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Telecommunications Policy

URL: www.elsevier.com/locate/telpol

Convergence and regulation of multi-screen television: The Singapore experience



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ARTICLE INFO

Available online 5 July 2013

Keywords:

Multi-screen TV
Cross-platform video
Convergence policy
Platform neutrality
Audiovisual content regulation
Digital copyright

ABSTRACT

This article addresses complicated convergent and regulatory issues arising from cross-platform audiovisual services and analyzes Singapore's multi-screen television experience. A "platform neutrality" multi-screen TV regulatory scheme is proposed to concentrate on content classification in order to respond to the fast-changing audiovisual industry and competition. Under the scheme, different content and license regulations are applied to four types of TV-like services which are categorized by "socio-cultural impact" (i.e., broadcasting and mass market vs. VOD and niche market)" and "content production/aggregation model" (i.e., gatekeeping vs. participatory mechanism). In addition, competition, content regulation, and digital copyright are identified as key issues involved in the fast-growing cross-platform audiovisual media industry. Finally, this study analyzes market development, regulatory issues, and national plans for multi-screen TV services in Singapore and examines them under the proposed regulatory scheme. Market and policy recommendations are discussed.

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1. Introduction

The prevalent use of networked and wireless technologies has dramatically shaped the television industry in digitally advanced countries in video consumption, content creation, and distribution and business models. Convergent video technologies have allowed viewers to watch audiovisual content on TVs, PCs, and mobile phones since 2007 (AT&T, 2007). In recent years, many surveys showed the growth of multi-screen TV services worldwide. According to a multi-screen video survey in 56 countries (Nielsen Wire, 2012), TV continues to be the universal significant platform and online users watched videos on multiple screens increasingly due to timeshifting and enhanced picture quality. Nowadays multi-screen TV has become a global phenomenon and the Asia-Pacific region leads its growth (Nielsen Wire, 2011). However, offering cross-platform video services brings industry players new business opportunities and immense challenges with respect to content copyright and system and device interoperability issues.

Regulatory reform usually lags behind fast-changing technological advancements and industry developments. The emergence of internet and mobile networks blurred the silo structure¹ of traditional media and caused regulatory disputes in convergence policies. With various perceptions, jurisdictions across the globe take different approaches to regulate new video services, like IPTV (Cheah, Lim, Ong, & Teo, 2009) and mobile TV (Curwen & Whalley, 2008; Lin, 2010). The complicated multi-screen TV which involves various platforms, different delivery modes, and diverse audiovisual content brings even more regulatory disputes to the TV and telecommunication industries.

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¹ "Silo structure" refers to separate market and legal structures of broadcasting, telecommunications, and information technology industries, which is regarded as "pre-convergence." Different media are treated distinctly and regulated differently.

Singapore is the second most competitive global digital economy and the fifth most advanced country globally in ICT development and performance.² Like other tech-savvy countries, it is facing convergent and regulatory challenges brought about by cross-platform video consumption. As of December 2012, Singapore's wireless broadband penetration and mobile penetration reached 166.1% and 151.8% respectively, with more than 6.4 million 3 G mobile subscribers (IDA, 2012). To cope with dynamic convergent changes, the Media Development Authority of Singapore (MDA) officially launched the Singapore Media Fusion Plan (SMFP) in 2009 to strengthen the local media ecosystem and support innovative content creation (IDM, 2009). FutureTV, one of SMFP's media futures and an industry initiative, signifies its directions to develop multi-screen TV industry. Noted for strategic economic planning, Singapore, a microcosm of Asia, provides a suitable context for studying convergent and regulatory issues of developing multi-screen TV.

The emergence of internet and mobile technologies shapes existing audiovisual media's regulatory frameworks and business models. Multi-screen TV services are expected to bring a lot of adjustments to current regulatory frameworks for video platforms, services, and applications. This study aims to examine complex convergent and regulatory issues arising from global audiovisual services and analyze Singapore's future media blueprint, policymaking, and local stakeholders' coping strategies for growing cross-platform media consumption. It also proposes a regulatory scheme for multi-screen TV and makes recommendations for policy and industry development. The structure of this paper is as follows. After Section 2 reviews the global development of multi-screen TV, Section 3 discusses its regulatory issues and proposes a regulatory scheme. Section 4 gives an overview of audiovisual services in Singapore. Related regulatory issues and the national blueprint are addressed in Section 5, which also examines Singapore's audiovisual services under the proposed multi-screen TV regulatory scheme. The final Section discusses conclusions reached and makes recommendations. This study of the rapidly growing audiovisual industry and cross-platform video consumption can shed light on potential improvements to policymaking and market development for multi-screen TV at a time when many countries are still pondering optimal solutions.

2. Global multi-screen TV trends

Due to the advanced broadband network, wireless ubiquity, and digital convergence, TV has progressed to the third generation of individualized TV (Noam, 2008, p. 3) which can be watched on various screens. Initiating the trend of media convergence, the internet provides a channel for content providers to redistribute existing programming and empower users to create personal content. Internet Protocol Television (IPTV) poses as a new form of interactive and personalized entertainment, communication, and information. It is categorized into a wall-garden pay TV model and a free web TV model (Good, 2008). Asia-Pacific is the second largest IPTV market worldwide (Azuri, 2011). Based on modes of content delivery, mobile TV services are categorized into "mobile broadcasting TV" that transmits content with a scheduled timetable over broadcast networks and "unicasting mobile video" that delivers user-selected videos over cellular networks (Kumar, 2007, p. 5). Asia is viewed as a hotbed for mobile TV development due to its advanced mobile technologies and commuting lifestyles. Connected consumers in Asia-Pacific are more likely to use mobile videos than the global average, especially among youths (Nielsen Wire, 2012).

