

The Gordian Knot of Mobile TV Policy in Singapore*

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Abstract. Mobile TV brings challenges to existing regulatory frameworks. The purpose of this paper is to analyze regulatory issues arising from TV services on mobile handsets, including 3G TV and mobile broadcasting TV. The research methods are document analysis and in-depth interviews with mobile TV policymakers and industrial players. Singapore's case is used to illustrate how the advancement and convergence of mobile video technology affect mobile TV policymaking and complicates regulatory considerations. Since 2005, Singapore's 3G TV services have been regulated under an Internet services' Class License scheme. In 2007, the Media Development Authority proposed to regulate both 3G TV services and the emerging mobile broadcasting TV under the broadcasting act with stricter licensing and content regulation. This paper argues that the old media laws cannot address mobile TV's unique characteristics and complex issues. Finally, it recommends the regulation of unicast and multicast mobile TV services separately under a light-touch, customized mobile TV policy.

1. Introduction

The global economic downturn has not changed the optimistic forecast of mobile TV's high potential growth in the near future (Informa Telecoms & Media, 2008; Oh & Jablon, 2008). Many reports regard Asia as a hotbed for mobile TV development because of high cell phone penetration, Asian commuting lifestyles, and advanced mobile technology (Gill, 2008; Pyramid Research, 2009). Singapore, a media hub in Asia, has more than 136 per cent mobile phone penetration and 2.8 million 3G subscribers in July 2009 (IDA Singapore, 2009). Since 2005, 3G mobile operators have launched some video services but failed to attract a large amount of users. Later, the advent of mobile broadcasting technology reignited the hope for mobile TV. In mid-2007, a new media company, Singapore Digital, launched Singapore's first broadcasting mobile TV trial, TV2GO. During the 2008 Chinese Olympics Games, a joint DVB-H mobile TV trial held by Singapore's three telcos (SingTel, Starhub, and M1) and sole broadcaster (MediaCorp) was inaugurated. Singapore's mobile TV, including 3G TV and mobile broadcasting TV, is still in its infancy.

In 2001, the three telcos obtained 3G licenses issued by the Infocomm Development Authority of Singapore (IDA) under the Telecommunications Act. Their 3G content is regulated under a light-touch Class License issued by the Media Development Authority (MDA). The Class License Scheme is mainly used for regulating decentralized, open-architecture services. Its service license is automatically obtained and content censorship is less strict. As unicast 3G videos become popular and multicast mobile broadcasting technology matures, the mobile TV platform can play 3G videos, mobile broadcasting content, and even multimedia broadcasting and multicast services (MBMS). Such convergence in mobile technology and content raises debates: whether 3G TV and mobile broadcast TV shown on the same platform should be regulated under the same policy or dual regulatory frameworks (light touch vs. tight control); with broadcasting characteristics, whether mobile TV should come under a tighter license scheme and content censorship similar to broadcasting TV, or a looser regulatory framework as applied to Internet or information systems? In November 2007, the MDA proposed a mobile TV regulatory framework for public feedback. It intended to integrate 3G TV and mobile broadcast TV under a controlled regulatory framework where mobile TV service providers (MTVS) apply individual licenses and abide by TV content codes. After the MDA received the reports of DVB-H TV trials in December 2008, it has yet to announce a new mobile TV policy, as a result of uncertain commercial viability, and complex regulatory considerations for this new convergent platform.

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Policy development usually trails behind the fast advancement of information communication technology (ICT). Mobile TV policy is no exception. Singapore is a digital savvy, media saturated, and mobile prevalent country. Often, it is one of the leading countries that adopt cutting-edge ICTs. Although noted for its scrutiny in policy planning, Singapore still cannot avoid modifying its ICT regulations due to unpredictable changes in technology and its national and societal needs. The motivation of this paper is to retrace some of the factors leading to the enactment of Singapore's 3G mobile video/3G TV law and the proposal of its 2007 mobile TV service regulatory framework. It is interesting to analyze Singapore's regulatory journey to see how it reacts to the convergence of mobile video technology and anticipate some possible challenges ahead associated with the implementation. The analyses and discussions are primarily based on document analysis and results of in-depth interviews with key mobile TV stakeholders (the MDA's policy director and analyst, the broadcaster, the new entrant for mobile broadcast TV). In section 2, the development of Singapore's mobile TV, including 3G videos and DVB-H broadcasting TV trials will be examined. Section 3 will first review mobile videos and mobile broadcast TV policy in other advanced countries, and then elaborate Singapore's policy for 3G TV and its 2007 proposed regulatory framework for MTVS. Finally, this article will make policy recommendations for this emerging and converging mobile TV platform.

