiation with *TU*. *TU* was successful in signing retransmission contract with only one of three channels, *MBC*, in spite of its willingness to pay significant amount of retransmission fee.

Another content issue was the lack of ability to develop DMB-exclusive content. While terrestrial-affiliated DMB broadcasters retransmit their channels with no additional cost, DMB-only channels must find and produce new content appropriate for DMB technology. However, it is difficult for them to invest in such content development since they have been accumulating wide losses annually(as shown in <Table 2>). As a result, T-DMB also demonstrated a limitation in creating new and competitive content strategies for new services other than the retransmission of already proven content, including sports and reruns of drama series from the terrestrial and cable broadcasting stations. In addition, T-DMB channels started to lease their time blocks to cable channels to substitute for the lack of content and to find revenue sources, but such strategy did not contribute much to solving T-DMB's content problem.

In summary, the regulatory policy on the content of S-DMB and T-DMB has proven the ineffectiveness and inefficiency of asymmetric regulation. While S-DMB service provider, *TU*, had a strong competitiveness in network, strict regulatory policies on retransmission have threatened its business as a multichannel premium mobile broadcasting by further weakening its content competitiveness.

On the other hand, T-DMB service providers, especially newly licensed DMB-only providers, have had difficulties in developing competitive content due to weak financial status and, thus, failed to contribute to promoting DMB as a competitive new medium in the market.

Coverage area and localism policy

Localism has been one of the most important yet difficult public goals in South Korean broadcasting industry. Localism can either be understood as geographical/administrative or social/cultural concept. In both dimensions, DMB policy has provided a very significant case to consider (Joo&Bae, 2009).

From a geographical/administrative perspective of localism, S-DMB and T-DMB were fundamentally different due to their technological basis; S-DMB, covering the entire nation with one satellite, provided nationally simultaneous content with identical quality broadcasting, although it required high-cost gap fillers. On the other hand, T-DMB had to establish a network for local reception which took more than a year to build and still has a problem of unequal reception quality in some regions. The network-building cost has been a considerable burden for T-DMB service providers.

In addition, S-DMB and T-DMB also had fundamental differences in terms of social/cultural dimension of localism. S-DMB had a limited channel capacity to retransmit all regional terrestrial broadcasting signals, which made it impossible to realize the regulatory principle of localism. On the other hand, T-DMB has made it clear that localism was one of its major goals from the beginning and a total of 13 service providers, including six metropolitan and seven non-metropolitan providers, have participated in its nation-wide distribution. However, instead of dividing the nation into small sized local markets, it is decided to establish middle-range regional markets to balance the economies of scale and the regulatory goal of localism. Still, such policy decisions have neither provided the financial stability for the providers nor satisfied the localism demand of the viewers.

At that time, there had been heated debates between small versus large DMB market demarcation. Local broadcasters were already suffering from advertising shortage, so that further small market ad-based broadcasting was considered risky. On the other hand, the incumbent local broadcasters were strongly against the large coverage broadcasting even though it was for mobile devices. The only alternative was middle-range regional market for the T-DMB industry (Executive manager, T-DMB service provider).

The regulatory policies of the S-DMB and T-DMB are clearly shown in the localism discussion: demarcation of coverage area as well as the protection of local culture. In summary, the regulatory decisions concerning localism issues also have undermined the expansion of market and financial outcome of the DMB industry

for both T-DMB, which was forced to establish the middle-range local markets in order to balance its localism goal and economies of scale, and S-DMB, which had difficulties in negotiating with the incumbent terrestrial broadcasters due to its technical unfeasibility to realize localism.

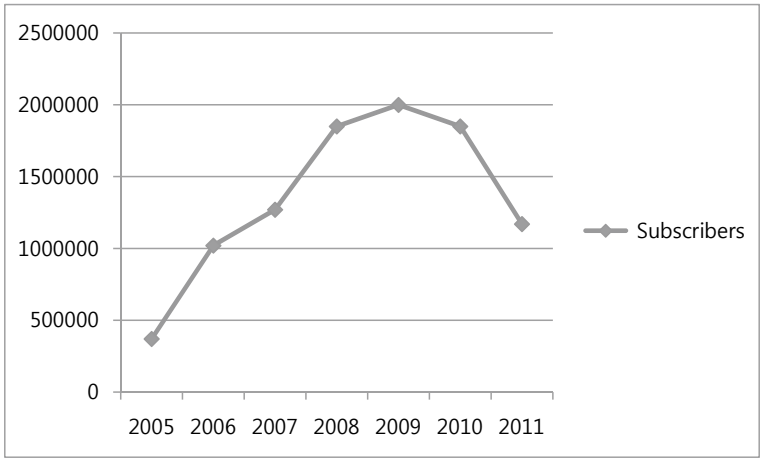
Impact of regulatory policies on DMB industry