According to the multi-screen video survey (Nielsen Wire, 2012), 74% and 56% of internet users worldwide watched online videos and mobile videos respectively. Armed with smart TVs, smartphones, and tablets, consumers nowadays want multi-screen services to seamlessly deliver premium content with diverse features and quality of experience (QoE). In January 2011, Nielsen reported that US consumers spent 45% more time watching multi-screen videos from home and work compared to previous year (Nielsen Wire, 2011). Enhanced TV viewing experiences offered by new technologies (e.g., HDTV, interactive TV, 3DTV and over-the-top TV (OTT)) kept them staying tuned to multiple screens. Bell Labs pointed out a dramatic shift in viewing habits from broadcasting content to video-on-demand services (Clancy, 2012). The popularity of OTT has been forecast to grow and even overtake IPTV (Cottle, 2011). However, OTT service operators must narrow the substantial gap between viewer penetration and low advertising revenue.

As consumer demand for "TV everywhere" takes off, companies which offer adaptive multi-screen transcoding solutions show impressive revenue growth in recent years (Media Excel, 2011). Stakeholders in the TV, telecommunications, and computer industries have been striving to provide integrated solutions for seamless switching between multi-screens. Developing interoperable technologies for switching among screens and systems is crucial to ensure users' optimal experience when watching their content across platforms with diverse video services and business models. For example, AT&T uses a three-screen integrated system, to deliver content, applications, and services across TVs, computers, and mobile phones (AT&T, 2007). Apple provides easy video and application transferring among iOS devices; Microsoft develops cross-screen access to videos via Windows, while Google integrates its Chrome OS and Android platforms to make videos run on all of them (Krazit, 2009). Delivering videos from networks and from the cloud to smartphones, tablets, and TVs present new revenue opportunities for stakeholders if challenges of maintaining high quality audiovisual services to consumers can be overcome (Clancy, 2012).

Traditional TV operators (e.g., broadcasters and cable TV) and content providers are attempting to capitalize on multi-screen viewing trends. Ericsson which provides multi-screen TV solutions suggests that broadcasters and pay TV providers should tap into the new revenue stream of video consumption on smartphones and tablets (PRlog, 2011). Alcatel-Lucent

² Singapore was ranked by the World Economic Forum as the second most competitive global digital economy in 2011 (BBC News, 2011) and the fifth most advanced country globally regarding ICT development and performance according to International Telecommunication Union's 2007 digital opportunity index.

research (2010a) provided solutions to deliver compelling multi-screen services. Besides, incumbent TV operators make efforts to repurpose content for cross-platform distribution and monetize shifting business models. With a variety of connected devices and content, the pioneering BBC iPlayer service reaches millions of users in the UK. Coverage of popular sports events like the 2010 FIFA World Cup raised broadcasters' interest in providing multi-screen services to appeal to a massive worldwide audience (Alcatel-Lucent, 2010b). After ESPN broke viewership records in the US market by making live tournament coverage available on TVs, PCs, and smartphones, the lesson learnt is that different screens complement one another and increase audiences' total viewing time. Following the inevitable multi-screen trend, media companies and content creators distribute cross-platform videos to increase their reach to audiences and increase overall synergy.

Seeing the business potential of multi-screen convergence, increasing video content, services, and applications have been introduced to audiences by many industry players including telcos, the computer and internet industry, broadcasters, and mobile application developers. Since 2008, AT&T consumers could watch NBC Universal's coverage of the Beijing Olympics Games on TVs, PCs, and wireless devices (AT&T, 2007). Increasingly, players including LG, Panasonic, Philips, and Google, are vying to winning the "smart TV" war. To improve the sluggish market demand, Apple TV (iTV), the first digital IPTV player, was launched, a lighter and cheaper second generation unit with improved three-screen connectivity. In early 2011, Google collaborated with Sony and Logitech to introduce Google TV which uses an Android-based system to offer video viewing across TVs, PCs, and mobile screens. In addition, Samsung Electronics' HDTV-based mobile app store is rapidly gaining traction with application developers and users (Relaxnews, 2011). Different strategic advantages and cost structures (e.g., entry cost, fixed cost, and marginal cost) have impact on how content/services provided by different stakeholders are packaged, priced, and delivered to audiences.

For the successful three-screen TV business as a whole, the key to multi-screen integration is to create ubiquitous "cloud" content working seamlessly across multi-platforms (Davidovitz, 2010) and develop platform independent devices with interoperable capabilities (O'Neill, 2009). With compelling content and seamless viewing experiences, multi-screen TV operators can strategize packages for users to consume cross-platform videos with reasonable pricing schemes. The new business models of multi-screen strategies require consideration of how to accommodate various types of video services, delivery, and advertising in addition to managing digital copyright issues.

3. Global multi-screen TV regulatory issues

3.1. Lessons learnt from convergent audiovisual services

Global policymakers are still dealing with controversies of video consumption across platforms and developing regulatory frameworks to tackle the complicated multi-screen TV development. Nowadays, internet and mobile networks have become crucial in distributing audiovisual content, and relaxing cross-ownership rules lead to fast development in audiovisual markets. Services on the internet remain primarily unregulated as information and mobile phone services belong to telecommunication services which usually do not involve content issues. However, IPTV and mobile TV are somewhat different species that lead to regulatory classification problems and competition between the telecom and the broadcast industry in many countries. Understanding IPTV and mobile TV regulatory bottlenecks can shed light on the directions of multi-screen TV regulations.

Classifications of new audiovisual services cause various regulatory decisions. IPTV services which are divided into a paid wall-garden type (closed content distribution networks) and a free web-based type (video streaming over the public internet) brought the first convergent conundrum for audiovisual service regulation (Dwyer, 2007). Some suggested the development of IPTV moves from "broadcast" to "on demand," from "push" to "pull" which requires calling for new regulatory frameworks (Tadayoni, Henten, & Skouby, 2007). Other countries categorize IPTV operators as broadcasting distribution companies (e.g., Canada) or internet multimedia broadcasting businesses (e.g., South Korea). The Canadian Radio-Television and Telecommunications Commission (CRTC) and the Korean Broadcasting Commission (KBC)³ treated IPTV similarly to existing TV services and applied the Broadcasting or Cable TV Act to regulate it (Tadayoni et al., 2007). Moreover, some jurisdictions classify IPTV services based on the degree of interactivity and differentiate "broadcast" and "VoD" components of IPTV (InfoDev & ITU, 2012). The European Union (EU) countries and New Zealand regulate linear programming (transmitted at a scheduled time) to broadcasting and content regulations, but their non-linear programming (selected by users' preferred time and modes) are subject to light-touch rules. EU's IPTV providers are subject to the pay TV content code with some must-carry obligations (InfoDev & ITU, 2012).

