



The Introduction of Digital Multimedia Broadcasting in Korea

Lessons Learned from Korea and Strategic Recommendations for Emerging
Mobile TV Broadcasters in Europe and America

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Abstract

Mobile operators, broadcasters, equipment manufacturers and regulators around the world are gearing up for the arrival of the mobile TV broadcasting services. While most markets at the time of this report (in the middle of 2006) are still planning or just starting the mobile TV trials, South Korea stands out as a market that fully launched a commercial service, where mobile TV has been in service since May of 2005.

The world's first mass market implementation of digital mobile broadcasting was a direct result of the Korean government's policy of aggressively promoting and supporting the IT industry. On top of the government's IT initiatives, the mobile operators' desire to find a growth business in a saturated mobile market and the Korean consumer's voracious appetite for new technology fueled the efforts to bring mobile TV to the market. Korea's regulatory environment, market structure and consumer behavior may be unique in many ways, however, the Korean experience still provides many valuable lessons for the industry participants around the world.

From the launch phase of DMB in Korea, the Korean operators have been observing some unexpected consumption behaviors in terms of when, where and what people use mobile TV for. These oddities are also being reported in mobile TV trials in other markets far away from Korea. While such unexpected consumption pattern is intriguing, it also questions the fundamental positioning of mobile TV operators. Is mobility what the consumer desire from a mobile TV offering? If it's not mobility, what is it? Also reported in this project are the types of programming most watched by the Korean consumers and how re-transmission or "simulcasting" of popular network television programs are affecting the demand.

Although the majority of mobile TV subscription is distributed by the mobile operators in Korea, there seems to be a significant demand for non-handset devices for mobile TV. I discuss these non-mobile distribution opportunities by focusing on the in-vehicle application.

After more than a year since the launch, the profitability outlook for all Korean providers is still bleak. Would they ever be able to turn a profit? Is there a fundamental flaw in their business model? Who is poised to reap the most benefit within the mobile TV value chain? I answer these questions by examining economic literature on two-sided markets and network effects.

At the end of this project, I conclude by making strategic recommendations for the aspiring mobile TV operators.

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1. Introduction

In May 2005, TU Media, a business consortium led by SK Telecom, launched the world's first commercial mobile TV broadcasting in South Korea¹. Dubbed "Takeout TV", TU's service was based on the S-DMB² technology. The TU launch was heavily publicized and marketed by SK Telecom and the new service attracted hundreds of thousands of new subscribers within a few months.³ TU Media's launch has also attracted the attention of mobile carriers, broadcasters, program producers and equipment manufacturers around the world as TU represented the first "digital convergence" service deployed by a mobile operator in a commercially meaningful scale.⁴

The subsequent introduction of T-DMB⁵ services in South Korea, only seven months later in December of 2005, added more drama to the situation. A total of six T-DMB broadcasters had been qualified and licensed by the Korean Broadcasting Commission (KBC) by the time TU Media launched its service in May 2005⁶. And by December, four of the six T-DMB licensees started their broadcasting in the Seoul metropolitan market. The T-DMB broadcasters adopted business models and operational strategies that were radically different from those of TU Media, as the Korean broadcasting law mandated that T-DMB remain a "free-to-air" service.

For my engineering colleagues, the on-going Korean experience is a proving ground for the S-DMB and T-DMB technologies as these standards are mostly hailed out

¹ In this paper, South Korea is also simply referred as "Korea".

² S-DMB stands for Satellite-Digital Multimedia Broadcasting.

³ Jun, S., (September 29, 2006) "TU Media has attracted over 200,000 subscribers", *Daily Chosun*.

⁴ It is true that a few 3G mobile carriers had previously tried providing video clips over their mobile data networks, however, the technical limitation of uni-cast streaming combined with the slow consumers uptake of 3G terminals had made any 3G video services negligible up to this point.

⁵ "T" in T-DMB stands for "terrestrial". More descriptions on different mobile TV technology standards are provided in Section 3.

⁶ TU Media is the only licensee for the S-DMB service.

of Korea. From a businessman's perspective, however, the Korean experience poses some very important strategic questions that must be answered before mobile TV can be a thriving and profitable business. How the Korean market would ultimately evolve is a great mystery that puzzles the industry participants, regulators and academics alike. However, the complex and comprehensive nature of the Korean experience provides a fertile ground for valuable lessons for all future players in the mobile TV value chain.

1.1. Purpose of Project

The main purpose of this project is to provide a better understanding of the mobile TV business by discussing and analyzing various aspects of the Korean DMB experience. It is my hope that the sponsor of this project and the business community at large would be able to discern the opportunities and challenges posed by the emerging digital mobile broadcasting technologies through this project. Ultimately, I hope that such understanding by the business community would translate into to a better mobile TV experience for the consumers all around the world.

This project attempts to achieve 4 main objectives: (1) first, I discuss the process, in which S-DMB and T-DMB services were introduced in Korea; (2) secondly, I analyze the Korean mobile TV industry in order to identify key strategic issues and business challenges that the Korean operators are facing; (3) I also study the major mobile TV technologies and their adoption status in the U.K., Germany and the U.S. in order to make parallel comparisons of regulatory environments, consumer behaviors and business models; and finally, (4) strategic recommendations are made for service providers by applying the lessons learned in Korea

It is also important to mention what this project is *not*: In discussing the events leading up to the introduction of DMB services in the Korean market, in no way, I attempt to evaluate the decisions and actions of the Korean companies and regulatory bodies. By

objectively providing the historical information, I endeavor to provide a useful business case study for introducing digital mobile TV broadcasting in a market. At the same time, this project is not intended to make any qualified technical evaluation of different mobile television broadcasting technologies. The technical descriptions and comparisons of competing technologies provided in this paper are solely provided to assist non-technical readers to follow the core discussions, which are mainly on the subject of economics and business strategy.

1.2. Approach

Much of fact finding is done through interviewing individuals who are from the relevant companies and government agencies. Numerous newspaper and trade journal reports, both in and outside of Korea, are reviewed in order to ascertain historical events. I also make two separate trips to Seoul in order to record consumer behavior and survey the retailer venues.

I refer to a number of theoretical frameworks within the subject of economics, marketing and strategy in order to analyze various aspects of the mobile TV business and also to make recommendations. They include discussions on: two-sided economy, economies of network, standardization, market segmentation, value proposition, long-tailed distribution, complementarities and value chain.

1.3. Project Outline

I begin the main part of this project in the following chapter by providing detail descriptions of historical events leading up to the launch of DMB services in Korea. I chronologically follow the three major players of the Korean DMB saga: the government, SK Telecom and the T-DMB camp.

In Chapter 3, I describe the current state of adoption of the five different technical standards around the world. Keeping the sponsor's requirement in mind, I focus my discussion on the U.K., Germany and the U.S. I make a comparison between Korea and these countries in terms of the regulatory environment, licensing, industry participants and differences in consumer behavior. At the end of Chapter 3, I make a prediction as to how the standard game will play out in the mobile TV industry in Korea and around the world.

In Chapter 4 is about the consumers. I talk about how mobile TV operators can capture the mass market. I discuss some of the unexpected consumption behaviors exhibited by these target customers in Korea. I link these observations with some of the recent studies done on media consumption trend. I describe the popularity of in-vehicle and other non-handset devices. Also in this chapter, I question whether *mobility* is really important for the consumers of *mobile TV*.

Chapter 5 discusses the different business models of TU-Media and the T-DMB camp. I analyze the subscription model of TU Media and I assess whether there is any monetization possibility for T-DMB in the horizon. I study the value chain of mobile TV and see who is poised to capture the most value given current industry structure. I conclude Chapter 5 by looking at the role of a wholesaler/content aggregator, which I argue, is the missing link in the Korean market.

In the final chapter of this project, I summarize my findings and make strategic recommendations to aspiring providers of mobile TV networks.

2. Historical Overview of Korean DMB Introduction

The DMB introduction in Korea has been driven largely by two forces. First is SK Telecom, the dominant mobile operator in South Korea. SK Telecom launched its satellite-based mobile TV service (S-DMB) through its subsidiary, TU Media, in May 2005. SK Telecom's motivation behind S-DMB was to find a growth business beyond its stagnant mobile telephone business. Secondly, the Ministry of Information and Communication (MIC) of Korea has been the driving force behind the T-DMB service. MIC's push for the T-DMB technology is largely motivated by the ministry's mandate to spearhead the national economic growth through promoting and supporting of the Korean IT industries.

With such uncommon sets of motivations, these two enormous and powerful champions of mobile TV—SK and MIC—are shaping the new industry by moving ahead at full-steam with two very distinctive business models. While the consumer experience of watching TV on a mobile device is quite similar; the value chain, revenue models, programming availability and operation structure of S-DMB and T-DMB cannot be more different from each other. And so the unusual competition between S-DMB and T-DMB continues to play out in Korea.

In the following sections of this chapter, I describe the series of events leading up to the launch of both S-DMB and T-DMB services in South Korea. I focus my discussions on the decisions and actions carried out by our three main characters of the continuing Korean mobile TV saga: MIC as the zealous government, SK Telecom as the hopeful patron of TU Media and the T-DMB licensees as the reluctant barons of the old media in the age of digital convergence.

2.1. MIC and ETRI Initiatives

2.1.1. T-DMB as Analog Radio Replacement

The birth of DMB in Korea, particularly of T-DMB, dates back to an ancient time (in digital standard) of the Year 1997. In 1997, the Ministry of Information and Communications (MIC) of South Korea reviewed a comprehensive plan for digital conversion of all analog broadcasting technologies.⁷ For audio broadcasting, i.e., to possibly replace the AM and FM radio, the European DAB⁸ (Digital Audio Broadcasting) system was recommended by several technology experts in a series of hearings held by the Technical Committee for Digital Radio Standard.⁹ However, when MIC studied the actual commercial performance of the DAB radio in Europe at the beginning of 2001, they were quickly disappointed to learn that the DAB radio was a “commercial failure”¹⁰ in Europe. Not only the DAB system failed to replace the FM radio, DAB was also on the verge of disappearing as it was unable to attract the critical mass of broadcasters and consumers. An internal MIC report later concluded that the reason DAB was doing so poorly in Europe was because it did not offer any compelling service advantage to the consumers above and beyond what the FM radio already offered. The report suggested the addition of video as a way to differentiating DAB from the FM radio. Based on this finding, MIC commissioned ETRI¹¹ to develop a new version of the DAB radio that would also carry video streams as well as audio. The end product was a modified DAB radio capable of

⁷ Kim, Hyuk, (July 5, 2005) “T-DMB Status and Issues”, in a presentation made to HNS2006 Session 6.

⁸ It is also known as Eureka 147 DAB system. DAB was originally developed by an international consortium called Eureka and recognized by ITU for the next generation radio (audio) broadcasting in Europe.

⁹ Ibid. 7.

¹⁰ Based on anecdotal recount by Ryu, Peob-Min, Director, Broadcasting & Satellite Division, MIC, in an interview with the author.