2. The Evolution of Mobile TV

2.1. Global Mobile TV Development

Television and mobile telecommunications have steadily converged over the past five years and many forecast mobile TV will soon become a mainstream reality (Informa Telecoms & Media, 2008). However, multiple technology standards, nebulous business models, and mixture of content delivery modes bring mobile TV multifaceted definitions and interpretations in different contexts. Simply put, mobile TV is the wireless transmission and reception of TV-related programmes or videos to a range of mobile devices (eg. cell phones, PDAs). Viewing videos on mobile handsets can be either point-to-point (streamed to handsets via a cellular network, known as "unicast") or point-to-multipoint (via a broadcasting frequency similar to TV or radio, known as "multicast") (Curwen & Walley, 2008). Since the introduction of 3G technology in early 2000, mobile operators saw a great opportunity to provide "unicast mobile video," delivering user-selected audio/video services to handsets by downloading or streaming over the cellular networks (Kumar, 2007). Unfortunately, the bandwidth limitation, less satisfactory viewing experience, and costly data charge caused the sluggish diffusion of 3G mobile video or 3G TV services in the early years. Consequently, a low percentage of mobile phone users take up such services globally.

In 2005, mobile broadcast TV that transmits content with a scheduled timetable over streamed cellular networks or broadcast networks (i.e., DVB-H or DMB-T) (Kurmer, 2007) started in South Korea. Currently, there are a few successful mobile broadcasting TV operators in Korea, Japan, and Italy and many trials are ongoing in Asia, Europe, and the United States. The multitude of technologies slow down the diffusion of mobile broadcast TV (Choi et al., 2008; Gill, 2008). Although Nokia-backed DVB-H seems the most popular standard with widespread adoption worldwide, other broadcast standards lead in different regions: MediaFLO and ATSC-MH in the US; T-DMB and S-DMB in South Korea; ISDB-T in Japan and Brazil; and home-grown CMMB and/or TMMB in China. Besides, the choice of business model – the subscription model and free-to-air model (FTA) – is suitable for its development is debatable (Gill, 2008; Kumar; 2007). The FTA advertisement-funded mobile TV services in South Korea and Japan grow faster than their satellite-based subscription services. However, Qualcomm's research supported the subscription model that provided incentives of revenue generation to stakeholders would become the mainstream in the Asia-Pacific region (Oh & Jablon, 2008).

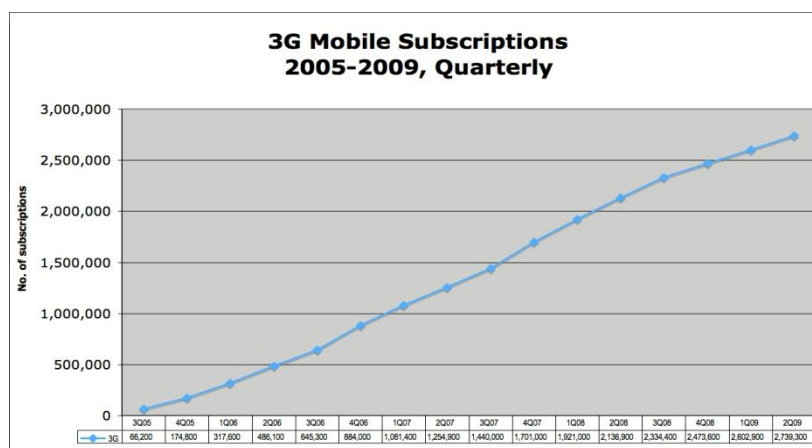
In 2008, mobile videos transmitted by 3G or 3.5 G technologies resurged and started to gain its prominence and develop rapidly worldwide, due to the improved performance and advanced handsets. According to Pyramid Research (2009), the number of global mobile video subscriptions will grow to 534 million in 2014, reaching a penetration rate of 8.5 per cent of total mobile subscriptions. Believing mobile TV will primarily be unicast (over HSPA or LTE networks), Ericsson predicted that DVB-H would lose out to MBMS – a mobile multicast technology. In mid-February 2008, Ericsson and South Korean vendor LG Electronics announced their successful demonstration of an MBMS-based mobile TV service in Sweden. Although 3G TV and video services are more mature in their subscription business models than the emerging broadcast one, current cellular TV streaming without an MBMS upgrade will suffer from traffic problems. Hence, most analysts expect mobile broadcast TV to take off in 2010/2011 (Informa Telecoms & Media, 2008).

2.2. Singapore Trends and Current Status

To keep abreast of the fast advancements in mobile technology and services, the IDA unveiled a draft of the 3G licensing framework and auction rules in January 2001. However, in early April 2001, the IDA decided to drop the auction due to a lack of interest. On 23 April 2001, the three mobile operators (SingTel, M1, and StarHub) were awarded with the Facilities-Based Operator (FBO) 3G licenses with a reserve price of 100 million Singapore dollars each (BBC News, 2001). In early 2005, the IDA, announced that all three telcos have successfully met the IDA’s requirements for the nationwide rollout of 3G systems and services by 31 December 2004 (Cellular-news, 2005).