IPTV licensing is cumbersome in some countries, like the US and China. Hildebrandt (2007) argued that IPTV with its new characteristics of interactivity should be regulated differently from the existing cable regulation and franchise framework. To unlock new media's potential and encourage new entrants, the FCC suggested IPTV should be subject only to federal jurisdiction like VoIP, thus exempting it from any local and state regulations (Hildebrandt, 2007). Even though IPTV is regarded as an information service by the FCC, it still needs to get a license from the local or state government (Taylor &

³ The Korean Broadcasting Commission (KBC) oversaw Korean broadcasting industry during 2001–2007. It set the regulations for IPTV and mobile TV (e.g., DMB). In 2008, a new convergent regulator, the Korean Communications Commission (KCC), was established to govern both broadcasting and telecommunications industries.

Zhang, 2005). In comparison, China controls IPTV strictly and commands consolidation and incorporation of provincial cable operators (Liu & Jayakar, 2012). IPTV is still under heavy regulation in China with respect to licenses and content regulation. The providers must have permissions from several state agencies and obtain a permit from the State Administration for Radio, Film, and Television (SARFT) for broadcasting services and from the Ministry for Information Industry (MII) for value-added services (Tadayoni et al., 2007). They are also subject to censorship of audiovisual products under the General Administration of Press and Publication (GAPP).

In addition, rights clearance is a significant barrier to entry in the IPTV market (Ganley, 2007). In early 2006 Ofcom pushed the industry to accept “new media rights” and outlined a windowing system of rights to assist industry negotiations (Ganley, 2007). Later, PACT (the UK trade association for producers in film, television, and interactive media) negotiated “new media rights” deals with the BBC, ITV, and Channel 4 to provide an extended period of time to view programs after initial transmission. Their agreements signified the shift to on demand TV (e.g., IPTV). IPTV operators also need to deal with copyright issues for transnational videos. In September 2006, WIPO’s proposed broadcast treaty created a new layer of intellectual property rights designed to prevent transmitted audiovisual material from signal piracy (e.g., capture, conversion, and retransmission of copyrighted content.) The draft treaty stated the exclusive 50-year “right of retransmission” of “broadcasting” and “cablecasting” content, including exclusive rights of communication to the public, fixation, reproduction and distribution (Ganley, 2007).

As videos can be accessed via the internet globally, the difficulty of content acquisition that IPTV or internet video service providers face is to obtain multi-jurisdictional rights clearances in every territory where their transmission can be accessed (Cheah et al., 2009). Some suggested such content copyright should be handled by a central authority who facilitate cross-border clearance of rights and by local authorities who offer licenses with nondiscriminatory and reasonable principles (Summer, 2008). Meanwhile, digital rights management (DRM), geo-coding, and watermarking technologies have become essential means to manage user accessibility and track video content distribution (Ganley, 2007). It is necessary to develop new commercial and technical solutions to reduce the rights clearance burden.

Most countries apply loose regulation of content and licensing to “unicasting cellular mobile TV” due to its impact on niche markets. However, the emergence of “mobile broadcasting TV” has highlighted discrepancies in regulatory decisions because some are concerned about its potential to reach mass audiences (Lin, 2010). Currently, the majority of regulatory bodies in the world apply original or amended digital broadcasting TV rules to mobile TV services (MTVS) (MDA, 2007). For example, KBC defines Digital Multimedia Broadcasting (DMB) and IPTV as “a special or new media broadcasting” to be regulated under the framework of traditional broadcasting and operators ought to obey key broadcasting principles and public interests (Tadayoni et al., 2007). Similarly, the Italian communications regulatory authority amended digital terrestrial TV regulation to extend to MTVS (InfoDev & ITU, 2012).

In contrast, mobile TV services (both cellular mobile TV and mobile broadcasting TV) in the US are classified as information services which are not subject to broadcasting rules and regulations (InfoDev & ITU, 2012). The Canadian regulator, CRTC, which found point-to-point mobile TV less impactful than traditional broadcasters exempted this emerging audiovisual service from licensing or other requirements of the Broadcasting Act of 1999 and 2006. The CRTC believed imposing strict broadcasting regulations on MTVS may delay its development (InfoDev & ITU, 2012). But it has yet to determine the regulation of dedicated point-to-multipoint mobile TV systems. Moreover, most countries apply their IPTV licensing frameworks and impose TV content regulations on MTVS (InfoDev & ITU, 2012). To facilitate the growth of the nascent MTVS, Lin (2010) recommended regulating content and licensing of unicast (non-linear) and broadcast (linear) MTVS separately with a light-touch mobile TV policy.

3.2. Regulatory issues of multi-screen TV

Like IPTV and mobile TV, the emerging multi-screen TV brings tremendous challenges to policymaking and regulations. In adopting a TV-centric approach it is politically easy to maintain existing interests and status quo by using extended TV regulations for managing licensing and content across all screens (Noam, 2008). However, such an old model is not appropriate to regulate emerging multi-faceted cross-platform audiovisual services which are constructed by complicated technologies and a huge volume of transnational videos. The regulatory concerns over multi-screen TV services include four key issues: separately regulating content and platform, content regulation, competition, and copyright issues.