¹¹ Electronics and Telecommunications Research Institute. It is a government-funded research institute under MIC.

also showing video images on a small LCD screen (up to 7"). The researchers at ETRI called the new technology "Terrestrial-Digital Multimedia Broadcasting" (T-DMB).¹²

2.1.2. DTV Standard Dispute

As described in the previous section, the T-DMB technology was originally developed by ETRI as the possible next generation standard to replace the analog radio. However, more techno-political events followed, which placed T-DMB at its prominence within the Korean broadcasting industry as described in the following paragraphs.

Also in 1997, MIC finalized its selection process for the digital transmission standard of terrestrial television (non-mobile) broadcasting. MIC had chosen the ATSC¹³ standard, which was developed and adopted in the U.S. as the replacement standard for the analog NTSC system.¹⁴ Just before the actual conversion processes were to commence in 2000, some industry groups including the Korean Broadcasting Engineers & Technicians Association and the Media Workers Union petitioned the Korean government to reconsider its decision to adopt ATSC as the DTV standard in Korea. These industry groups argued that DVB-T¹⁵, a European standard offered better DTV performance. These groups were convinced that the government had made a hasty selection in 1997 influenced largely by the business community in selecting the ATSC system.¹⁶ Amplified by the growing anti-American sentiment within the general public underscored by other political events at that time, the digital TV standard selection became a hotly contested topic of public debate in the media.¹⁷ One of the key technical arguments against ATSC

¹² Ibid. 10.

¹³ Advanced Television Systems Committee. The ATSC standard was developed in 1982.

¹⁴ South Korea had too used NTSC as the analog TV standard.

¹⁵ Digital Video Broadcasting-Terrestrial. DVB-T is a digital television broadcasting system developed by the DVB Project and is largely accepted as the digital standard in Europe, Middle East and Africa.

¹⁶ Kim, Tong-Hyung (July 9, 2004), "KOREA: Seoul chooses ATSC as digital TV standard", The Korea Herald. This article is available on the AsiaMedia website (last visited on July 27, 2006), <<http://www.asiamedia.ucla.edu/article.asp?parentid=12649>>.

¹⁷ It did not help the fact that ATSC was simply referred as the "American Standard (미국식)" by the media.

was that ATSC could not support the mobile applications, such as in-vehicle reception of TV programs, as easily as the DVB-T standard. As the trade union members refused to carry out the work, the digital conversion process came to a screeching stop by the end of 2003.

Finally, in 2004, a specially-appointed panel¹⁸ concluded that the trillions of Korean won already invested in the conversion process by the industry and consumers made it impossible to adopt a new standard, regardless of the actual technical superiority of DVB-T. The panel, at the same time, agreed upon a compromise, in which the ATSC standard would continue to be the standard for broadcasting to the fixed television sets while MIC would choose another standard for mobile TV in order to compensate for the shortcomings of the ATSC system.¹⁹ At the time of announcement, DVB-H and T-DMB were mentioned as possible standard options for the mobile applications. DVB-H, however, was soon dropped from the standard race in favor of T-DMB, a home-grown technology.

2.1.3. MIC's Push to for World's First Commercial Mobile TV

Thus, the emergence of T-DMB standard also involved a political MIC mandate to adopt a mobile TV standard coming out of the DTV standard dispute. It is an interesting story that seemingly unlikely groups, such as a labor union, motivated the adoption of mobile TV standard in Korea. Later in this project, I discuss another event that involves the powerful Media Workers Union. But for now, let's look more closely at the motivations behind MIC's push to launch the world's first mobile TV broadcasting service.

¹⁸ The 4-men panel consisted of the chairman of KBC, minister of MIC, president of KBS and the leader of Media Workers Union.

¹⁹ Woo, B., (June 29, 2005) "ATSC is Agreed as the DTV Standard", *Daily Chosun*

Since the Korean currency crisis of 1997, MIC has had an implicit responsibility to spearhead the national economic recovery and growth by developing the IT industry. In fact, the Korean IT industry recorded annual production growth rate of 14.6% between 1998 and 2005, while the GDP growth rate was at 7.5%.²⁰ In 2005, IT exports accounted for 36% of Korea's total export volume.

MIC's enthusiasm was also bolstered by its previous experience with the CDMA²¹ cellular technology in Korea. South Korea was the first market in the world to deploy a large-scale commercial CDMA network in 1995. As more countries, including the U.S., deployed CDMA networks in ensuing years, the Korean handset manufacturers including Samsung and LG, benefited tremendously by dominating CDMA handset sales in the these markets. In 2004, at the aftermath of the DTV standard dispute, MIC and the Korean handset manufacturers were looking at yet another possibility for market domination by commercially launching the first mobile TV broadcasting in the world. The main competing technologies, like Nokia's DVB-H and Qualcomm's MediaFLO, were still at least a year away from going commercial.

In February of 2004, MIC announced its IT839 Strategy, which spelled out the ministry's policy directions for promoting and supporting certain IT industries.²² The purpose of the strategy was largely to provide prioritization for private companies and research institutes in developing and investing in new technologies. It also formalized

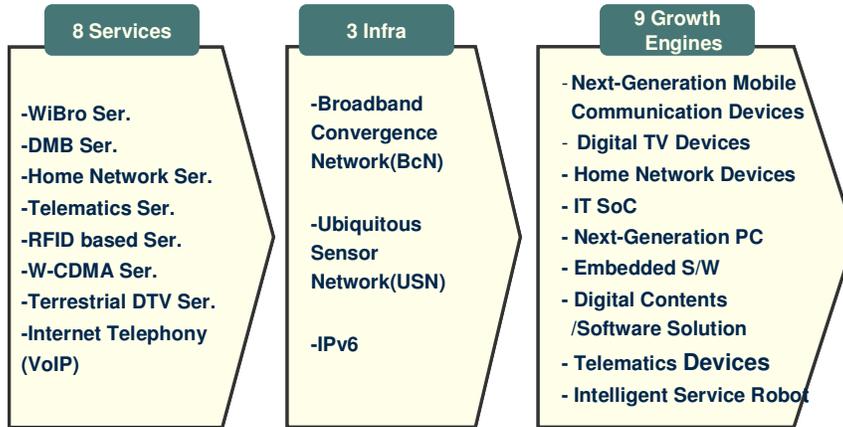
²⁰ Based on a Korea Association of Information and Telecommunication (KAIT) estimate.

²¹ Code Division Multiple Access. More advanced versions of CDMA, CDMA2000 and W-CDMA, are also the underlying technology behind the 3G cellular networks. CDMA technology is largely owned by Qualcomm in San Diego.

²² See *IT839 Strategy: A Leap to Advanced Korea based on Information Technology* (2004), a publication by MIC of Korea. It contained initiatives to encourage growth of 8 IT services, 3 IT infrastructures and 9 methods. The incoming minister of MIC revised the IT839 Strategy in 2006, but the revision still includes DMB (albeit combined with DTV) as one of the main 8 services. The Korean government's emphasis on the IT industry is largely motivated by the prospect of overall economic growth through exporting technology products and services. It is also reinforced by the recent successes of Korean semiconductors and mobile telephones products.

how the government would coordinate and support the domestic IT industry as a way to achieving higher rate of economic growth.

Figure 1 Components of IT 839 Strategy (Source: MIC)



As illustrated in Figure 1, DMB was designated as one of the 8 services included in the strategy. As a part of IT839, DMB (both S-DMB and T-DMB) has enjoyed a wide range of benefits including government-funded R&D by Electronics and Telecommunications Research Institute (ETRI) and fast-track regulatory approvals. Appendix A illustrates the efficiency, at which MIC coordinated different regulatory efforts to push DMB into the market. The actual launch of the commercial service for both T-DMB and S-DMB took less than 21 months from the legislation amending the broadcasting law to make provisions for mobile TV operators. T-DMB particularly received a great deal of support from the government during this period.

2.2. T-DMB Licensees

2.2.1. Operator Selection Process

In order to understand the T-DMB provider selection process that took place in 2005, it is useful to understand the legal context of the Korean broadcasting industry. Although MIC is the primary government agency driving the mobile TV initiatives, the broadcasted media, as defined by the Korean broadcasting law²³, fall under the jurisdiction of Korean Broadcasting Commission (KBC). KBC is a governing body, which is totally independent from MIC—the 9 commissioners are all appointed by the president in consultation with the National Assembly. From the early stages of DMB development KBC maintained a position that the emerging mobile TV services (as well as other new video services such as IPTV) were subject to the Korean broadcasting law and regulation by KBC.²⁴ Therefore, when the broadcasting law was amended in March, 2004 to include provisions for mobile TV services, KBC officially retained the authority to select new T-DMB operators. The existence of KBC poses an important ramification for the network operators in Korea as any future convergence service involving video or audio contents is likely to be subject to the authority of KBC and the Korean broadcasting law.

There are two characteristics of the Korean broadcasting law that are worth noting for the purpose of my discussion. The first characteristic is that the public interest is significantly stressed. In fact, the first line of the Korean broadcasting law mentions the “public responsibility” of broadcasters. As a result of this emphasis on public interest, advertising and programming contents are subject to stringent rules. For example, commercial breaks are not allowed during a program and there is strict limit to how many commercial spots a broadcaster can sell between programs.

When the law was amended in March of 2004 to provide provisions for “digital mobile television” services, it required T-DMB to be a free-to-air (FTA) service. In return,

²³ The Korean text of the entire broadcasting law, as amended in March 2004, is available at the following website (last visited July 27, 2006): < <http://approval.rri.go.kr/7.pdf>>

²⁴ For example, a ZDNet Korea news article reported in 2004 about KBC issuing warnings to SK Telecom and KTF regarding the mobile operators’ streaming video services over the 3G networks. In KBC’s opinion, these streaming video services were a form of broadcasting and the mobile operators lacked the license to carry out such business. The broadcasting law, of course, had no provision for video data streaming at that time. See Park, Chang-S. (2004).

two unused VHF TV channels in the Seoul metropolitan area (channel 8 and 12) were split into 6 T-DMB blocks and assigned to the T-DMB licensees at no cost. The FTA business model and the free allocation of VHF frequency for T-DMB operators would become a hotly contested debate topic later on, however, I defer that discussion to Chapter 5 of this project. Many potential T-DMB operators stayed away from the licensing process since all-advertisement revenue model was a doubtful business proposition for them. On the other hand, many incumbent terrestrial and cable broadcasters were encouraged to apply for the T-DMB licenses since they already had the access to the advertisers as well as the contents.

The second characteristic of the Korean broadcasting law is that there is a set of very onerous ownership requirements for broadcasting companies. For example, the law prohibits “large corporations”²⁵ from owning a broadcasting company. This particular clause immediately disqualifies all three Korean mobile operators from owning a T-DMB broadcasting company. Other provisions within the law severely restrict concentration of ownership as well. Any future consolidation of T-DMB licensees is not feasible without an amendment to the law.