From 2005 till now, the 3G subscription in Singapore has grown exponentially. According to the IDA’s Statistics on Telecom Services, 3G subscriptions accounted for about 0.5 per cent, or 21,600 out of more than 4 million mobile phone subscriptions in May 2005. By the end of 2005, the total number 3G subscriptions grew more than eight-fold to 174,800, while mobile penetration rate rose from 96.7 per cent to 99.8 per cent. As of July 2009, the mobile penetration rate stood at 136 per cent, while the total number of 3G subscriptions hit 2.79 million, more than 40 per cent of the total mobile subscriptions of 6.58 million (IDA, 2009).

Figure 1. Singapore’s 3G mobile subscriptions 2005–2009



Source: IDA, 2009

2.2.1 3G TV in Singapore

SingTel and M1 launched their commercial 3G services in February 2005. StarHub, which began 3G trials in December 2004, started two months behind its competitors in April 2005 and but is the first to introduce mobile video content over its 3G platform.

In January 2005, StarHub announced a tie up with Japan’s NTT DoCoMo to bring i-mode – a mobile Internet platform that allows users to access various services including video content – to Singapore (NTT DoCoMo, 2005). i-mode officially launched on 18 November 2005. M1 partnered with MediaCorp to offer popular Mandarin dramas streaming service on MiWorld Mobile in May 2005. One month later, they produced made-for-mobile TV dramas aired on M1’s 3G platform and continued to develop Singapore’s first 3G local entertainment programmes (M1, 2007). SingTel launched a “3G TV” service in November 2005 and became the first to provide users easy access to a video portal instead of using WAP to access audiovisual content.

Tapping further into the video consumer market, M1 launched MeTV, a video sharing service on its 3G TV platform in January 2007. M1 customers could upload and share videos on their social network and get paid \$0.05 for each download by other users. Subsequently, MeTV was made available to StarHub users in July 2007 in order to increase mobile content generation and customer database (Cellular-news, 2007). In May 2008, SingTel extended its IPTV services, mio TV, to its mobile customers. Its 3G mobile users could view six mio TV channels, on-demand programmes, and pay-per-view with an Electronic Programming Guide (EPG). Separately in 2008, SingTel announced its tie-up with Apple to offer the latest 3G iPhone exclusively in Singapore. Singtel’s iPhone also provided live TV channels and video clips for its 3G subscribers.

In July 2009, StarHub expanded its 3G mobile TV service to pre-paid customers. Building on its strong line-up of cable TV content, StarHub added channels in four languages – Mandarin, Bahasa Indonesia, Hindi and

Tamil –to target the foreign worker customer base (ST Telemedia, 2009). StarHub TV on Mobile channels is available on its Gee! portal from any supported 3G mobile devices with a StarHub pre-paid 3G SIM card.

2.2.2 Mobile Broadcasting TV in Singapore

After several trials, Singapore's mobile broadcast TV service has yet to be commercialized. In June 2007, Singapore Digital, a joint venture between Broadcast Australia and PGK Media, started a TV2GO mobile broadcasting TV market trial. 100 trialists could view 10 foreign TV channels and use real-time interactive services (e.g., voting, mobile internet services) on the Nokia DVB-H broadcast platform. The trial was completed in November 2008.

In July 2008, another three-month mobile TV consumer trial was kick-started by local content provider, MediaCorp, and the three incumbent telcos, namely SingTel, StarHub and M1. With the trial just in line with the 2008 Beijing Olympics, 300 participants could watch live event coverage of the Olympics (Major, 2008) as well as other 14 channels. The content was delivered by the DVB-H platform supported by Alcatel and Gemalto.

In both trials, young adult users and PMEBS (Professionals, Management, Executives, and Businessmen) were regarded as early MTVS adopters. The common problems that surfaced include insufficiency of innovative content, interactive services, and technologically immature and costly MTVS devices. The trials revealed that mobile TV users would like to watch more made-for-mobile content, interactivity as well as user-generated content. In comparison, the joint trial between MediaCorp and the telcos relied mainly on local content and the Olympics, while TV2GO offered interactivity on top of premium foreign channels. However, Singapore Digital may be disadvantaged due to the lack of a local customer database and experience.

Reports from both trials have been submitted to the MDA in December 2008. After 2007's consultation paper, the MDA has yet to make any further announcements. At present, industry players are still waiting for the MDA to finalize its mobile TV policy.

3. Mobile TV policy

3.1. Global Issues in Mobile TV policy

Dramatic changes in ICTs such as mobile TV bring challenges to the accumulated regulatory structure. The two kinds of mobile TV services, 3G TV and mobile broadcast TV, have their own developmental trajectories and regulatory considerations in different national contexts. The dilemmas that the global mobile TV policy faces are whether the two evolving mobile TV services should be regulated under one policy and what kinds of regulatory framework – broadcasting TV policy, extended broadcasting policy, or information service policy – should be applied to them. Currently, most countries in the world regard mobile telephony and broadcasting TV as two separate industries. However, the dual nature of the mobile broadcasting TV could be categorized either as one kind of broadcasting TV service that serves a mass audience or as live mobile programming that can only be watched by users with customized portable devices, depending on the perceptions of the policymakers.