3.2.1. Separately regulating content and platform

According to Flew (2012, p. 5), media convergence shifts from “silos” of vertically-integrated industry and sector-specific regulation to a series of horizontal layers of infrastructure, content/services/applications, and access devices. Which kinds of regulatory agencies are suitable to be in charge of policymaking for convergent new media like multi-screen TV? Should they handle network and content regulation together or separately? Based on economic considerations, Grove and Baumann (2012) stated that separately regulating infrastructure and content/services of convergent media could increase efficiency in resource allocation. To cope with complex media convergence, KCC⁴ suggested a two-tier framework to regulate content and

⁴ The Korea Communications Commission (KCC) is the current convergent regulatory institute that governs Korean broadcasting and telecommunications industries. It accommodates policymaking and regulation together and chooses a commission model as a new organization style.

platform separately with a network neutrality approach (Van Oranje et al., 2008). While content regulation focuses on societal, cultural, and economic values (e.g., protecting minorities, promoting production, and distribution, and property rights), platform regulation prioritizes consumer protection and fair competition. KCC supports the regulation of network technical standards, price, and market power (Van Oranje et al., 2008). When most suggested separate regulations of content and platform of convergent media (Noam, 2008), some pinpointed the significance of not overlooking their interconnection (Kim, 2011).

Also, a technology-neutral approach is advisable in regard to infrastructure (Henten, Samarajiva, & Melody, n.d.), such that videos are not treated differently based on delivery platforms (e.g., TV, internet, or mobile). Flew (2012) pointed out that the main challenge in achieving platform neutrality was the classification of similar media content by simply extending the rules developed from one media platform to another. In 2012 Australian Law Reform Committee (ALRC) issued the final report “Classification-Content Regulation and Convergent Media” which emphasizes “platform neutrality” to focus on content rather than platform or means of delivery. The reason why ALRC minimized platform-based distinctions in the context of media convergence was to maintain an adaptive regulatory framework for future media developments. Imposing minimum regulation for emerging audiovisual services can encourage investments (Storsul & Syvertsen, 2007). To foster nascent multi-screen audiovisual services, it is beneficial to apply light-touched regulations similar to information services for next-generation media (Lin & Liu, 2011; Noam, 2008).

3.2.2. Content regulation

To cope with challenges brought about by rapid video technological advancements and cross-platform TV convergence, the EU has amended regulations of TV-like services several times after the emergence of IPTV. It first focused on settling contentious issues to make distinction of regulating “linear” (conventionally scheduled TV broadcasts) and “non-linear” (on-demand, interactive video, or IPTV) audiovisual services (Mercado-Kierkegaard, 2006).⁵ It proposed to apply lighter content rules to “non-linear” audiovisual services compared with “linear” ones (Edgecliffe-Johnson, 2006).

In 2007 the European Parliament announced Audiovisual Media Service (AVMS) Directive, EU’s latest regulatory framework coping with dramatic changes of video technologies, which aimed to ease regulatory burdens on new audiovisual service providers (e.g., IPTV and mobile TV). It amended TVWF’s key provisions but still applied some traditional TV content rules to non-linear audiovisual services. This reregulation of digital media services was interpreted as EU policymakers’ proactive step to protect cultural content (Chakravarty & Sarikakis, 2006, p. 105). However, many criticized that its over-regulation disfavored emerging audiovisual services (Outlaw.com news, 2006; Van Eijk, 2007). In 2010, AVMS’s scope extended to all types of TV-like services to ensure fair competition. Based on a two-tiered framework, this directive regulates linear programming strictly but applies only a basic set of public interest principles to non-linear services. By June 2011, 24 of 27 EU member states had applied this directive and its provisions as national laws (ACT, n.d.).

In principle, the more pervasive impact of innovative TV services on society, the stricter the content regulation. Traditional TV content regulation obeys strict public interest obligations like diversity of programming quality, children protection, standards in taste and decency, and restrictions on advertising for consumer rights (Kim, 2011). When multi-screen TV services are regarded as similar to broadcast TV, they are subject to stringent content regulation for public interest. Comparatively, some that treat emerging audiovisual services as information services impose minimum rules on content in order to facilitate the growth of nascent markets. According to the AVMS Directive 2010, emerging audiovisual services are only subject to the basic tier of content regulation such as protecting the EU’s cultural products, human dignity and minors, prohibition of harmful and hate content, and imposing some advertising rules (DCEN, 2012). ALRC (2012) imposes regulations on Australia’s audiovisual services to obey public interest provisions, like protecting community interests, individual rights, diverse cultures, and minors.

3.2.3. Competition

The dichotomy between competition and public interest in content regulation is a dilemma of convergence regulations. Conflicts often occur in the attempt to balance cultural and economic goals (e.g., cultural diversity and competition) during developing a coherent convergent framework (Kim, 2011).

To develop multi-screen TV, it is critical to make policies to maintain fair market competition for all TV-like services regardless of content type or platform. It is also important to ensure local service operators to have market competitiveness against international players. To ensure fair competition, regulators must tackle the challenges in classifying emerging audiovisual services and making policy decisions appropriately (ACT, n.d.). When new policies emphasize a technology-neutral, pro-innovative approach, they aim to foster the nascent audiovisual services (Lin, 2010; Lin & Liu, 2011; Noam, 2008). For example, the AVMS Directive attempts to ensure optimal conditions of competitiveness and legal certainty for Europe’s media and information technology industries as well as maintain free and fair competition among linear and non-linear audiovisual services providers (EU, 2010). ALRC (2012) stressed that Australian classification regulation must encourage competition, innovation, and foster local media content and service providers in international markets.

⁵ In 2005 EU Commission proposed to amend the Television Without Frontiers (TVWF) Directive, the cornerstone of the EU’s audiovisual policy, to extend the regulations of “linear” services to “non-linear” ones. This aroused strong opposition from a neoliberal alliance which advocated redefining “linear” services and taking a self-regulation approach toward “non-linear” services (Edgecliffe-Johnson, 2006).

A vertically integrated media market structure is identified as an inhibitor for competition and convergence of audiovisual services and content. Hee (2007) criticized Korean vertical broadcasting market for allowing incumbents to enhance monopolistic positions and limiting the growth of emerging services, which impeded fair competition and public interest (e.g., content diversity). Comparatively, the UK's Communication Act enabled Ofcom to move towards a horizontal structure and regulate all types of networks neutrally and lower infrastructure entry barriers in response to convergent challenges (Hee, 2007). Thus, a technology-neutral horizontal approach is recommended to facilitate fair competition and development of new audiovisual services and content.