It is no accident that the three of the six T-DMB operator licenses were awarded to incumbent terrestrial broadcasters. The fourth license went to an all-news cable TV channel operator. The two remaining licenses were awarded to newly-formed consortiums that included equipment manufacturers and internet media companies. Figure 2 summarizes the 6 T-DMB licensees.

It is important to make it clear that the six T-DMB operators listed in Figure 2 are licensed to broadcast only in the Seoul metropolitan area. Additional T-DMB operators will be licensed for the non-Seoul broadcasting area later in 2006.

²⁵ If it sounds subjective, it is supposed to be so. Administrative decrees define the criteria for being a “large corporation.”

Figure 2. Seoul MetroT-DMB Licensees

Operator	Company Description	Channels	Programming
KBS	Public television broadcaster (BBC of Korea)	1 Video 3 Audio	Simulcasting of KBS1 1 business news; 2 music
MBC	Incumbent TV and radio network operator	1 Video 3 Audio	Simulcasting of MBC TV Simulcasting of MBC FM; business news; English cultural
SBS	Incumbent local TV and radio network operator in Seoul	1 Video 3 Audio	Simulcasting of SBS TV Simulcasting of SBS FM; traffic information; local programs
YTN	Incumbent all-news cable channel operator (CNN of Korea)	1 Video 2 Audio 1 Data	Simulcasting of YTN TV Traffic information; music Premium data (inactive)
U1 Media	Newly organized consortium mostly invested by equipment manufacturers	2 Video	Original mobile TV contents; simulcasting of KBS2 TV
1to1	Newly formed consortium mostly invested by media companies	1 Video 2 Audio	Original mobile TV contents Music; cultural

(Source: T-DMB website)

2.2.2. Un-Coordinated Efforts of the T-DMB Licensees

Although the selection of the T-DMB operators were mostly carried out by KBC and the licensing process closely resembled the terrestrial television broadcasting model, the new licensees quickly found out that the operational realities of T-DMB were quite different from those of terrestrial TV. First, there was the network build out issues. Since mobile TV had to work wherever mobile phone worked, the T-DMB network required many “gap-fillers” to cover public indoor locations and poor reception areas with topographical issues. Especially Seoul’s subway stations and tracks needed to be completely covered with gap-fillers as the signal from the transmission towers did not reach underground locations and the subway riders were vital in capturing the early mass market.²⁶ The cost of installing gap-fillers to cover the subway system was estimated at

²⁶ In Seoul, consumers are used to using their mobile phones in the subway cars. On my recent visit to Korea, for example, I observed an average of 4 out of 7 people using their mobile phones while sitting in a subway car. (Each bench in Seoul subway cars sits 7 people.) I noticed people tended to use the phone much less while standing up though. They were mostly sending and reading SMS, playing games or listening to music.

\$50 million.²⁷ Since the six T-DMB operators could share most of the network infrastructure, a joint effort was necessary in planning and installation of transmission equipment. However, it was often difficult to reach an agreement since each operator had different priorities and varying degree of financial resources.²⁸ Some licensees argued that the free spectrum that they received did not warrant the underground and indoor coverage and pressured KBC to allow the licensees to charge for such additional coverage.²⁹ Some licensees, on the other hand, wanted to maintain the principle of free-to-air service and argued that the mobile operators should pay for the underground coverage. The dispute ended when MIC mediated a deal where the handset manufacturers, whom were perceived to reap the most profit from the mobile TV business, would bear the cost of installing the gap-fillers for the subway system.

The marketing efforts were also difficult to carry out since any T-DMB receiver would show channels from the all six operators. Why would one operator spend money on marketing the T-DMB service to the mobile operators, while other operators can free-ride on such marketing effort? And there were the customer service issues. Since the mobile operators had no direct revenue being generated by offering mobile TV on their handsets, the customer-facing operators were unlikely to provide extensive customer care for T-DMB. Who would handle calls regarding poor reception coverage?

It is unfair, however, to portray the T-DMB licensees as un-cooperating selfish organizations. The six operators did organize the *T-DMB Special Committee* almost as soon as their selection by KBC was confirmed in May of 2005. The T-DMB Special Committee continues to act as the collective decision making body for all T-DMB operators. The committee also handles marketing and PR activities and has sub-committees dedicated for developing the next generation T-DMB contents and data

²⁷ See Lee & Kwak (2005)

²⁸ Kim, Joon-U. (August 28, 2005), "T-DMB in Impasse for Two Months", *Hankooki.com*

²⁹ Some licensees even threatened to exit the market by returning the T-DMB license to the government.

services. But the committee has only 6 full-time employees to handle all T-DMB related issues.³⁰

With the emergence of other wireless data platforms capable of delivering video and other multimedia contents, e.g., Wi-Bro³¹ and HSDPA, T-DMB operators may need to better coordinate their efforts in all facets of market development including their negotiations with mobile operators and equipment manufacturers. Also with the possibility of adding paid services on T-DMB in 2007, the operators need to figure out a way to set up and run a joint operation for billing, customer care and content management. Some sort of joint venture or even a consolidation may be necessary.³²

2.3. TU Media

While the historical events running up to the launch of T-DMB is rather complex and somewhat chaotic, the story of S-DMB and TU Media, on the other hand, is a straightforward tale of a stagnant, but cash-rich company looking for a new growth business. Alas, even this seemingly simple story, however, gets quite complicated towards the end with the drama of politics and competition.

2.3.1. SK Telecom's "Blue Ocean"

Lee and Kwak (2005)³³ suggest in their paper that SK Telecom's interest in mobile TV service was directly influenced by the Blue Ocean Strategy made popular by Kim and

³⁰ Hong, Myung Ho (May 17, 2005), "T-DMB Special Committee Launched", Digital Times. The Korean text for this article is available on the web (visited July 28, 2006)

<http://www.dt.co.kr/dt_txt_see.htm?article_no=2005051702011031706003>

³¹ Wireless Broadband, it is the Korean version of Wi-Max technology. In simple terms, it would allow Wi-Fi like experience in a much wider coverage area.

³² See another article reported by Hong, Myung Ho (August 29, 2005). This particular article talks about industry experts' opinion that the T-DMB operators should merge.

³³ In their paper presented at the annual Telecommunications Policy Research Conference in Arlington, VA.

Mauborgne (2005). It is not clear whether the top management of SK Telecom was actually aware of Kim and Mauborgne's work in 2001 when they first considered the possibility of launching a mobile TV service based on a satellite technology. It is clear, however, that SK Telecom's motivation behind the project was to create an uncontested market, a blue ocean indeed.

In 2001, a Toshiba subsidiary, MBCo, approached SK Telecom about a possible joint venture for mobile TV. MBCo had been working on a satellite-based technology since 1997, mainly for in-vehicle applications. With the technical development almost complete, MBCo was looking for a business partner who would share the cost of launching the satellite. SK Telecom agreed to move ahead with MBCo and prepared for the service in the ensuing years. The commitment for the S-DMB project was reinforced as SK Telecom experienced a surprising success with "JUNE", its 3G 1x EV-DO service launched in 2002. SK Telecom was impressed by the number of VOD downloads despite the high metered pricing for the data usage.³⁴

By the end of 2003, SK had signed a joint ownership contract for the satellite with MBCo³⁵, developed a prototype handset with Samsung, selected vendor for the gap-fillers and set up its subsidiary TU Media for the S-DMB business. And by the end of 2004, TU Media had completed most of the preparatory work for the service including the actual launch of the satellite, securing legislation amendment, obtaining the broadcasting license and accommodating additional investors into the consortium in order to comply with the ownership rules³⁶ of the broadcasting law. It is remarkable to see that SK Telecom went ahead with the launch of the satellite in March of 2004, even before applying and obtaining the license later in the year. (See Appendix A.) The speed at which the various branches of the government moved to support the SK's effort to launch the mobile TV

³⁴ Kim, Namgu, an anecdotal recount during an interview with the author.

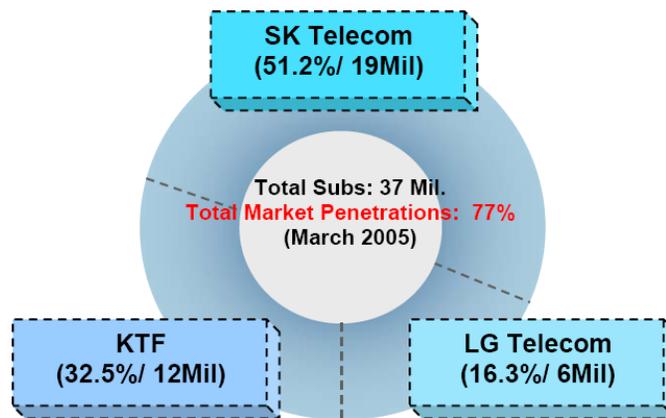
³⁵ With SK Telecom and MBCo owning 34.66% and 65.34% respectively.

³⁶ Even with the relaxed requirement in the 2004 amendment, SK could not own more than 30% of TU Media. SK owns 29.6% of TU Media.

service is also impressive. The application and approval process for TU Media’s license took only about three months. The application process was formal and by the rules, but it was largely ceremonious with one applicant and one license to be issued. Again, MIC was very much at the forefront of the government’s fast-track coordination efforts.

By 2005, the mobile telephone service market was fast approaching the saturation point with the penetration rate near 80% of the population. With SK’s dominant market position with 51% market share, it was difficult for SK Telecom to expect any type of meaning business growth coming from the mobile business. (See Figure 3.)

Figure 3. Korean Mobile Service Market Share (Source: Lee & Kwak (2005))



Therefore, the launch of the S-DMB service in May of 2005 could not come at a better time. 100,000 people signed up for the service within the first two months. By September the subscription number was well over 200,000. With a clear revenue model of one-time setup charge and continuing monthly subscription, it was a matter of time before TU Media to turn an operating profit and cover the initial capex of \$250 million. Right? Unfortunately for SK and TU Media, there were clouds looming ahead of them.

2.3.2. TU Media Hits Snags

First development that sapped TU's momentum was the T-DMB operator selection process. The continuing news headlines about the T-DMB operator selection and licensing process had a "product preannouncement effect". Dranove and Gandall (2003), in the example of DVD and DIVX players, present some empirical evidence that the preannouncement of incompatible product reduces the demand of the currently available product. Dranove and Gandall also points out the aggravating role of the Internet in the preannouncement phenomena. Korea being one of the most Internet savvy countries, there is little doubt that a preannouncement effect was present and it hampered TU Media's subscriber acquisition efforts. It also didn't help that the news media coverage of the T-DMB licensing always mentioned that the T-DMB service would be a free service for the consumers.

Another disappointment for TU Media was its failure to secure retransmission (or simulcasting) rights to the terrestrial TV programming. Like the U.K. and Germany, terrestrial TV is the most popular form of TV reception in Korea. And the TV program production is dominated by the three terrestrial broadcasters, namely KBS, MBC and SBS. Therefore, it was critical for TU Media to secure the simulcasting rights to these channels in order to secure high-demand contents. In previous years, the DBS and cable operators were all allowed by KBC to simulcast these terrestrial channels, again, in the interest of the public. However, the simulcasting by TU Media was strongly opposed by the three terrestrial broadcasters. Eventually in April 2005 (less than a month before TU Media's launch), KBC issued an opinion saying that the commission was *not* against the live retransmission of terrestrial channels and the current dispute between TU Media and the terrestrial broadcasters should be resolved by separate agreements between the parties. It had taken KBC more than 6 months to tell TU and the broadcasters to basically "work it out yourselves." KBS, MBC and SBS subsequently all refused to allow TU Media to simulcast and that condition remains to this date.