Adoption and usage patterns of DMB service

One of the ways to assess the successful entrance of a new medium in the market is its adoption and expansion rates among users. The number of subscribers for S-DMB and the number of T-DMB equipped devices as well as the results of audience survey can provide such information.

As it can be seen from <Figure 1>, the number of subscribers and users have increased constantly ever since the launch of DMB services. S-DMB, a pay service, started with 370,000 subscribers in 2005 and secured a million subscribers at the end of 2006. The number stayed stagnant for a while, and then dramatically increased again up to 2 million after *TU* introduced slim rate (free for basic service) by the end of 2009. However, the increase of free subscribers has lowered the ARPU and has further weakened the financial outcome, though it might have maintained the number of subscribers temporarily. The number of subscribers fell down to 1.1 million in 2011, and was only 38,000 (including both free and pay subscribers) at the time of service termination in July 2012.

Figure 1: Number of TU Subscribers



Source: Cho(2012), The end of S-DMB and the policy implications, p.2.

On the other hand, for advertising-based T-DMB, the indicators of adoption and usage include the number of reception devices, including mobile phones and vehicle reception devices, as well as the actual viewing rate. It is difficult to distinguish the availability and actual viewing for free T-DMB, but the number of mobile phones available for T-DMB service increased at a very fast rate. Currently, T-DMB is available via more than 40 million mobile phones in use. The actual viewing rate for T-DMB has been reported since 2008, and the survey results have shown that the average DMB viewing rate was 1.17% (highest reaching 3.59%) in 2008, but unfortunately dropped to 0.6% in 2011. The most watched programs have been sports events such as the Summer and Winter Olympic Games as well as national soccer and baseball league games.

Such analysis of the adoption and expansion of DMB users is imperative to understanding DMB industry and to assessing its current status. DMB service providers have argued that their services are underrated as an advertising medium and that advertisers should reevaluate them appropriately. However, as the broadcasting applications are widely available for smart-phone users, the future of DMB expansion may be even more discouraging for service providers.

Financial achievement

Unlike what had been expected during the promotion of DMB service at its launching, the financial achievements of both S-DMB and T-DMB have been insignificant. S-DMB service provider, *TU*, launched its business with the capital of 350 billion won, but recorded a huge deficit for the following five years, and in 2009, dramatically cut down the cost for content and labor due to continuing financial downhill. Although the revenue surpassed 100 billion won, it recorded the deficit of 96.5 billion won (2005), 84.2 billion won (2006), 74.8 billion won (2007), and 39 billion won (2008), encroaching more than 300 billion won out of its initial investment by the end of 2008. With the introduction of slim rate system, *TU*'s ARPU decreased from 7,000 won to 5,000 won and the financial status of *TU* did not improve. Ultimately, *TU* was merged with the SK Telink, a subsidiary of SK Telecom, in 2010 in order to cover the losses.

For T-DMB, advertising revenue increased from 1.7 billion won in 2006 to 12.4 billion won in 2009. However, service providers are not making the most out of the advantages of DMB that enables focused viewing and personalized marketing. In addition, the revenue gap between terrestrial-affiliated and DMB-only service providers is in fact increasing, giving DMB-only providers a dark prospect. As of 2011, DMB-only service providers, YTN DMB, Korea DMB, and U1 Media, each have accumulated losses of up to 30 billion won. Without a new business revenue model, it will be hard for T-DMB to maintain its business in the face of continued recession, low evaluation of its advertising effect, and competition against smart-phone applications for video distribution.