In response to fast-changing media convergence, self- and co-regulation are regarded as viable alternatives to traditional regulations (Van Oranje et al., 2008). Fostering self-regulation like voluntary codes permits the industry to respond quickly to emerging issues in a technologically fast-changing and convergent environment (Mercado-Kierkegaard, 2006). It is also advantageous for domestic audiovisual content and service providers to cope with global competition.

3.2.4. Copyright

In many countries, copyright protection plays a large role in relation to the regulation of cross-platform video services (Tadayoni et al., 2007). The internet allows users to deintermediate and watch or download on-demand audiovisual content. After peer-to-peer (P2P) reconfigured the distribution of audiovisual content, emerging TV technologies and services increased the complexity of safeguarding digital copyright. Existing copyright provisions have trouble keeping abreast of technological advancements to solve rights clearance and licensing problems (Ganley, 2007). While creative businesses exploit the new media technology and open up access to audiovisual content, there is no protection for business to make returns on their investment and creativity. Copyright indeed becomes central in convergence challenges caused by innovative TV services (Dwyer, 2007). When distributing digital audiovisual content across platforms and across border lines, how can copyright owners be protected by legal enforcement, content licensing schemes and new technologies (e.g., Digital Rights Management (DRM) technologies)?

New audiovisual regulations cannot emphasize enough the importance of copyright protection and keep track of technological advancements to solve rights clearance and content licensing problems. According to Geach (2009), the EU's AVMS Directive which provides the latest regulatory framework for emerging audiovisual services fails to address copyright protection of the innovative media sector and creates a loophole in the existing copyright protection regime by distinguishing between "television broadcasts" and "on-demand services." That is, the intellectual property rights (e.g., reproduction and public availability) of audiovisual content offered by on-demand only service providers are not protected by existing Directive 2001/29/EC (Copyright Directive). New multi-screen TV regulatory scheme should put audiovisual copyright concerns into considerations.

For video providers who offer user-generated content (UGC), they have to identify copyright owners and cope with the infringement of copyright (Ganley, 2007). These providers increasingly use applications to analyze UGC and compare the results against a database of known copyrighted content. After locating infringing content, they notify rights holders to make decisions to remove or, license and permit the content to remain on the site (Ganley, 2007).

The prevalence of UGC also stimulates the development of Creative Commons agreements which attempts to balance the protection of major media companies' intellectual property and individual creativity and privacy, thus allowing greater distribution of ideas. It also enables some content creators (e.g., BBC's iPlayer) to move to "some rights reserved" arrangements which allow the reuse of materials for non-commercial purposes (Dwyer, 2007). However, some criticized the current commons approach saying it was controlled by traditional TV and the government based on the potential for commercial incentives and economic growth (Geach, 2009).

Moreover, new platforms and content delivery modes complicate the judgments of viewers' copyright infringement (e.g., file sharing). There is ambiguity in categorizing some cases as criminal behavior and others as private use. For example, audiovisual providers offer PVR functionality "locally" by using a set-top box installed at customers' homes. There are several contentious copyright issues regarding the applicability of the timeshifting exception (Ganley, 2007). Also, uploading and sharing copyrighted videos on YouTube and social media are likely to get users into intellectual property infringement problems.

The fluid flow of videos across multiple screens which contain varieties of copyrighted content, Creative Commons content, UGC, and some copyrighted reserved content requires further cooperation of local, regional, and international legal authorities to deal with the complexity of intellectual property issues. As multi-screen TV services may trespass national territories and violate domestic copyright and children protection laws, the cross-boundary issues may be solved by new technological solutions (e.g., content access restriction rules pre-set in set-top boxes or consumer devices) complemented by customized local cultural policies. With respect to international copyright governance, the complicated multi-screen TV content copyright should be handled by a two-level cooperation: (1) a central authority to facilitate cross-border clearance of copyrights and negotiation; and (2) local authorities to offer licenses with fair and culturally sensitive principles (Summer, 2008).

3.3. Proposed multi-screen TV regulatory scheme

Recent regulatory reforms emphasize classification of innovative audiovisual content with a technology (infrastructure, network, platform, and standard) neutral approach (ALRC, 2012; Flew, 2012; Lin & Liu, 2011). To create an adaptive

regulatory framework for rapidly growing and complicated multi-screen TV services, this study proposes a “platform neutrality” approach and focuses on classification-content regulation of the convergent audiovisual media. It also supports to impose light-touch regulation on innovative TV-like services which benefits their future development to face increasing competition in international and domestic markets.

Some new audiovisual media regulations (e.g., the EU’s AMVS Directive) regulate linear programming strictly but apply light-touch principles to non-linear services. In addition, the technology-neutral approach suggests not to differentiate policy treatments based on video delivery and viewing modes. According to Kim (2011), broadcasting TV’s tight content regulation reflects its extensive impact on society and its mission to maintain socio-cultural values. The reason why linear (broadcast) TV services, compared with VOD services, should come under strict content regulation with public interest and cultural requirements is because of their huge socio-cultural impact on a large number of viewers. As such, market reach (i.e., mass market vs. niche market) which directly affects media’s socio-cultural influence is a key determining factor in classification-content regulation. To avoid the contentious linear and non-linear content categorizations, this study classifies “socio-technical impact” of multi-screen TV services into “broadcast and mass market” and “VOD and niche market” audiovisual services.