Why are the terrestrial broadcasters against TU Media simulcasting their programs? After all, isn't it in the best interest of the broadcasters to have as many eyeballs watching their programs as possible? Especially, MBC and SBS are both minority investors of TU Media, why wouldn't they allow TU Media to carry their programs? There are three main reasons: (1) the terrestrial broadcasters are also T-DMB operators themselves and they want to catch up with TU media in terms of viewership before allowing TU Media to carry the most popular TV programs in Korea; (2) KBS and MBC are also concerned about their local affiliates since TU Media would simply carry the Seoul programming of these two networks; it also means that SBS will be available to viewers outside of the Seoul area since TU Media is a nationwide satellite system; (3) finally, there is the National Media Workers Union again; the union members feel that the entry of a rich mobile operator, namely SK Telecom, into the broadcasting market is harmful for their job security and they violently oppose any provision that would give TU Media any type of edge in business. The union members staged several sit-in demonstrations inside of KBC offices expressing the workers' disapproval for simulcasting by TU Media.

Figure 4 shows the current lineup of TU Media programming. The drama channels, such as SBS Drama and MBC Drama, show re-runs of popular drama programs from the respective broadcasters.

2.4. The Latest Numbers

According to a Financial News article published on July 24, 2006, a total of 992,000 S-DMB handsets were sold since May of 2005. On the other hand, a total of 432,000 T-DMB handsets were sold since December of 2005. T-DMB Special Committee estimates that when non-handset T-DMB receivers are added, more than 1 million T-DMB receivers had been sold at the aftermath of World Cup 2006. That means there are over 2

million mobile receivers in the hands of Korean consumers currently at the end of July 2006.

Figure 4. TU Media Channel Lineup

Video (12+)			Audio (26)		
Channel	Genre	Title	Channel	Genre	Title
Ch.05	Education	EBS u	Ch.30	DJ Music	Melon
Ch.06	Drama	SBS Drama	Ch.31		Bugs
Ch.07	Original Contents	ch.BLUE	Ch.32		Power Station
Ch.08	Entertainment	My m.net	Ch.33		KISS
Ch.10	Latest PPV	TU BOX	Ch.34	MUZ	
Ch.11	Drama	MBC Drama	Ch.40	Variety	ch.Joins
Ch.12	News	YTN	Ch.41		Gag station
Ch.13	Films	Channel CGV	Ch.42		Winglish Dialogue
Ch.14	Sports	MBC ESPN/ SBS Sports	Ch.43		Arirang FM
Ch.16	Business	MBN	Ch.44		Ch.Eureka
Ch.17	Games	OnGame Net	Ch.50		TU Music Today
Ch.19	Animation	ToonyBus	Ch.51	Nonstop Music	Latest Popular
			Ch.52		Hit 2000
			Ch.53		Hit 90
			Ch.54		7080 Romantic Gen
			Ch.55		Pop Street
			Ch.56		Power Dance
			Ch.57		Ballad
			Ch.58		Trot
			Ch.59		Music Showcase
			Ch.60		J-POP
			Ch.61		JAZZ
			Ch.62		HipHop/R&B
			Ch.63		Rock
			Ch.64	Classic	
			Ch.65	New Age	

(Source: TU Media)

3. Mobile TV Technical Standards

There are several Mobile TV standards developed and adopted by various consortiums, technology projects and equipment manufacturers. They are all jockeying against each other in order to establish a better foot holding in the coming era of mobile television. In the following sections of this chapter, I describe some of the major technology standards that are making headways in to the marketplace. The focus here is not to evaluate the technologies based on their technological merit, but is to discern the mobile TV landscape and organize industry participants into different technology camps.

3.1. Competing Mobile TV Broadcasting Standards³⁷

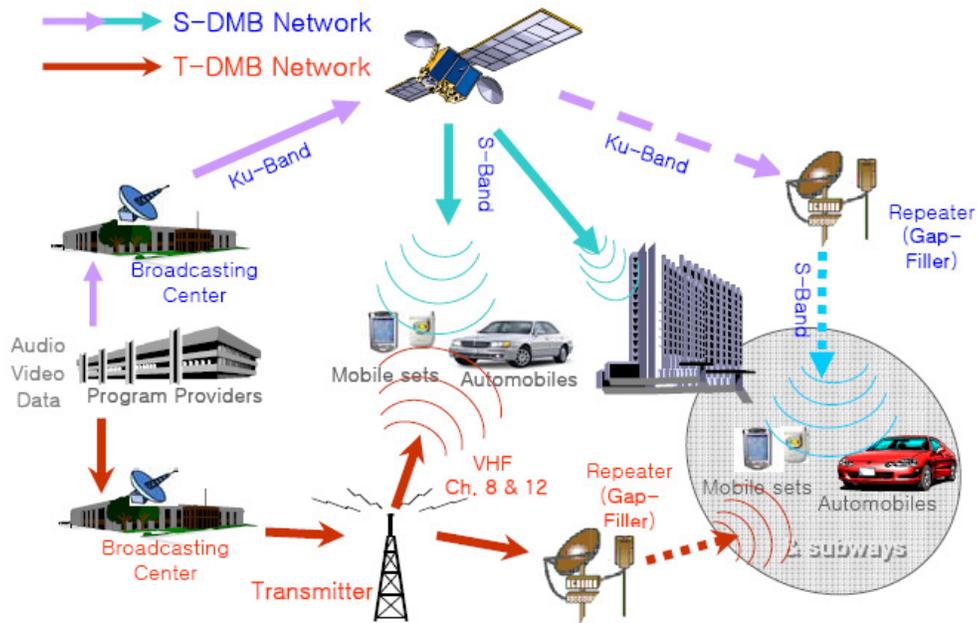
3.1.1. S-DMB

As mentioned earlier, S-DMB is the satellite based mobile TV broadcasting technology originally developed by Toshiba's subsidiary MBCo and subsequently adopted by TU Media in Korea for the world's first large scale mobile TV deployment in May 2005. Contrary to popular belief, S-DMB's technical specification is quite different from those of T-DMB. It is based on a modified CDMA modulation and S-DMB uses the Ku band to upload signal to the satellite and the S band for transmission of TV programs into receivers. (See Figure 5 for illustration of S-DMB and T-DMB systems.) Since it is a satellite technology, numerous gap-fillers are required to cover poor reception spots and indoor locations. The advantage of S-DMB is that the network deployment over a large area can be done quickly—as seen in the case of TU Media—and it can carry a large number of channels. The biggest disadvantage is the initial capital expenditure associated

³⁷ Most technical descriptions of different mobile TV standards were taken from Gauthier, Francois O & Pascal Marcoux (June 2006), "What is DMB", *CBC Technology Review*, <www.cbc.radio-canada.ca>

with launching a satellite. Also the screen speed of 15fps makes it difficult to view fast-moving sports events like ice-hockey and football.³⁸ S-DMB is unlikely the choice of worldwide deployment since the system uses a frequency band that is not available in many parts of the world.

Figure 5. How S-DMB and T-DMB Work (Source: Lee & Kwak (2005))



3.1.2. T-DMB

I have already discussed the technical origin of T-DMB in Chapter 2. T-DMB utilizes band III (VHF channels 7-13) and L-Band (1452-1492 MHz) frequencies. T-DMB uses COFDM³⁹ modulation technology. After the rollout in Korea, aspiring operators in a number of markets are conducting T-DMB trials much to MIC officials’

³⁸ a.k.a. soccer.

³⁹ Coded Orthogonal Frequency Division Multiplexing

delight. In Great Britain, government-level discussions for cooperation have been held for the T-DMB standard. Currently, Arqiva is testing T-DMB during the second half of 2006 in London. Also in China, Guandong Province is conducting a trial deployment of T-DMB services. The Guandong trial is a large scale trial involving 8 transmission sites in the Perl River Delta area.

Mobiles Fernsehen Deutschland (MFD) in Germany deployed a full commercial service using a T-DMB system in eight cities across Germany on May 31, 2006, just in time for the World Cup 2006 Germany. What is most interesting is that the L-Band frequency that MFD acquired earlier in the year represents the only frequency that can be available for mobile TV broadcasting for the next two years in Germany. MFD is in comfortable position to perfect its technology and business model before the large mobile carriers of Germany can start their own mobile TV services. MFD is currently distributing its T-DMB service only through its affiliate Debitel, which is an MVNO. But it is actively discussing wholesale possibilities with other mobile operators. According to Jens Stender⁴⁰, MFD's Managing Director, the T-DMB technology is very satisfactory. MFD's version of T-DMB service is a paid monthly subscription and the subscription authorization and the data return path all seem to be working fine based on the operator's experience. The L-Band frequency, on the other hand, seems to be producing coverage issues as the L-Band has much shorter range than Band III used in Korea.

3.1.3. DAB-IP

DAB-IP is another mobile TV standard based on the Eureka147 DAB system. Therefore, it is similar to a T-DMB system. The system uses the DAB frame in data streaming mode with the addition of the enhanced packet module feature (EPM). It differs from T-DMB in that it uses Windows Media 9 encoder instead of MPEG-4. This system is originally developed by Livetime in the U.K., but became a BT technology when

⁴⁰ In a telephone interview with the author.

Livetime was acquired by BT. Currently DAB-IP service is being deployed by BT under its mobile TV business unit called, BT-Movio. BT-Movio's business model is a wholesale model and BT-Movio is working to provide private-label mobile TV services to mobile operators in the U.K.⁴¹ As BT-Movio's first customer, Virgin Mobile has committed to using BT-Movio to launch the first mobile TV in the U.K. Currently, BT-Movio is conducting the second trial in London after conducting its first trial in 2005. BT-Movio plans to use a limited bandwidth within a DAB multiplexer to deliver its mobile TV service.

There is an auction scheduled by Ofcom later this year for the L-Band of frequencies and many aspiring mobile TV operators are closely studying the bidding strategy for the auction. Once the L-Band is auctioned off, the next batch of frequency for mobile TV in the U.K. will be available in 2012 when the digital switch over is completed.

3.1.4. DVB-H

The Digital Video Broadcasting-Handheld standard is derived from the DVB-T standard, which is the adopted European terrestrial digital television system. This standard also uses OFDM modulation, but uses 5 to 8 MHz channels, allowing 5 to 11 Mbps of capacity—much broader than T-DMB. This standard is largely being pushed by Nokia and Motorola. In recent months, DVB-H has received a great deal of attention from the industry as the two American wholesalers of mobile TV, Crown Castle and Hiwire announced their selection of DVB-H. Crown Castle owns 1.67 GHz blocks of spectrum across the U.S. and has trialed in Pittsburgh and New York.⁴² Hiwire, on the other hand owns a block of spectrum in the 700 Mhz range and claims that it will be more cost efficient in terms of network operations. Neither Crown Castle nor Hiwire has any mobile

⁴¹ Lloyd, Emma, Managing Director of BT Movio, in her presentation at the Mobile TV-Now: UK/Korea Partnership Trial seminar on June 5, 2006.