In some countries, regulators regard the offering of any TV programming as broadcasting and regulate mobile broadcasting TV providers as traditional broadcasters. For example, the Korean Broadcasting Commission (KBC) defines DMB as an extension of traditional broadcasting and amends its broadcasting regulations to include mobile TV services over broadcasting networks (Dong, 2006). It requires DMB operators to follow broadcasting TV content codes and offer universal services. Besides classifying these mobile TV services as broadcasting services, the communications regulatory authority in Italy, AGCOM, amended its 2001 digital terrestrial television regulations in 2006 to extend their coverage to mobile TV services delivered over broadcasting networks (Infodev ITU, 2009). So far, Singapore's MDA 2007 consultation paper is the only one that proposes to migrate its 3G video services from light-touch, Internet-like regulation to the broadcasting act, so that both 3G TV and the mobile broadcasting TV services (MTVS) must obey the same individual licensing and TV content codes.

Although the majority of global regulatory authorities apply original or amended (digital) broadcast TV rules to mobile TV (MDA, 2007), some jurisdictions, like the United States, have opted for a light-handed approach, classifying mobile TV (2G, 3G, live mobile TV channels) as an information service for accelerating its rollout.

Same as the FCC (Federal Communication Commission) in the USA, the Ofcom (Office of Communication) in the UK recognizes that the boundaries for conventional media are no longer relevant in the convergent age. They have left the control of broadcast channels in the hands of broadcasters, while mobile operators take charge of the great majority of uplink capacity, including 3G TV and mobile broadcasting services (Curwen & Whalley, 2008). The Canadian regulator, Canadian Radio-Television and Telecommunications

Commission (CRTC), views imposing stringent broadcasting conditions on the mobile broadcasting services as potentially detrimental to its development (Infodev ITU, 2009) and unicast mobile TV would not affect traditional broadcasters greatly because of the inherent technical limitations of the wireless technology (e.g., battery life, screen size). But it has not determined how to regulate dedicated point-to-multipoint mobile TV systems yet. Moreover, other jurisdictions like Hong Kong realize that existing broadcasting regulations are not adequate for mobile TV policy. Hong Kong has proposed two alternative approaches: either deploying a self-regulatory approach similar to Internet services or amending the Broadcasting Ordinance for fixed TV reception to treat mobile TV (3G TV and MTVS) as a new service (Infodev ITU, 2009).

Besides, convergent regulatory authorities, like the FCC, the Ofcom, and the MDA, can scrutinize and make consistent mobile TV policy for the fast-changing telecommunications industry. They can quickly respond to a situation where distinctions of media and platforms are becoming blurred. In contrast, if several regulatory entities claim jurisdiction over mobile TV, contradictions in decision making will cause problems in development. For instance, the biggest barrier for China's mobile TV diffusion is the turf fight over mobile TV standard setting between Ministry of Industry and Information Technology's (the telecommunications regulator) TD-SCDMA 3G mobile TV standard and State Administration of Radio, Film and Television's (the broadcasting regulator) proprietary technological standard CMMB (Lin, 2009). The competition between two regulatory entities slows down China's mobile TV's rollout.

Furthermore, although most countries apply IPTV licensing approaches to mobile TV services, many impose TV content regulations to mobile TV providers (Infodev ITU, 2009). In Australia, mobile premium services like mobile TV are regulated by the Broadcasting Service Act 1992. It restricts minors' access to certain content on mobile premium services, including mobile portal and premium rate SMS/MMS services. The EU, for example, also imposes the same restrictions of broadcast TV advertising on mobile TV advertising.

The global mobile TV policy is still evolving. Provisional regulations set up by some countries do not fully address the complex issues of mobile TV. As Dong's (2006) study argued, Korea's mobile broadcast TV policy does not reflect constant technological changes and complicated interactions in the mobile industry. Similar situations are also occurring in other countries, including Singapore. The next section looks at Singapore's mobile TV policy as a case study to analyze the regulatory framework of 3G TV/mobile videos and mobile broadcast TV (MTVS) as well as elaborate the Gordian knot in the complicated interrelationships of existing and emerging mobile video technologies, industry/market, and policy.

3.2. Singapore's Evolving Mobile TV Policy

The competition in Singapore's telecommunications industry is guided under the government's national development plans. The Singapore government aims to create a close-to-competitive market with a few competitors (Singh, 1998). The key industrial stakeholders in Singapore's mobile TV industry include three 3G mobile operators (Singtel, Starhub, and M1), one broadcaster (MediaCorp), and one potential new entrant for mobile broadcast TV (Singapore Digital). Singapore is one of a few countries that have converged regulators for the telecommunications and media industry: the IDA takes charge of broadcast spectrum issues, while the MDA primarily deals with content.