Varieties of traditional TV and new TV-like services can be categorized based on their content production and aggregation models. Conventional TV media (i.e., broadcast TV, cable and satellite TV) adopt a “gatekeeping mechanism” to hire trained professionals to produce and aggregate copyrighted audiovisual content. Only a few elites control when, how, and what content to be transmitted to their audiences uni-directionally. This top-down model allows content producers and aggregators to maintain tight control of the intellectual property of their creative products. On the other hand, their programming is subject to broadcasting or pay TV content codes. The regulators control conventional TV operators by issuing and renewing individual licenses over certain periods of time. After the emergence of the internet, innovative interactive media flourish which generates a diverse and participatory convergence culture. Jenkins (2006) stressed such convergence culture created a radical democratization of media use with looser control. He identified both a “top-down corporate/producer-driven process” and a “bottom-up consumer-driven process” that co-existed in the new media convergence. This turns the previously passive audience turns into active users of cross-platform videos and empowered prosumers who create their own UGC and contribute to audiovisual media’s content production and service innovation. Conventional TV operators (e.g., BBC, CNN) try to embrace the participatory culture to enrich their programming, engage audiences, and improve their fading viewership and ratings, while emerging audiovisual services (e.g., YouTube, Hulu, and Netflix) develop diverse content creation and aggregation models. The “participatory” mechanism encourages diverse content and plural voices; however, it also invites controversial copyright issues like piracy, illegal video reproduction, file sharing, and global right clearance challenges. Therefore, the two content production/aggregation models (i.e., gatekeeping mechanism vs. participatory mechanism) require different sets of rules to regulate their content and licensing.

Table 1 shows this study’s proposed platform neutrality regulatory scheme which classifies cross-platform audiovisual services into four categories based on the following criteria: “socio-cultural impact” and “content production/aggregation model.” Type I are audiovisual services which transmit schedule broadcasting content via a gatekeeping mechanism to a mass market. They have to apply for individual licensing and obey broadcasting TV content code due to high socio-cultural impact and tight content control of production and aggregation. Broadcasters fall into the Type I category which is subject to strict content and conduit regulations. Also, in providing on-demand videos with a gatekeeping mechanism Type II service operators (e.g., cable TV, wall-gardened IPTV, and OTT) should be regulated by on-demand TV content code (and/or subscription TV content code) with individual licensing. When service providers use a participatory model to aggregate diverse videos and services from a variety of content and services producers and UGC, the imposition of loose content regulation and light-touch licensing will encourage innovation and foster nascent market development. Type III audiovisual service operators (e.g., mobile broadcasting TV) transmit one-to-many videos and interactive services through the

Table 1
Multi-screen TV regulatory scheme.

Content Production/aggregation model / Socio-cultural Impact	Gatekeeping mechanism (Videos only)	Participatory mechanism (Videos+ Interactive services)
Broadcasting & Mass market	Type I -Broadcasting TV content regulation - Individual licensing (e.g. broadcaster)	Type III - Subscription TV content regulation - Less strict individual licensing (e.g., mobile broadcasting TV)
VOD & Niche market	Type II -VOD and/or subscription TV content regulation -Individual licensing (e.g. cable TV, IPTV, OTT)	Type IV - Self-regulation of content -Light-touch licensing (e.g., internet TV, cellular mobile services)

participatory mechanism. They come under broadcast or subscription TV content regulation⁶ and a less strict licensing scheme, at least at the initial developmental stage. Finally, Type IV providers (e.g., internet TV and cellular videos) that offer on-demand videos to a niche market through the participatory mechanism are subject to self-regulation of content and light-touch licensing similar to information services. By doing so, these innovative audiovisual services can have diverse content and creative business models. This regulatory scheme, which takes a horizontal approach to regulate multi-screen TV services, will foster the growth of content creation, aggregation, and distribution.

4. Development of multi-screen TV in Singapore

As a competitive digital economy with high broadband and mobile penetration rate, Singapore's government aims to build an Asian media hub. Due to the safe legal environment and sophisticated value chain, it is regarded as the springboard of international cable and satellite networks and global media companies to the Asia market. Singapore has a dual legal system to cope with media convergence: IDA is the regulatory body supervising carriers and infrastructure, while MDA governs media content and licensing issues. The local stakeholders in the multi-screen TV industry include MediaCorp (broadcaster), Singapore Press Holding (SPH) (print media organization), Starhub (cable TV operator and telco), Singtel (telco), and MobileOne (M1) (telco).

As timeshifting multi-screen video consumption becomes popular in Singapore, MediaCorp and Starhub run innovative audiovisual services over the internet and mobile platforms as additional distribution channels or news businesses in response to declining viewership. MediaCorp broadcasts seven free-to-air channels in four languages (English, Mandarin, Malay, and Tamil) and produces a wide range of local content distributed over TV, PCs, mobile phones, and tablets. Pioneering the rollout of DTV in Southeast Asia, MediaCorp's TV channels will go digital by the end of 2013 and move to high definition broadcasting by 2016.

MediaCorp's TV news has started cross-platform distribution. After on-demand news on Channel News Asia's (CNA) website gained popularity, it started to provide 3 G mobile news in 2006. In April 2010, MediaCorp collaborated with Microsoft to launch a free VOD website, XinMSN.com, to attract a younger audience. Matching Singaporeans' busy lifestyle and timeshifting video consumption habits, XinMSN became Singapore's top portal and entertainment site (MediaCorp, 2010). Its popular channels include Catch-Up TV (playing past episodes from MediaCorp TV shows) and Xfirst (showing premiere webisodes). Under the SMFP, MDA's 360 TV scheme encouraged experimental webisode proposals for XinMSN.

MDA and IDA supported MediaCorp in developing interactive TV as part of the Next Generation Nationwide Broadband Network (Next Gen NBN). In late 2012, MediaCorp's beta preview OTT, "Toggle," transmitted news and entertaining programming from its FTA channels and web videos to multiple devices (CNA, 2012). In February 2013, Toggle launched a 21-day free preview campaign. Its content includes free local content (e.g., FTA channels, Catch-up TV, and CNA streaming news) and paid a la carte channels and movies. Toggle, a multi-screen TV service, can be viewed on the internet and mobile platform via smart TVs, computers, mobile phones, or tablets. By mid-2013, Toggle will be available for overseas Singaporeans.