⁴² "Wanna know how to win the mobile TV War?", (July 6, 2006) By *Faultline*. This article is available on the web (visited July 15, 2006) <http://www.theregister.co.uk/2006/07/06/mobile_tv_wars/>

operator customer at this time and it is not clear whether they would have a commercial service launched within the near future. Since the required frequency spectrum is not widely available yet DVB-H is not getting much traction in Europe despite it being an European TV standard.

3.1.5. MediaFLO

MediaFLO (Forward Link Only) is a proprietary technology developed by Qualcomm. It uses COFDM modulation and time slicing similar to DVB-H. It features a two-layer modulation in which a basic layer of information is modulated more robustly while the enhanced layer is used only when the receiving condition is good—resulting in better image quality and frame transition. Qualcomm took an uncharacteristic step of acquiring the UHF channel 55 in an FCC auction in 2004 in order to build out the MediaFLO network across the U.S. Qualcomm plans to aggregate media contents as well as operate the MediaFLO network in order to wholesale mobile TV to the mobile operators. At this time, Verizon has joined the MediaFLO camp while Sprint Nextel and Cingular are also known to be discussing different possibilities with Qualcomm. According to Jeff Brown of Qualcomm, this is not a stepping stone for Qualcomm to enter the media business. Rather, he claims that Qualcomm's focus remains on selling the technology and the chipsets associated with MediaFLO. Qualcomm will eventually spin off the service side of MediaFLO, he says.⁴³

It is interesting to note here that the Koreans have not selected, or even considered the MediaFLO standard for their mobile TV system, while the Korean cellular telephone system (both 2G and 3G) is largely based on Qualcomm technologies. On this point, I will simply state here that I have encountered a high-ranking MIC official saying, "Korea

⁴³ In a telephone interview conducted by the author. Jeffery Brown is the director of International Business Development at Qualcomm.

will never use a Qualcomm technology again as a standard for any future application.”⁴⁴ Apparently, the Korean regulators feel rather resentful about the loyalty arrangement that Qualcomm has with the CDMA handset manufacturers. It is reported that the Korean handset producers pay a 5.25% and 5.75% loyalty on the factory price of domestic and export handsets respectively.⁴⁵ As mobile handsets include more and more auxiliary devices unrelated to the core RF technology, e.g., camera, organizer, MP3 player, etc., the Koreans feel increasingly uncomfortable with the loyalty arrangement. At the same time, while Qualcomm received \$2.63 billion in loyalty payments from the Korean manufacturers since 1995, Qualcomm’s lack of investment and CSR activities within Korea is also being criticized by the government officials.

3.2. Standard Economics

The example of VHS and Beta as illustrated by Cusumano, Mylonadis and Rosenbloom (1992) teaches us how the strategic alignment of mass production capacity and the complementary products (VHS) prevailed over perceived technological superiority and first mover advantage (BetaMAX). As the first-mover in the Korean mobile TV market, TU Media had a clear advantage of all the publicity and the well developed distribution network through SK Telecom. However, as the T-DMB camp is quickly gaining on TU Media with a free-service proposition. The absence of terrestrial TV program simulcasting is also hampering the growth of TU Media. Many observers are concerned that TU Media may go down the path of BetaMAX.

The mobile TV market of Korea however does not appear to be “tippy”. Victor Stango (2004) discusses a distinction between direct and indirect network effect. Since the S-DMB handsets do not communicate with each other directly, the network effect is

⁴⁴ This is a crude translation of what was said in Korean.

⁴⁵ As reported by an EETimes article. (May 10, 2006)

<[http://www.eet.com/news/latest/showArticle.jhtml;jsessionid=NCQFL3GFQPTDYQS...>](http://www.eet.com/news/latest/showArticle.jhtml;jsessionid=NCQFL3GFQPTDYQS...)

indirect and the externality is weak. Also, the product differentiation between S-DMB and T-DMB service is not very visible to the consumers. Therefore, the force of positive feedback is not as strong as it might have been in the VHS-BetaMAX case.⁴⁶ Another key distinction that needs to be made from the VHS-BetaMAX case is the fact that the mobile TV service is an ancillary service to the mobile telephone service. Therefore, the SK Telecom customers are likely to be more forgiving about the shortcomings of S-DMB service than if it were sold as a stand-alone service. Apart from the economics of standard, the Korean market appears to be big enough to sustain both S-DMB and T-DMB services for the time being. According to a TU Media manager, a subscriber critical mass of just 2.2 million people is needed in order to turn positive operational cash flow. With the 20 million SK Telecom subscribers, reaching the critical mass of 2.2 million seems quite feasible for TU Media. The trick question, however, is whether SK Telecom would be allowed to inject additional investment into TU Media subject to the ownership rules of the current Korean broadcasting law.⁴⁷

Outside of Korea, various companies including Qualcomm, Nokia, Motorola and other wireless powerhouses are jockeying against each other to take the higher ground in the battle of digital mobile TV. Their websites are littered with all types of apple-to-orange comparisons claiming technical superiority of their own standards. All mobile TV standards mentioned in Section 3.1, however, provide all the basic functionality of mobile TV quite well. Any technical advantage is arguably subtle, and more importantly, not understood by the consumers. The mobile TV standard war will be, therefore, fought and won on the basis of total user experience, which would include content availability, ease-of-use and other mobile service components outside of the mobile TV domain.

The technology seems to have finally caught up to the consumer desire to receive multimedia contents to handheld mobile devices. This is a defining moment for the

⁴⁶ See Shapiro & Varian (1998).

⁴⁷ SK Telecom's stake in TU Media is capped at 33% by the Korean broadcasting law.

operators as it opens up an entirely new set of business possibilities. The industry participants must focus on optimizing the user experience. The technology can always be refined later based on the customer's requirements.

4. User Experience

As mentioned at the end of the previous chapter. The user experience would largely shape the final form of the mobile TV industry rather than any subtle technical difference between standards. Therefore, it is worthwhile to closely examine viewer experiences and their consumption behavior.

4.1. Observation of Early User Behavior

When TU Media first launched its service in May 2005, the management had seemingly obvious expectations on the consumption behavior by the subscribers. Some of them were:

- People would be watching mobile TV during short breaks and while stopping, therefore short video clips, 5 to 8 minutes in length, or “mobisodes” would become popular.
- People would be watching DMB while in transit or commuting, therefore the prime time would be the rush hours
- DMB would be used by the young people (late teens to mid 20’s), therefore the latest hits and pop music would be the most popular audio programming⁴⁸

These intuitive assumptions are commonly shared by the industry professional around the world and also reinforced by a widely cited Finnish VTT study⁴⁹. This particular study emphasized the need for shorter video programs that people can “snack”

⁴⁸ Based on TU Media internal presentation by Kim, Young Bae.

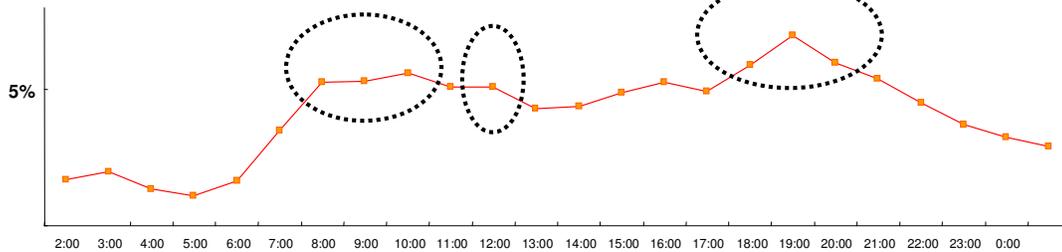
⁴⁹ See Sodergard, Caj

on. At the same time, the enthusiasm for mobile TV by the youth consumers was inferred from analysis of the trial data.

After one year of commercial operation, however, TU Media has following observations to report:

- The most watched programs are dramas and sports events live coverage, which are typically over 30 minutes in length.
- There is an increase in demand during rush hours, but the peak follows the popular programming of the day. On average, it peaks between 7 and 8 pm.
- The age of subscribers were one level older than expected in their mid 20's and 30's. The most popular audio programming was non-stop Trot.⁵⁰

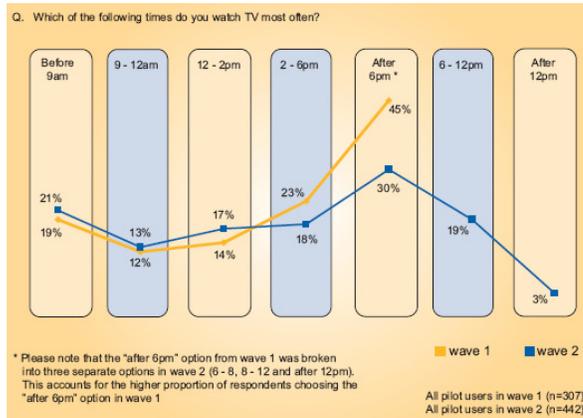
Figure 6. Rating by Hour - TU Panel Participants (Source: TU Media)



It is also remarkable that many of these oddities reported by TU media have been observed during a trial in London by BT-Movio, as well as another trial in Oxford by Arqiva. For example, as in Figure 7 and Figure 8, the consumption of mobile TV is spread throughout the day peaking during the regular TV prime time. Likewise, the lengths of viewing time per session are similar ranging between 17 minutes and 23 minutes on average.

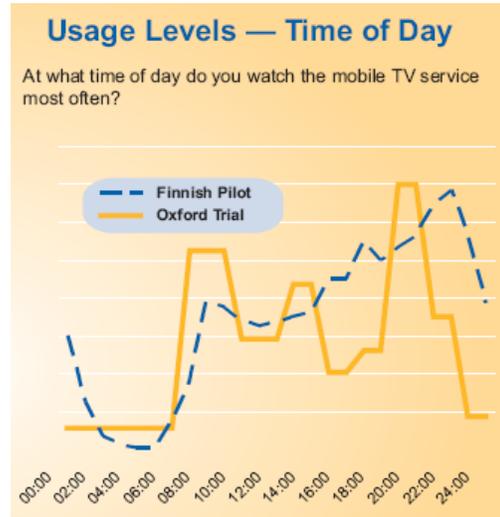
⁵⁰ The Korean Trot is equivalent of country music in America.