Table 2: Revenue of DMB-only service providers

(In one hundred million won)

		2006	2007	2008	2009	2010	2011	Total
Korea DMB	Revenue	3	23	43	33	55	65	243
	Profit	-57	-65	-45	-41	-18	-5	-231
YTN DMB	Revenue	8	25	52	51	72	90	298
	Profit	-75	-65	-51	-51	-38	-7	-287
U1 Media	Revenue	12	47	75	47	50	55	286
	Profit	-87	-59	-37	-43	-25	-11	-262

Source: KBC (2007), KCC (2008-2012). Annual Report on the Broadcasting Industry.

In conclusion, S-DMB and T-DMB have not been successful in generating profit for the past years. Although a huge initial investment for starting business and the downturn of advertising market from the recent years' economic recession could have affected the situation, the fundamental problem was that the profit generating models for S-DMB and T-DMB as new media have been neither effective nor pertinent.

Conclusion

DMB has received much attention since its 2005 introduction as a new medium representing a convergence technology and service between broadcasting and telecommunication. S-DMB, the world's first broadcasting service with DMB-exclusive satellite, and T-DMB, ancillary service to incumbent terrestrial broadcasting for its HD conversion, were highly promoted by the South Korean industry and government. However, seven years after the introduction of the DMB business, current status and future prospect of DMB seem unpromising.

For one, the availability of audio and video channels through smart-phone applications for more than 31 million smart-phone users (60 % of total mobile-phone as of September 2012) appears as the strong and imminent threat to DMB at this point. During the past seven years, the DMB industry has lost its opportunity to stabilize business, to increase the number of subscribers, and to develop competitive content for the broadcasting market.

Currently, the S-DMB service provider, *TU*, terminated its service permanently and will return the assigned spectrum for DMB to KCC. With its initial investment of 400 billion won in addition to the satellite launch, it is likely to become one of the biggest failures in the broadcasting industry in South Korea. T-DMB also has not proven its competitive value as a new medium for advertising, other than a free retransmission service of the incumbent terrestrial broadcasting available for

mobile devices. Especially, newly licensed DMB-only service providers recorded continuing losses during the past, which have grown enough to encroach their total capital stock.

Diverse political, social, and economic variables could have affected this result. However, most of all, inconsistent asymmetric regulatory policies are pointed out to have had a significant influence. The basic assumption of such regulatory policies was the principle that S-DMB was considered as a telecommunication service and T-DMB a terrestrial broadcasting. Thus, policy decisions on ownership, content, and the realization of localism were made accordingly. Nevertheless, such asymmetric regulatory policies have undermined the successful entrance of DMB into the market in several ways; for example, ownership regulation has worsened the weakness of T-DMB-only service providers. In terms of content regulation, strict regulatory policies prohibiting retransmission of incumbent terrestrial broadcasting weakened the business value of S-DMB service provider, which were already lacking the content know-how and competitiveness. In addition, the policy goal of localism has made it difficult for S-DMB, technically impossible for local service, to negotiate retransmission with terrestrial broadcasters, and for T-DMB to satisfy the balance between localism and economies of scale.

The case of South Korean DMB demonstrates the importance of policy decisions regarding the introduction of new technology and service. Successful introduction and expansion of a new technology and service basically requires adequate policy support. Meanwhile, the case of South Korean DMB also leads to reconsider the conditions for fair competition in the emerging convergence media industry. A number of different levels of asymmetric regulatory policies have been applied to the DMB competition structure, since S-DMB was provided by a dominant telecommunication firm and T-DMB was led by dominant terrestrial broadcasters. However, inconsistent and inadequate regulations imposed upon them undermined the DMB industry as a whole. Based on this analysis of the DMB industry in South Korea, it should be emphasized that the application of regulatory policies involving the formation of competitive relationship among new media technologies and services be carefully examined in the future.

NOTES

1. The draft of this paper was presented at the 10th World Media Economics and Management Conference (May, 2012) in Thessaloniki, Greece.
2. MBCo was established to provide mobile broadcasting in Japan and started its S-DMB broadcasting in 2005 in cooperation with South Korean SK Telecom. The major investor was Toshiba which manufactured DMB receivers as well. It was a multi-channel pay service, but ceased its operation in 2009 due to unrecoverable deficit.
3. 1,000 Korean won = 0.92 US dollar (November, 2012)
4. Broadcast Act Article 1, Section 2
5. Broadcast Act Enforcement Ordinance Article 1, Section 2
6. http://www.sktelink.com/jsp/02_personal/tu/tu_02.jsp

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