Starhub, the only local cable TV operator, also runs broadband internet and mobile businesses. It provides bundled services for fiber broadband, cable TV, and home phone line with promotional prices. After 2007, it faced competition from Singtel's paid IPTV, mio TV. In June 2009, Starhub Cable Vision (SCV) switched to full digital with 15 HD channels and VOD or DVR services. Starhub's TV on mobile services has been available since 2009. Its pre-paid 3 G mobile phone users pay little monthly fee to watch dozens of streaming TV channels without data charge. In July 2010, Starhub participated in the FutureTV plan and collaborated with MediaCorp and Singtel in the MDA-initiated 3DTV trial. So far, Starhub has not used the internet platform to provide video services.

After MDA awarded Singtel a national IPTV license, the telco launched mio TV in July 2007, which brought competition to a previously monopolized pay TV market. Viewed from PC or TV screens, it offers HD channels, VODs, and interactive services like DVR and EPG. In May 2008, mio TV on mobile started to offer streaming content/services via GPRS or 3 G networks. The competition between SCV and mio TV resulted in the widespread use of exclusive carriage agreements (ECAs) with content providers (MCI, 2010). As MDA claimed the ECA-centric competition caused high costs of exclusive TV content and fragmented viewership, it mandated both companies to cross-carry each other's content acquired after March 2010.

After SPH obtained a "niche" IPTV license, RazorTV (a made-for-Internet content creator), was launched as Singapore's first webcast TV portal in August 2008 (Lee, 2008). In order to engage young viewers, RazorTV offers free professionally-made short videos with sensational and hyperlocal appeal (Hou, 2008). RazorTV features timeshifting viewing, interactivity, and the ability to comment on videos. After 2008, its content was distributed and promoted on social media and via mobile apps. Due to the prevalent web video consumption, Singapore is ranked as the top 11 IPTV market in Asia-Pacific (Business Wire, 2011).

In November 2010, M1 offered 1Box, Singapore's first OTT to connect TV with the internet and stepped into the pay TV market partially (M1, 2010). With a paid rental set-top box (STB), M1 users can enjoy 1Box's value-added services. To appeal to audiences without computers, 1Box provides free web videos and music and paid premium content/services (e.g., educational programming, games, and PPV films). The rollout of 1Box is slow. MediaCorp's Toggle is likely to compete strongly with 1Box which lacks compelling local content.

⁶ The reason why Type III audiovisual services are subject to subscription TV content regulation (not broadcast TV code) is because their viewers, unlike broadcast TV audiences, must subscribe or register for the services and purchase specific reception devices before watching them.

Table 2
Multi-screen TV operators and services in Singapore.

Operator	TV service	Internet audiovisual service	Mobile audiovisual service	Three-screen services (TV, PC and mobile)
MediaCorp TV	7 FTA digital channels	XinMSN.com	XinMSN.com (mobile internet)	Channel News Asia (CNA) Toggle (OTT)
Starhub	15 digital HD cable TV channels & VODs	x	Starhub TV on mobile (Different from SCV's content)	x
Singtel		mio TV	mio TV on mobile 3G TV (cellular mobile TV)	mio TV
SPH	x	RazorTV	RazorTV (mobile internet or downloaded clips)	x
M1	x	1Box (on Internet or TV)	MeTV (cellular mobile TV)	x

Singapore's cellular mobile TV services were offered by the three telcos in 2005. However, the take-up of these services, like Singtel's "3 G TV," was sluggish. M1 was the only telco that created original mobile videos with MediaCorp and launched a popular innovative service, MeTV, which integrated social media and UGC (Lin & Liu, 2011). During 2007 to 2008, two DVB-H mobile broadcasting TV trials took place in Singapore. TV2GO, a year-long trial, was first launched in June 2007 by Singapore Digital, which involved 100 trialists to use 10 foreign TV channels and interactive services (e.g., voting). During 2008 Beijing Olympics, MediaCorp, Starhub, Singtel and M1 started another three-month mobile broadcasting TV trial (Lin, 2010). Their 300 trialists could watch live broadcasts of the Olympics Games and 14 local and foreign channels. Comparatively, the new entrant, TV2GO, lacked an existing mobile user base, local content, and local market experience (Lin & Liu, 2011). More than two years after submitting the trial reports, MDA finally announced the new mobile TV policy in April 2011. (Table 2) shows various cross-platform audiovisual services provided by key operators in Singapore.

5. Multi-screen TV regulatory issues in Singapore

The Singapore government develops the media industry to foster digital economic growth and societal well-being. Its dual regulatory system – IDA supervising the infocomm infrastructure, and MDA managing media licensing and content – efficiently works to cope with convergent issues of the audiovisual media industry.

5.1. IPTV and mobile TV regulatory frameworks

Singapore has laid the regulatory foundations for the launch of IPTV since January 2007. Online audiovisual services are regulated by a class license scheme, a light-touch regulatory framework, as MDA realized the decentralized and borderless nature of web videos. Under the Broadcasting Act (Cap. 28), IPTV providers in or from Singapore must obtain a service provider license and a content license (Cheah et al., 2009). With respect to the service provider license, a two-tier model (national vs. niche market) was applied to encourage the growth of IPTV. For the 10-year Nationwide Subscription TV License, online video services, like Singtel's mio TV, must reach over 100,000 subscribers (mass markets). Service providers for no more than 100,000 subscribers (niche markets), such as RazorTV, should apply for a five-year Niche Subscription TV License as it lowers the entry barriers for nascent small-scaled IPTV businesses (Lee, 2008). As for content regulation, mio TV is regulated by the Subscription TV programming code similar to SCV, while RazorTV which provides on-demand web videos for the niche market has light-touch content rules and less obligations in must-carry content and advertising (Lin, 2010).