Figure 7. When Users Accessed TV from BT Trial



(Source: Lloyd (2006))

Figure 8. Oxford Trial by Arqiva



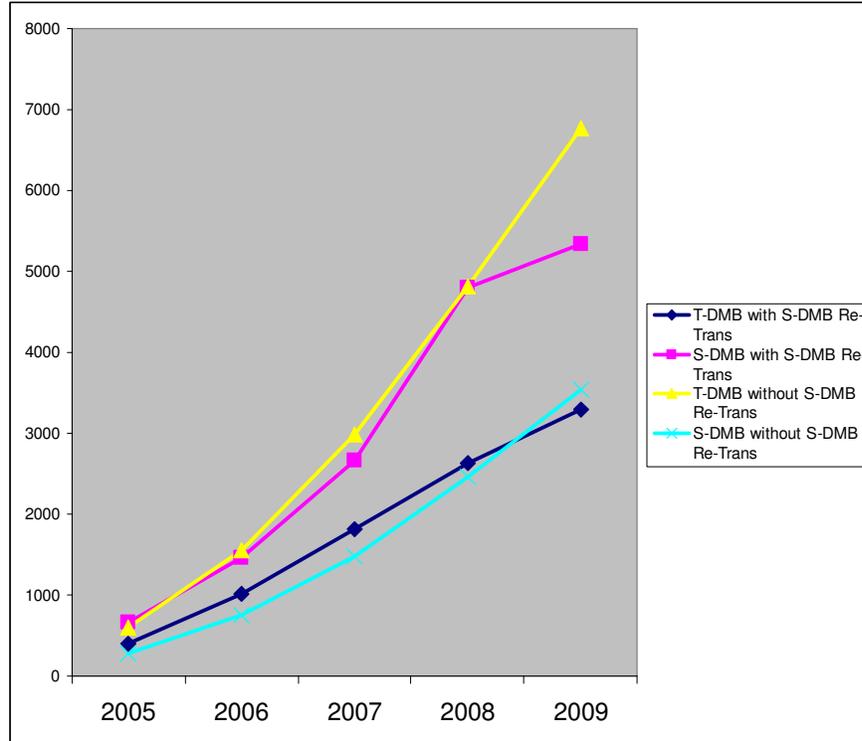
(Source: Mason (2006))

What is more interesting is that TU Media, the Oxford Trial by Arqiva, the London Trial by BT and even the Finnish VTT study all report the high usage at home. The home usage was as high as (or higher than, in case of the Oxford trial) the commuter time usage.

4.2. Re-Transmission as Killer App

Earlier in this project I assert that TU Media’s inability to carry the terrestrial TV channels is one of the most critical business issues. Figure 9 is an ETRI projection of subscriber growth for S-DMB and T-DMB under two scenarios: the first one without the simulcasting rights and the second with the rights. It clearly shows the great impact simulcasting has on consumer demand. Watching regular TV seems to be one of the killer apps, if not *the* killer app of mobile TV.

Figure 9. Subscription Growth based on S-DMB Re-Transmission (Source: Hyuk Kim)



Another significant observation is that the short “mobisodes” are not what the consumers desire. These programs, specially produced for mobile viewing, consistently score low on the viewer rating surveys. The consumers still want the “steak” even if they cannot finish the meal. Giving them “McDonald’s” instead appears to be a bad idea. Providing more personalization capability such as VOD and the PVR⁵¹ functionality in the handset may ultimately resolve this issue of time constraint.

In search of ever illusive revenue streams, many researchers and industry professionals in Korea are working diligently to develop a killer data application for the T-DMB platform. Some of the more promising applications being mentioned are weather forecast, traffic information, news alerts, early disaster warning, stock quotes, etc.

⁵¹ Personal Video Recorder.

However, it is not clear whether mobile TV is the most suitable data broadcasting platform. As we can see from our everyday experience with the Internet, data usage requires a two-way path. Inherently lacking the return path, Mobile TV has to rely on another platform to send back the data. With so many data communication alternatives imbedded in today's mobile handset, using the mobile TV broadcasting for data is not the optimal use of the technology. Instead, efforts to enhance the core multimedia experience should be the priority.

4.3. In-Vehicle and Other Non-Handset Devices

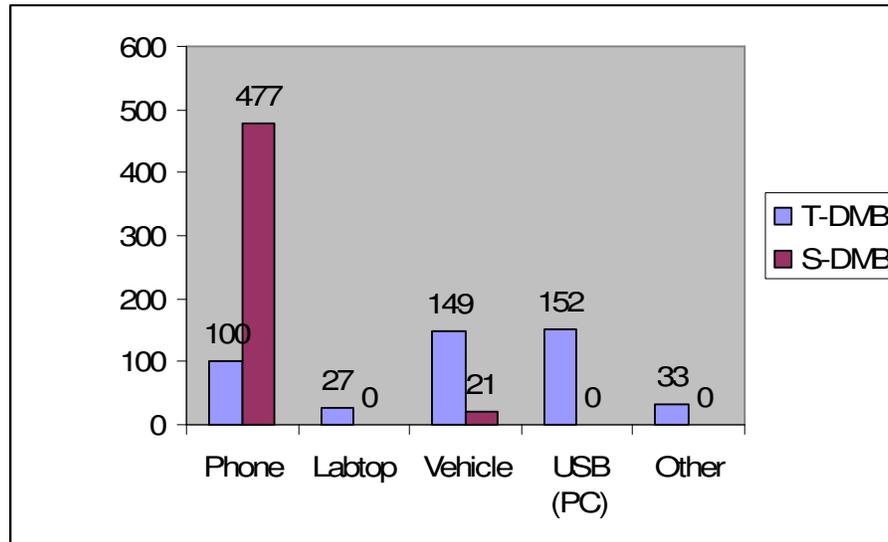
The in-vehicle devices represent just a small subset of all DMB receivers sold in Korea. According to the MIC (Ministry of Information and Communication) data, about 170,000 in-vehicle receivers were sold as of March 2006 representing 17% of all DMB devices distributed to the consumers. However, the installation figures do not accurately portray the potential of the mobile TV in vehicles.

4.3.1. TU Media Struggles with In-Vehicle Devices

When I visited TU Media and asked about in-vehicle DMB receivers, I was told that in-vehicle penetration of S-DMB service was “negligible” for TU Media. In fact, no one at TU media could immediately tell me how many in-vehicle subscribers were being serviced. MIC estimates that the total number of in-vehicle S-DMB receivers distributed at 21,000. (See Figure 1.) But ET News, a newspaper specializing in high-tech industry, estimates the total accumulated S-DMB subscription at 17,000 at the end of February.⁵²

⁵² Kwon, Kun-ho. “Sales of Vehicle S-DMB Handsets Remain Lackluster”. *ET News*. March 29, 2006

Figure 10. DMB Receivers Sold as of March 2006 Source: MIC



Following are some of the most significant barriers to capturing the in-vehicle market for TU Media:

- Price of receivers. The prices of in-vehicle S-DMB receivers are still hovering around 700,000KRW for the stand-alone units that include the LCD screens. The receiver-only models are around 400,000KRW.
- Subscription fee. The 13,000KRW subscription fee becomes much more visible and burdensome for the in-vehicle application as the absolute number of hours an average household spends in the vehicle is rather small.
- Lack of distribution. Most TU subscriptions are distributed by SK Telecom. In fact, the dominant position of SK in the Korean mobile industry has been the driving force behind TU's subscriber growth. However, when it comes down to marketing to the after-market auto accessory dealers or small electronics merchandisers, neither SK nor TU has any significant distribution capability.⁵³

⁵³ Conversely, this distribution issue also explains the low mobile phone penetration of T-DMB service in Korea. SK Telecom only carries S-DMB handsets and does not sell T-DMB handsets. As a result, the T-DMB providers have a weak distribution position in the mobile phone market.

4.3.2. In-Vehicle Usage is One of the Driving Forces behind T-DMB

Compared to the nationwide satellite footprint of TU Media, T-DMB currently has spotty coverage and the service is available only in the Seoul metropolitan area. Surprisingly however, the in-vehicle usage has been one of the major driving forces behind T-DMB's growth since its launch at the end of 2005. As shown in Figure 1, the in-vehicle receivers are only second to the USB receivers in terms of the total units sold.

What are the driving forces behind such rapid adoption of in-vehicle T-DMB devices despite its limited service coverage? Following are some of the key factors that are driving the in-vehicle equipment sales of T-DMB receivers in Korea:

- T-DMB has the re-broadcasting contents. (See Section 4.2.)
- T-DMB is embraced by the telematics and vehicle entertainment system manufacturers. Since T-DMB is an open standard, it is relatively inexpensive to build the T-DMB functionality into telematics and vehicle entertainment systems, most of which already have the TFT LCD screens. Most new GPS navigation equipment and vehicle media players sold in Korea now include T-DMB receivers. (See Exhibit B. for samples of DMB receivers.)
- Distribution efforts are driven by equipment manufacturers and distributors. Since T-DMB service requires no subscription, the equipment manufacturers and distributors are free to sell T-DMB receivers through their existing distribution channels without the involvement of the mobile operators. These channels include electronics mega stores such as Hi-Mart and Samsung ET Land, but also included are many smaller dealers that specialize in in-vehicle equipment.
- Commercial vehicles increasingly install T-DMB receivers as an extra service to the passengers. All Seoul bus and taxi services are privately owned and they compete for ridership. There are usually more than one public transportation

options for a trip within and around the city. Many premium bus operators as well as deluxe taxi medallion owners continue to equip their vehicles with mobile TV receivers in order to keep their passengers entertained and win business. The cost of a T-DMB receiver is relatively small for these commercial operators, when considering the overall cost of the vehicle and operator license. The early adoption by the commercial vehicles is also ushering in the adoption by private vehicles.

4.3.3. In-Vehicle Strategies for Mobile TV Operators

Despite the fact that the S-DMB standard was originally developed by Toshiba specifically for the in-vehicle delivery of mobile TV contents, TU Media's in-vehicle service is about to be decimated by the T-DMB service. However, the in-vehicle application seems to play an important role in the overall growth of mobile TV services in Korea. Even TU Media originally forecasted that 20% of their subscribers would be in the in-vehicle market based on initial customer survey. As the T-DMB's service coverage improves with the installation of more gap fillers, and as the non-metropolitan areas outside of Seoul come on live with the T-DMB signals, the growth of in-vehicle T-TMB device sales is expected to accelerate. There are several important lessons to be learned from the Korean experience for the in-vehicle application of mobile TV:

1. Distribution of in-vehicle receivers must be separated from the distribution of mobile phone receivers. The after-market vehicle accessory and small electronics channels are best reached by the manufacturers. In-vehicle markets are best-served without the coordinating efforts of the mobile carriers. This will cause added complications in markets where DVB-H or Media FLO standard is selected as these standards are pushed by the mobile phone manufacturers. Nokia and Qualcomm must recognize the potential of the non-mobile phone devices and proactively support the equipment development efforts of the telematics and vehicle entertainment system manufacturers.