3.2.1 3G TV and Mobile Video Policy

On 25 October 1999, the IDA issued a consultation paper about the regulatory framework for 3G cellular network deployment services to gather industrial and public feedback. In Singapore, before telecommunications companies deploy and operate any form of telecommunication networks, systems or facilities to provide public telecommunications and/or broadcasting services, they must obtain a facilities-based operations (FBO) license from the IDA (IDA, 2009). In April 2001, the three telcos were awarded the FBO licenses, allowing them to establish, install, and maintain the 3G mobile communication systems and provide 3G services (IDA, 2001). The license also required them to comply with the 3G nationwide rollout deadline at the end of 2004.

Apart from a license issued by the IDA under the Telecommunications Act, the 3G contents are separately regulated under a Class License issued by the MDA. The Class License Scheme is filed under the Broadcasting Act, Chapter 28, Section 9, (Class License) Notification released on 15 July 1996. It states that any licensee who is providing broadcasting services should not use its content for purposes of gambling or any immoral activity like the solicitation of prostitution. With regards to content being broadcast, a licensee shall

- (f.) in the case of the broadcast of sound recordings, ensure that only sound recordings that are acceptable to the censorship section of the Ministry of Information and the Arts are broadcast;
- and

g. in the case of the broadcast of films or video recordings, ensure that only films and video recordings that are approved by the Board of Film Censors are broadcast, unless the film or video recording is one to which the Films Act (Cap. 107) does not apply or is one which is exempted from the provisions of that Act (MDA, 1996).

Under the Films Act (cap.107), the censorship board is appointed by the Ministry of Information, Communications, and the Arts (MICA). The films that are exempted from the Films Act include government-sponsored films and not-for-public-distribution films. The Minister is also entitled to exempt a film as he sees fit or withdraw an exemption at any time (MICA, 1981).

The Class License Scheme is a “light-touch” regulatory framework that was first laid out for Internet Content Providers (ICP) and Internet Service Providers (ISP). It is an automatic licensing scheme; that is, operators who intend to provide cellular mobile video services need not seek prior approval from the MDA, but their content must comply with the Class License conditions. This light-touch scheme was created for Internet services, as the MDA recognized that strict domestic legislation cannot be applied to such a global and borderless online medium. The reason why the MDA first put cellular video services under the same licensing framework was that 3G operators initially provided more information services similar to the Internet, and 3G TV consisted mainly of short video clips then. Under the Class License Scheme, 3G TV and mobile video providers are expected to self-regulate and exercise discretion in ensuring that their content abides by the regulations. The MDA, being the regulatory body of content on cellular mobile networks, typically initiates investigations upon receiving feedback from the public (Teo, 2009).

However, over the last few years, 3G TV has progressed from just merely providing short downloadable video clips to streaming live TV channels similar to broadcasting TV content. In November 2007, the MDA announced a public consultation paper and claimed that 3G TV services and broadcasting mobile TV services should be regulated under the same framework to ensure a level playing field in the mobile TV industry, since both services involve the delivery of TV programmes to handheld devices and have the same look and feel (Teo, 2009). The MDA explained this was in line with its principle to regulate all kinds of mobile TV services on a technology-neutral basis.

When questioned about what has prompted a policy shift to re-regulate 3G TV and mobile broadcast TV under the same policy, Teo (2009), an MDA policy analyst, said “In view of the personalized nature of cellular mobile TV services and high adoption rate among young users and children, there is a need to migrate them from the Class License Scheme to the stronger individual licensing approach.” The MDA’s policy director also explained the difference between the class license scheme and the individual licensing:

The class license is an automatic licensing ... There are some minimal conditions to make sure contents for public safety. That is what we call a very light-touched approach. The individual licenses are more for the TV services, and there is a programme code that the operators have to comply with ... the programme code will touch on the various concerns like violence and sex (Ling, 2009).

Hence, if the MDA’s 2007 MTVS proposal is passed, the class licensing approach toward 3G TV services will be dropped in favour of a more stringent individual licensing approach (FBO, multiplex license, broadcasting license) that will be elaborated in section 3.2.2. Moreover, under the new proposed regulatory framework, 3G TV content – including full streaming of scheduled TV channels, downloadable clips, and VOD programming –will be regulated by applicable programming codes (e.g., Free-To-Air TV code, subscription TV programme code, or niche programming code) (MDA, 2007; Teo, 2009).

Apart from common programme guidelines about “children’s programmes”, “sex and nudity”, and “violence and crime”, due emphasis is given to guidelines pertaining to “national interest”, “racial and religious harmony”, and “social values” in Singapore’s programme codes. Under “Part 1: National Interest” of the guidelines in all three programme codes,

- 1.1 Programmes should not undermine public security interests or public confidence in the law and its enforcement in Singapore.
- 1.2 Programmes should not contain extremist or anarchic messages, such as advocating or promoting the use of violence for political ends or other purposes (MDA, 2004).

Under “Part 2: Racial and Religious Harmony” of the guidelines in all three programme codes,

- 2.1 Matters pertaining to race and religion are sensitive and capable of evoking strong passions and emotion. Therefore, service providers must exercise due caution when featuring the activities, beliefs, practices, or views of any racial or religious group in a programme.
- 2.2 For the purposes of this Code, race includes dialect groups and ethnic groups (MDA, 2004).

Under the guidelines pertaining to social values (part 4 in both the Subscription TV and VOD code and part 5 in FTA TV code), broadcasters are reminded about the importance of the family as the basic unit of society, and hence, the sanctity of marriage should be respected and divorce should not be treated casually. The portrayals of alternative lifestyles and behaviours – such as homosexuality, bisexuality, paedophilia, and incest – should not be justified, promoted, or glamorized in broadcasting TV content (MDA, 2004). All these guidelines are deemed necessary by the MDA in view of Singapore being a young Asian nation with strong Asian values. Singapore's unique makeup of various races and religions also requires broadcasters to pay extra attention to content that may potentially tear the social fabric apart.

Singapore's mobile TV policy has not yet been finalized. If the MDA's 2007 proposal is enacted, current 3G TV service providers will probably migrate their video services from the Class License regime to the mobile TV licensing framework. 3G mobile providers in Singapore strongly oppose such as move as its regulatory implications – classifying cellular mobile TV services as broadcasting services – would subject them to stricter licensing and content regulation (Infodev ITU, 2009).

3.2.2 Mobile Broadcasting TV Policy

In November 2007, the MDA proposed a regulatory framework for Singapore's mobile TV services and asked for public consultation. Issued at a time when the three telcos only provided point-to-point services over cellular networks and the market trial of mobile broadcasting TV was ongoing, this paper mainly focused on the regulation of future mobile broadcasting TV services (MTVS) that could be delivered by DVB-H, MediaFlo, or other broadcasting technologies. The MDA (2007) defined MTVS as "personalized viewing TV, often with a choice of 10 to 15 channels on an 'anywhere anytime' basis," and unlike cellular mobile TV, the service is not charged by the length of viewing time. Licensing framework, technology, market structure, and content/advertising regulation are the four main issues addressed in this proposal.

The MDA proposed subjecting mobile TV to the existing licensing structure for fixed digital broadcasting:

1. Under the Broadcasting Act, the MDA will issue a multiplex license to use and/or lease digital multiplex capacity for approved content and data, and a Broadcasting Service license to offer broadcasting services on the multiplex.
2. Under the Telecommunication Act, a license will be issued to any party running a telecommunication system for operating the multiplex broadcasting service.

The MDA's director thus explained the rationale behind separate arrangements for the multiplex license, the broadcasting service license, and the FBO:

... there are two dimensions to mobile TV: One is the service that is offered, and our view is that it is content-concerned, so it should be regulated under the Broadcasting Act. But the transmitters that are put in place will need to get a technical license from our colleagues who take care of the technicalities in IDA (Ling, 2009).

Uncertain of which frequency the industry would find suitable in deploying MTVS, the MDA proposed to issue up to four multiplex licenses for MTVS: two 8 MHz UHF channels and two 1.5 MHz VHF channels. The MDA indicated there would be a comparative tender process to award licenses to applicants, based on evaluation criteria including technical measurements, financial and commercial measurements, and consumer interest requirements.

Proposed two-tier framework for MTVS and cellular mobile TV service providers		
	Niche Subscription TV Licence	Nationwide Subscription TV Licence
Licence duration	5 years, renewable	10 years, renewable
Number of Subscribers	Not more than 100,000 subscribers in Singapore	No limit to the number of subscribers in Singapore
Licence fee¹	The licence fee will be 2.5% of total revenue subject to a minimum of \$5,000.	The licence fee will be 2.5% of total revenue subject to a minimum of \$50,000.
Performance bond	\$50,000, in the form of either banker's guarantee or cash.	\$200,000, in the form of either banker's guarantee or cash.
Ownership	No ownership conditions	Subject to the ownership conditions as stipulated in Part X of the Broadcasting Act
Must carry	No must carry obligations.	
Advertising revenue	No cap on advertising revenue.	
Advertising time limit	14 mins per hour advertising time limit applies for channels with scheduled programming. The 14 mins advertising time limit is not applicable for VOD content and interactive advertising services.	
Content guidelines	Subject to the MDA's programming codes for FTA content, subscription content, video-on-demand (VOD) and other kinds of content.	

To foster the growth of nascent mobile TV industry, the MDA proposed to adapt IPTV services' two-tier framework (niche and nationwide licenses) for MTVS operators and cellular mobile operators who wish to provide content services on their cellular network. The licenses are differentiated by the number of subscribers, whether less than 100,000 (niche), or more than 100,000 (nationwide). In view of the infancy of MTVS, the MDA proposed that such service providers should come under the niche licensing framework (MDA, 2007).

Standard setting is a key issue in ICT policy. DVB-H, MediaFLO, and UHS platforms are the MDA's three recommended technologies for mobile broadcasting TV. It announced a platform-neutral approach to MTVS because there is no mainstream standard worldwide and no strong public interest consideration. The MDA's policy director Ling indicated the government would give the industry maximum room to find out the best technological match without mandating any specific standard:

This is a situation where there is no need for the government to intervene. So the market will tend to sort itself out in deciding which is the most viable standard in terms of equipment availability, pricing and of course technical robustness (Ling, 2009).