2. Whenever possible, the mobile TV receivers should be supplied as the original equipment for automobiles. Mobile TV broadcasters should work with the automobile manufacturers in order to add the mobile TV components to the original navigation and media player equipment. The successful example of XM and Sirius Radio in the U.S. should be carefully studied.
3. Subscription fee for the in-vehicle device should be considered separately for different price sensitivity and adjusted if needed. Most consumers have innate ability to rationalize the utility of their purchase and they will react negatively to a TV subscription that is grossly under-utilized.
4. Target the commercial passenger vehicles as early adopters. These buses and taxi cabs will showcase the mobile TV to the mass market. Strike a deal with TfL to install mobile TV receivers in all London city buses for continuous playing of BBC 24, for example.
5. For a future subscription model—as to FTA model—and for other paid services, a return path is required. Non-handset devices, including in-vehicle receivers should be complemented with cellular or Wi-Max equipment.

4.4. Audio Program

Another surprising usage pattern observed by TU Media and BT-Movio is the popularity of the audio service component of Mobile TV. For TU Media, the audio usage accounts for 30% of the total usage logged by the subscribers.⁵⁴ The BT-Movio's trial in London also reports positive responses to the capability of listening to the DAB radio programs. This may prove the MIC researcher's assessment in early 2001 correct: DAB radio needs video.

⁵⁴ Ibid. at 48.

4.5. Mobility Oversold Again?

4.5.1. The Shifty TV

In light of observations and finding reported in the previous sections of this chapter it appears that “mobile” in mobile TV is oversold. It is the “portable” nature of mobile TV that attracts people, more so than the mobility. Mobility is important in limited cases where the consumer has a long commute and has the right condition to assume the venerable TV-watching position. However, I claim that such “mobile” opportunities are rare. Instead, the space-shifting nature is central to mobile TV’s value proposition for the consumers. My argument for the space-shifting nature of mobile TV is also supported by the fact that a large number of USB devices were sold for T-DMB reception in Korea. TV on a PC or laptop provides portability rather than mobility.

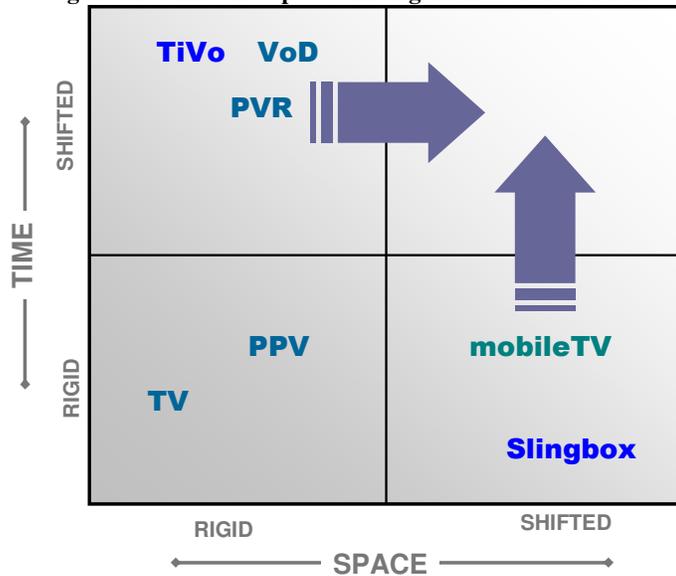
At this point, it is helpful to discuss the two important trends in TV consumption exhibited by the contemporary TV viewers: namely, time-shifting and space-shifting. Time Shifting was originally introduced by VCRs in the late 70’s and was significantly improved by TiVo and PVRs in recent years. VOD services by the cable operators (and now increasingly the new media IPTV services) also satisfy the consumers’ desire to time-shift their TV viewing.

Space-shifting, on the other hand, has been more difficult to realize. However, more and more attempts to deliver space-shifting to TV watching are being made. One such attempt is Slingbox.⁵⁵ Slingbox allows a user to emulate his home TV screen on a PC connected via the Internet, providing a crude form of space-shifting.

⁵⁵ <<http://www.slingmedia.com/>>

A research by RealNetworks⁵⁶ concludes that mobile TV with streaming and PVR capability would greatly enhance the user experience—“delivering total mobile TV”. A research by Alcatel, on the other hand, touts a combination of broadcasting and unicasting (for VOD) as a way to deliver enhanced user experience—“unlimited mobile TV for the mass market”. Figure 11 illustrates how today’s mobile TV can be improved by adding the features of PVR and VOD. This *convergence of the convergences* would deliver the TV viewing experience that can be both time-shifted and space-shifted.

Figure 11. Time and Space Shifting Trends of Television



4.5.2. Individual Viewing and Long Tail

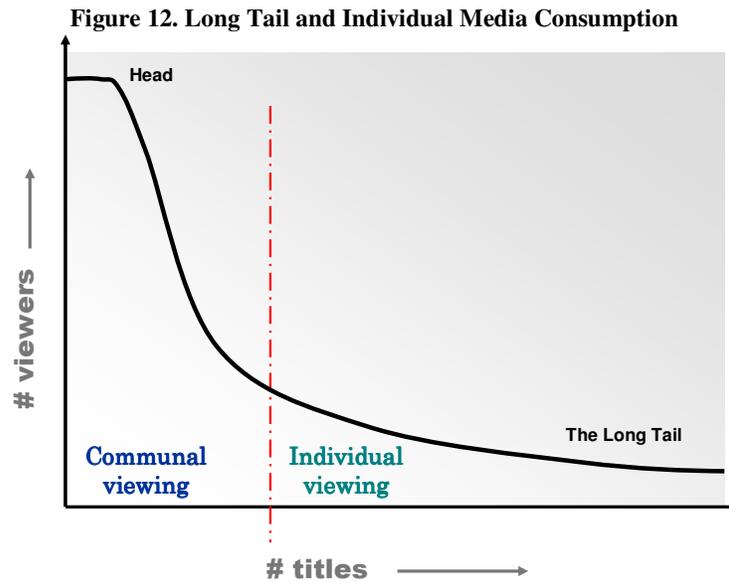
The small screen of a mobile TV receiver makes mobile TV an individual viewing experience, rather than a communal viewing experience. Is it possible that this individualism in TV watching is what people find attractive in mobile TV? Today’s consumers are surrounded by an overwhelming amount of multimedia contents in all

⁵⁶ See Steck, Chris.

shapes and forms. Do consumers require individual consumption of media since individual consumption is more efficient than communal consumption?

In order to answer this question it is useful to review the concept of the “Long Tail” in digital media distribution. As summarized by Chris Steck (2006), the Long Tail asserts that the less popular contents (“tail”) can be accessed by more users cumulatively outweighing the most popular contents (“head”). Steck used Long Tail to explain the need to have mobile TV broadcasting converge with streaming and recorded delivery.

In Figure 12, I argue that the Long Tailed nature of media consumption also creates a tendency towards the *individual* consumption of media. A great anecdotal example is provided by TU Media. During World Cup 2006, TU Media expected a great surge in viewing rate when matches of the Korean national team are broadcasted live. After all, TU Media already had experienced the highest rating (of over 20%) during the World Baseball Classic tournament in March of 2006. World Cup matches are much more popular than WBC baseball games and they would, TU Media thought, surely delivered the viewing rate records. The results were rather disappointing—none of the World Cup matches came close to the record. The immensely popular World Cup match (therefore, a “head” content in the Long Tail curve) was a communal viewing experience, whereas a WBC baseball game fell a bit more towards the tail—an individual viewing experience.



It is perhaps the space-shifting and the individual viewing experience that the Sony Watchman⁵⁷ was trying to deliver to the mass market some 20 years ago. The advancements in the media encoding, wireless, power (batteries) and display technologies are finally delivering on what the Watchman promised.

⁵⁷ Sony Watchman received rave reviews as a “revolution” in TV watching when it was introduced to the market in 1984. It quickly disappeared and the introduction is generally considered a failure. For more detail see van Welie (2006).

5. Business Model

5.1. Revenue Model

5.1.1 TU Media Subscription Model

TU Media has a straightforward revenue model that is easy to understand for everyone. First, the subscriber pays a \$20 one-time setup fee to provision his handset to start receiving the TV programs. The monthly subscription for the S-DMB service is \$13, however, most SK Telecom subscribers receive 15 to 20% long-term contract discount. SK telecom takes 25% of the revenue net of the discount. TU Media states that the revenue sharing arrangements with program providers further reduces the net revenue by \$2, leaving TU Media with approximately \$5.80 in ARPU. In recent month, TU Media introduced PPV service including adult movies at \$3 per “rental”.

5.1.2. T-DMB FTA Model and Monetization

T-DMB was launched as a free-to-air broadcasting service in Korea. The revenues of T-DMB operators, as mentioned in earlier chapters, come 100% from advertising. However, it is necessary to take the advertising concept into perspective. Even in Korea, where consumers exhibit insatiable appetite for online media, a typical subscriber watches mobile TV for 45 minutes a day.⁵⁸ That is significantly lower than the average consumption of other media such as regular screen TV and the Internet. Also thanks to the Korean broadcasting law, there can only be a limited number of commercial announcement spots during the 45-minute daily consumption of mobile TV. Therefore, convincing advertisers to shell out big money to sponsor T-DMB programs is proving difficult. It is not surprising, therefore, that there are many who argue that the T-DMB

⁵⁸ Ibid. at 48.

service must be converted to a pay service. These proponents of the subscription model point to TU Media and other consumer survey results to articulate that the majority of consumers are willing to pay for mobile TV service, ergo the T-DMB operators are leaving money on the table.

David Evans (2002) points out that the pricing condition of a two-sided market cannot be explained by the elasticity of the buyers alone. He further explains that there is no way to allocate the increase in revenues from changes in prices to one side or the other. Therefore, the argument that there is a great deal of consumer surplus in the FTA model is both incorrect and dangerous since it does not consider the consequences a pricing change would have on both sides of revenues including the advertising income. Evans also provides some empirical evidence that the practice of providing free services to one side of a two-sided market can be a profitable strategy. Since the transaction volume equals to the product (not addition) of buyers and sellers demand, rapidly expanding the demand of one side by providing free services often results in overall business profitability.

5.2. Value Chain

The mobile TV value chain is long and complex since it involves a convergence of wireless communications and television businesses. As additional devices, delivery methods and services are added to mobile TV in the future, the value chain would only get longer and more complex. So far in the Korean experience, equipment manufacturers are the only player within the value chain that clearly profited from the mobile TV business. It is no wonder then, equipment manufacturers like Qualcomm, Nokia, Motorola, Samsung and LG are at the forefront of promoting mobile TV. Is there any hope for the mobile TV operators?

Whether it is a subscription business (TU Media) or an FTA advertising business (T-DMB), the ability of mobile TV operators to improve their profitability is directly linked to the number of hours consumers spend watching mobile TV. There are two ways to increase mobile TV consumption: either get more people to watch mobile TV or increase the number of hours each person watches. Therefore, it comes down to two components in the mobile TV value chain that matter greatly for the mobile TV operators: (1) mobile carriers as the distributor to get more viewers; and (2) the content providers as a source programming that solicits longer viewing hours.