In fact, the two market trials show that Singapore's industrial players tend to select DVB-H for their MTVS commercial deployment. The MDA plans to impose minimum 95 per cent outdoor network coverage requirements on multiplex licenses. Due to MTVS viability reasons (e.g., flexibility of content providing), the MDA has proposed not to mandate any QoS (Quality of Service) on picture quality.

The interviews show Singapore mobile TV players prefer to have the subscription model in the early adopter markets rather than the FTA model (Dorrucci, 2008; Ku, 2009). They believe early adopters would pay for MTVS even though the subscription model may encounter problems in diffusing MTVS to the mass market. MediaCorp's Business Development Director said the FTA model should be introduced after the subscription model was well deployed:

In the early adoption market, it has to be a paid model. So there is this complex interplay. I think for a start, you want to go on a paid model, but at some point at the transition to mass market, you need to go more and more free-to-air. But of course, you have to make sure you don't do it prematurely that you destroy all values for the whole market (Ku, 2009).

To encourage market competitive and content innovation, the licensees have no must-carry obligations, no cap on advertising revenue, but their content must abide by the MDA's programming codes that have been clearly elaborated in last section. Currently, there are two models for broadcast content regulation in Singapore: broadcasting class license approach for the Internet and cellular networks, and the standard regulatory approach used for fixed FTA and pay TV under specific licenses issued by the MDA. However, the MDA proposed to regulate both cellular mobile TV and mobile broadcasting TV under its fixed and pay TV content codes. The

argument is that in most countries (e.g., the EU) children are protected from indecent and inappropriate content broadcast on MTVS in the same way as on broadcasting TV services. As mobile TV is likely to attract young users, the MDA justified its mobile TV content regulation by saying it is intended to protect vulnerable user groups.

As mobile TV is an emerging industry, there is no policy model that can be directly imported into Singapore's unique context. Keeping a technology-neutral and market-driven approach, the consultation paper and MDA interviews (Ling, 2009; Teo, 2009) revealed that Singapore's mobile TV policy will be stringent in content regulation and licensing, even though some industrial players prefer the light-touch class license. The economic downturn increases the risk of launching commercial mobile broadcast TV. With deep concerns about MTVS's commercial viability, the MDA emphasized they would not force the launch of MTVS when the market and business models is premature (Ling, 2009). While industrial players are waiting for the implementation of MTVS policy and expecting the government to invest in the infrastructure establishment, the MDA is taking a consultative and collaborative approach to have open dialogues with the industrial players before the final decision is made.

4. Recommendations and Conclusion

Mobile TV is currently one of the dominating issues in the telecommunications industry. Its convergent nature creates legal and regulatory challenges similar to IPTV. However, its characteristics of mobility, ubiquity, and multicast are likely to bring even greater social and economic impact. Singapore has two important decisions regarding mobile TV policy: whether 3G TV and nascent mobile broadcast TV should be regulated under similar policies; and which regulatory framework – broadcasting TV act, amended broadcasting policy, or information service policy – should be used to regulate them.

Regulations usually trail behind fast-changing technological advancement, which is why mobile TV brings challenges to existing regulatory frameworks. Many countries, like Singapore, Italy, and South Korea, apply original or amended broadcasting TV acts to regulate mobile TV, especially mobile broadcasting TV. The Broadcasting Act was made decades ago to regulate terrestrial TV operators to serve public interest and universal service as they use the scarce spectrum to broadcast TV content massively. There are heated debates on whether fixed broadcast TV regulation is applicable to the TV-on-the-go technology which encompasses broadcasting TV content, live channels, downloadable mobile videos, and interactive services. Curwen and Whalley (2008) argued that the broadcasting act could not be applied to mobile TV, because it tended to be highly rated – particularly in terms of content – and public service provision was often financed via a compulsory user license. Due to the convergent nature of mobile TV, it is inadequate to use the old, public-trustee Broadcasting Act to this emerging mobile platform. Neuman et al. (1997) proposed an “Open Communications Infrastructure” policy framework as a new regulatory approach to lift distinctions between broadcast or switched-communications services, and content and conduit. It is important to realize that old media laws cannot address mobile TV's unique characteristics – unicast (personalized), multicast, interactivity, ubiquity – and its complex issues. Policymakers can learn from IPTV's lessons to make new regulations or at least to modify existing laws significantly for mobile TV instead of using existing broadcasting policy.