TU Media's early success is largely attributed to the solid distribution network of SK Telecom. Instant access to one half of the Korean mobile subscribers undoubtedly gives TU Media an edge in attracting subscribers. On the other hand, the T-DMB camp has a limited access to the mobile carriers. KTF and LG Telecom are both less enthusiastic about T-DMB lacking a clear revenue generating mechanism. SK Telecom is reluctant to distribute T-DMB obviously because of its affiliation with TU Media. The T-DMB camp, therefore, must bolster its relationships with KTF and LG Telecom through joint investment and profit sharing arrangements. They must involve these carriers in any new service development efforts.

The T-DMB camp is gaining momentum despite its poor distribution capability as it is also the owners of the most popular contents in the Korean media industry. On the other hand, TU Media is suffering from its inability to simulcast the rival's TV programs. This situation, however, will not last indefinitely. The powerful lobbying of SK Telecom and a shift in political undertone in the Korean society will eventually allow TU Media to simulcast the terrestrial channels. Lacking the terrestrial channels currently, TU Media has built a sizable library of contents on the tail side of the Long Tail curve.⁵⁹ The T-DMB camp must start building its library of contents on the tail side as well.

⁵⁹ See Section 4.5.2. of this report.

5.3. Wholesaler/Content Aggregator Model

It is difficult for the Korean T-DMB camp to develop distribution relationships and build contents library since it is a group of six independent and competing companies.

In U.K. and America, the wholesaler/content aggregator business model is gaining popularity for mobile TV. For example, BT-Movio is a business unit within the Wholesale division of the telecom giant. BT-Movio is also an excellent strategic ploy for BT as it has the potential of servicing BT's IPTV offerings in the future as well as the mobile carriers it is currently targeting. Qaulcomm's MediaFLO promises that its mobile TV platform is totally compatible with all mobile networks including GSM/GPRS networks. Crown Castle and Hiwire are also frantically looking for a distribution partner for their DVB-H wholesale solutions.

The T-DMB camp has much to learn from these wholesale/content aggregator business models. By consolidating their scattered mobile TV efforts in one single organization and positioning themselves as a wholesaler/content aggregator to the mobile operators and other platform owners will give them the best chance at winning the mobile TV war in Korea.

6. Conclusion

Geoffrey Moore (1999) in his best selling book, *Crossing the Chasm*, argues that the most important characteristic about marketing high-tech products is the “tendency of consumers to reference each other when making buying decisions.” With subscribers in millions, and from the sheer volume of newspaper articles, research papers, advertisement and blog postings, mobile TV in Korea seems to have crossed the chasm.

The history of mobile TV in Korea is fascinating to study for its unlikely start as an FM radio replacement and the complex nature of relationships between parties involved: technology owners, broadcasters, content providers, mobile carriers, multiplexers, regulators, researchers, politicians and labor unions, ah, the labor unions. The complexity of mobile TV business may well be the hallmark of all future convergence services to come. In that sense, I credit the Korean government for bringing the first commercial mobile TV market. Without MIC’s coordinating efforts, it would not have happened as efficiently as it did.

Mobile TV in Korea fall within the regulatory domain of KBC and the Korean broadcasting law, despite the fact that MIC is the focal point for the industry efforts to bring mobile TV to the market. As the convergence of broadcasting and communication technologies continues, policy makers and legislators around the world may need to adjust their regulatory frameworks in order to accommodate mobile TV and other emerging media services.

There are many mobile TV technology standards competing to become the dominant design⁶⁰. However, it is not clear whether any one particular technology today

⁶⁰ See Costantinos Markides (2005)

provides a compelling advantage over the others in terms of producing a better user experience. Mobile TV, as introduced today in Korea, has weak and indirect network effects, therefore, co-existence of multiple standards will continue for some time. The market dominance will eventually be achieved by a provider who can deliver the best total user experience, which include elements outside of mobile TV broadcasting technology.

Some of the observations on early consumer behavior suggest that the *mobility* in mobile TV is oversold. Instead, it is the *portability* of mobile TV that appeals to the consumers. The *portability* allows a space-shifted TV viewing. The ability to space-shift and the small screen of a mobile TV receiver make the viewing experience *individual* as supposed to *communal*. Mobile TV is, therefore, most suitable for delivering contents of the tail end of the Long Tail Curve. The store-and-play capability of a PVR and the VOD capability of unicasting can be incorporated into mobile TV in order to provide a complete experience for the user that is both time-shifting and space-shifting.

Regular, full-length TV programs seem to be the killer-app for mobile TV, at least for now in Korea. The much anticipated mobisodes prove to be far less popular than expected in almost all mobile TV trials that I look at. It is unclear whether mobile TV will end up creating a genre of its own in terms of new video and data contents. Mobile TV may be just one of the many avenues, via which users would have ubiquitous access to their desired media contents.

TU's impressive early gains in S-DMB subscriptions prove that the distribution is as important as content availability and pricing. However, mobile TV does not have to be exclusively sold through the mobile operators. In-vehicle devices and other handheld device with an LCD screen and appropriate user interface can deliver the core attributes of mobile TV, i.e., portable and individualized media consumption. One should not be surprised to see iPod or Sony PSP with mobile TV receiver in the near future.

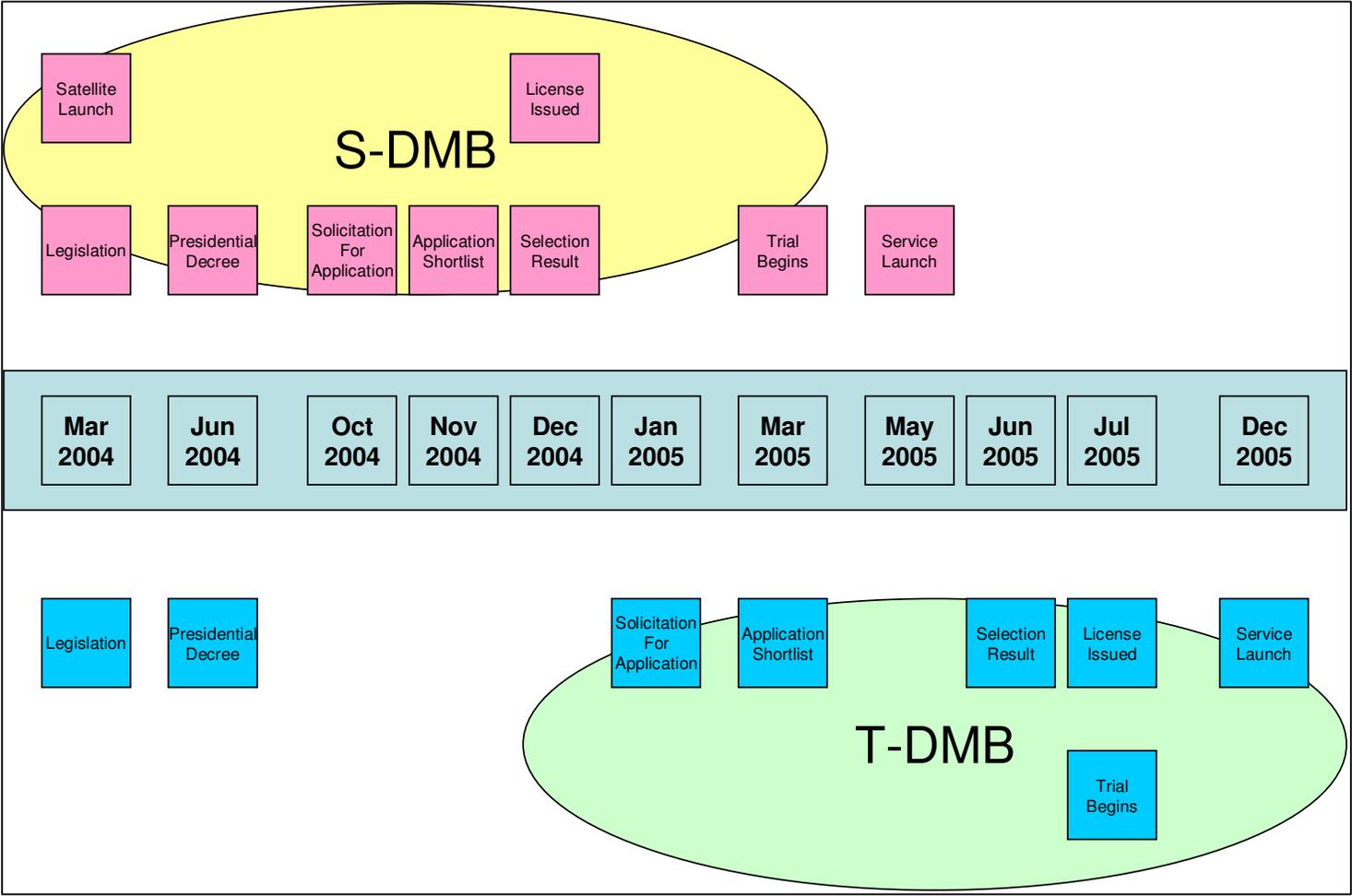
At the same time, the audio programming should not be ignored. The audio programs on mobile TV provide another huge opportunity for the operators. The audio programming must include genres beyond the Top 40s and the youth favorites.

There are several business models emerging for mobile TV. The viability of the advertiser-sponsored FTA model is not proven. The very nature of the two-sided market economics makes it impossible to isolate the buyer side elasticity from the overall elasticity of demand. However, it is clear that the profitability of a mobile TV business positively correlates with the number of viewing hours. With the significantly shorter daily average viewing time for mobile TV (in comparison with regular TV), the FTA model would be much more difficult to achieve with mobile TV.

An increased number of viewing hours can be achieved when the distribution channels or the content libraries are expanded. In order to establish strong multiple distribution channels and in order to secure a vast library of media titles, the wholesaler/content aggregator model is most suitable for mobile TV operators. The fragmented efforts of the current 6 Korean T-DMB licensees may benefit from any type of consolidation. However, any such consolidation is impossible under the current Korean broadcasting law.

Costas Markides (2005) may characterize the current mobile TV industry as a classic example of a “colonist” market. Who would eventually “consolidate” the industry is unknown. What is clear, however, is that the dominant design that eventually consolidates the mobile TV market would be a convergence of many more technologies, delivery methods, devices and interfaces. I will declare the winner only when my two-year old daughter can time-shift, space-shift and device-shift her TV.

Appendix A. Time Line of DMB Launch



(Source: Hyuk Kim (2006))

Appendix B. Sample In-Vehicle Receivers

S-DMB Receivers		T-DMB Receivers			
Hyon	Innoace	NexTech	Hyundai Autonet	GT Electronics	Firstel
					
835,000 KRW	687,500 KRW	638,000 KRW	699,000 KRW	410,000 KRW	298,000 KRW
Touch screen, GPS navigation, Traffic warning, 4GB storage	7" screen; USP port; Remote control; EPG; PMP functions	Touch screen; GPS navigation; PMP functions	6.2" screen; GPS; Touch screen control; PMP functions	7" screen; Remote control; Media player	5" screen; Remote control; Installation not included

All prices include installation charges unless indicated otherwise.
 Exchange rate: £1=1677.18 KRW; \$1=957.9 KRW (14 April 2006)

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