Taking a technology-neutral approach, Singapore's MDA not only proposes to regulate mobile broadcast TV services under the broadcasting act, but also requires existing 3G TV operators to drop their light-touch class license scheme and re-apply for MTVS licenses (FBO, multiplex, and broadcasting service licenses). This raises the question of whether telecommunications or media services available on the same platform should be regulated by the same policy. The old medium, TV, provides a platform for terrestrial TV programmes, cable channels, PPV, VOD, and interactive content and these programming/services abide by different content codes and regulatory obligations. If unicast and multicast are two distinct content delivery modes of mobile TV services, different regulations should be imposed upon the two services, regardless of technologies (3G, MMBS, DVB-H, mobile broadband IPTV, etc.). Deploying one unified policy for distinct services on a convergent platform is not the best solution because it is unlikely to cater to their specific characteristics. This study suggests mobile TV policy should regulate multicast and unicast services separately if there are concerns that mobile TV broadcasting audience may include minors and vulnerable groups.

In fact, even though multicast mobile TV is similar broadcasting in nature, its power should not be overemphasized. The reach rate and coverage of mobile broadcasting TV, especially in the initial stage, is far behind terrestrial TV. In addition, if MTVS adopts a subscription business model, the user base will be much smaller than the audience for terrestrial TV's. Most importantly, the broadcast TV act is inadequate for regulating any convergent medium. If IPTV is not regulated by this broadcast TV act, there is no reason why this mobile platform – which incorporates communication, Internet, and multiple media (TV, radio, film, print) – should be.

Hence, in order to accelerate the rollout of mobile TV, a customized licensing scheme and light-touch content regulation are more appropriate for this new platform, at least till consumption hits critical mass.

Besides, the stringent broadcasting TV content regulation is likely to inhibit the rollout of mobile TV and discourage content/service innovation and diversity. Singapore's multi-cultural and multi-racial society requires tight censorship to maintain social order and harmony. It is understandable why the MDA has proposed the high-standard TV content code for use on mobile broadcasting TV and 3G TV. Singapore's case shows economic growth and political stability are two contradictory forces in its mobile TV policymaking. On the one hand, developing mobile TV is highly consistent with Singapore's national policy to become the media hub in Asia. On the other hand, Singapore is a conservative country comprised of multiple ethnic groups and religions, so content censorship is necessary to maintain social harmony. Inevitably, the strict content regulation curbs the creativity in Singapore's mass media content. Although Singapore's MDA emphasized the proposed market-driven MTVS framework encouraged competition and innovation, if it regulated both 3G TV and mobile broadcast TV under the broadcast act, it would be detrimental to the development of mobile TV. For instance, after the 2007 MDA consultation paper, industrial players have expected to have less innovative and safer content on mobile broadcasting TV services and they would not even consider user-generated content as it might cause controversy. The blossom of mobile TV requires not only cutting-edge infrastructure, but also good-quality, creative, and innovative content. Even though Singapore's MDA proposed to waive MTVS operators' obligations of public interest and place no QoS requirements, it is still difficult to foster the growth of the mobile TV industry, because the strict broadcasting act is not supposed to apply to the new medium directly. Thus, a light-touch content regulation is more suitable for this emerging and convergent new mobile platform.

Standards are critical to encourage investment in new ICT and bad technical choices for standards create high social cost (Neuman et al., 1997). The various standards of mobile TV give involved parties opportunities to develop their preferred proprietary standards and vie for prevalence in a country or region (Curwen & Whalley, 2008). The selection of technological standards usually involves politics, interests, compatibility to legacy/existing technology, sustainability, and cost. Uncertain mobile TV policy and standards increase the risk for industrial players involved. The mandatory standard, like South Korea's DMB, kicked off the take-up of its mobile TV industry. However, a small country like Singapore will find it hard to afford the high social cost of bad standard choices. So far, Singapore and many other countries have adopted a technology-neutral approach to mobile TV in order to avoid the risk of selecting inappropriate standards.

It is understandable why Singapore holds a conservative attitude towards the launch of commercial mobile broadcast TV. It involves a lot of uncertainty, like unsettled standards, nebulous business models and customer needs, and unclear policies, and it will be highly risky to invest in costly infrastructure and R & D in mobile content and services. What may frustrate 3G mobile operators or telcos more finally is if 3G TV and mobile videos start to slowly take off after the four-year trial-and-error and the MDA suddenly proposes to shift these services under a strict broadcast act, tighten content censorship, and require operators to re-apply for individual licenses. Singapore is currently the only country to recommend a strict regulation for 3G TV and mobile video services. The MDA's 2007 consultation paper indeed is at the extreme end of control in mobile TV policymaking, in contrast to the US's *laissez-faire* approach that applies Internet policy to all mobile TV services.

In conclusion, this paper has highlighted key issues concerning mobile TV policy, including 3G TV and mobile broadcasting TV. Singapore's case is used to illustrate how the advancement of mobile technology affects policymaking and the convergence in the mobile platform complicates regulatory considerations. This paper also analyzes the problems involved in mobile TV policymaking and raises doubts about the suitability of imposing existing broadcast TV regulations upon this emerging and convergent mobile medium. Singapore, like many other countries, has not finalized its mobile TV policy yet. At this moment, it is still too early to forecast how future mobile TV regulation will shape the development of Singapore's 3G TV and mobile broadcast TV and elsewhere. The only sure thing ahead is the great challenge to cut the Gordian knot of mobile TV regulation.

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