Compared with IPTV regulations, Singapore's mobile TV policy raised more debates after the emergence of mobile broadcasting TV technology. Classified as niche information services, Singapore's cellular video services initially were regulated under a light-touched Class License Scheme, similar to IPTV services. However, given that mobile broadcasting TV has potential to reach mass market, MDA's 2007 consultation paper proposed to re-regulate all mobile video services as fixed digital broadcasting (Lin & Liu, 2011; MDA, 2011b). Cellular mobile services were suggested apply for new licenses, including a multiplex license and a broadcasting service license from MDA under the Broadcasting Act and a Facilities Based Operator (FBO) license from IDA under the Telecommunications Act (Lin, 2010). Instead of using self-regulation to exercise discretion, mobile videos would then be subject to different TV programming codes. MTVS operators could apply for the niche licenses for initial development (MDA, 2007). However, the three telcos argued that shifting cellular mobile TV services into the broadcast regime would defer investment and service growth for the nascent industry. Lin (2010) pointed out that regulating mobile videos homogeneously as digital broadcasting was contradictory to MDA's "pro-innovation" principle as laid out in its 2007 consultation paper.

In 2011 MDA perceived mobile TV as high impact and personalized new media and decided to regulate the new audiovisual services with an individual broadcasting scheme and a two-tier license framework (MDA, 2011b). MDA's latest mobile TV policy will issue multiplex licenses, including a 10-year national service license and a 5-year niche service license. This dual threshold criteria of dividing a mass or niche service by the daily reach of any single channel of 100,000 viewers or the daily reach of a broadcaster of 250,000 viewers respectively. As for content regulation, broadcast and subscription TV

codes are applied to mobile TV services. MDA does not impose obligations of public service broadcasting and advertising cap to mobile TV services, but they serve public interest by facilitating access to FTA channels in Singapore. MDA called for mobile broadcasting TV proposals and made the decision to migrate cellular mobile operators from the Class License regime to a new mobile TV licensing framework (MDA, 2011b). Currently, MDA is waiting for industry players' MTVS proposals and changing cellular mobile operators to the new licensing.

5.2. FutureTV national blueprint

To set Singapore as a global media city and Asia's media hub, MDA launched the national media blueprint, SMTP, in June 2009 to catalyze the growth in interactive digital media (IDM) and propel the development of future media (IDM, 2009). Building on the plans of Media 21 and Asian Media Hub, the SMFP is MDA's response to the rapidly changing global media landscape by transiting this country to a creative economy and enabling the creation of future Asia media (IDM, 2009). The SMFP initiatives strengthen Singapore's media ecosystem, fuel innovative content/service creation with global appeal, and develop world-class talent (MDA, 2010a). In this blueprint, Mediapolis@one-north, Singapore's first digital media hub, has been established to encourage media startups, incubate IDM's research and development (R&D) companies, and develop future media (MDA, 2011a). By 2020, the hub will be completed to house state-of-the-art facilities for IDM R&D and production.

FutureTV, an industry initiative of SMFP, was implemented in mid 2009 by a partner network of 13 MDA-supported founder companies, including local companies (i.e., MediaCorp, Starhub, Singtel, and M1) and international alliances (e.g., Microsoft and Motorola) (IDM, 2011). With MDA's endorsement, the advantages of the FutureTV partner network is to leverage on each other's capabilities and resources to fuel TV's innovative offerings and access global markets. FutureTV's key mission is to use Singapore as a test-bed for developing cross-platform audiovisual media and finding new business strategies to monetize multi-screen TV services. MediaCorp's immersive OTT is one of the recent projects. Through R&D and attractive global talents, the SMFP ensures local capacities to keep pace with global media breakthroughs and technological advancements and thus prepare for Singapore's multi-screen TV development.

Project NIMS (Next Generation Interactive Multimedia Application and Services) is another national project that provides the impetus for innovative audiovisual services in Singapore. In 2009 IDA and MDA launched Project NIMS to facilitate the infrastructure development and improve capabilities for IDM industry ecosystem. The two regulators held several industry dialogs to discuss possible commercial, regulatory, and technical models to implement interactive IPTV riding on the Next Gen NBN. In September 2010, IDA and MDA requested the proposal for one NIMS platform operator to develop and deploy a national video delivery platform and a universal Common Feature STB for cross-screen and cross-system video viewing without switching costs (MDA, 2010b). They received three bids from M1, SingNet, and StarHub in August 2011. However, after a two-year evaluation, IDA and MDA decided not to award the contract to any one as none would achieve the desired outcomes of minimizing consumers' inconvenience to access multimedia content, applications, and services from multiple providers (IDA-MDA, 2012). Technically and politically, it is difficult to build a national integrated platform and a universal STB for multi-screen TV services, even for a small country like Singapore.

5.3. Proposed multi-screen TV regulatory scheme for Singapore

Prior studies (Grove & Baumann, 2012; Storsul & Syvertsen, 2007) and industry reports (Lein, 2011) do not support the regulation of multi-screen videos based on delivery platforms. In Section 3.3, this study proposed a multi-screen TV regulatory scheme to regulate audiovisual services based on content variations in "socio-cultural impact" (i.e., broadcasting and mass market vs. VOD and niche market) and "content production/aggregation model" (i.e., gatekeeping mechanism vs. participatory mechanism). Under this scheme, Singapore's old and new audiovisual services can be divided into four categories which apply different licensing and content regulations. MediaCorp's terrestrial TV falls in the Type I category which broadcasts content through a gatekeeping mechanism nationwide. It is subject to a strict broadcasting licensing scheme and broadcasting TV code, due to high impact to mass audience and tight control of content creation and aggregation. Service providers that offer on-demand videos for niche markets via a gatekeeping mechanism, like Starhub's SCV⁷ and Singtel's mio TV,⁸ SPH's RazorTV,⁹ and MediaCorp's Toggle,¹⁰ ought to obey the VOD content code (or/and subscription TV code) with an individual licensing scheme. In order to foster the development of innovative services, Type IV services which adopt a participatory mechanism to produce and aggregate on-demand programming and services to niche markets should use self-regulation for content and apply for light-touch licensing (e.g., class license scheme) similar to

⁷ Starhub TV's SCV and Starhub on mobile are operated separately on TV and mobile platforms with different programming and packages. SCV is Type II but Starhub on mobile whose programming overlap with SCV's need not apply for a new licensing and its content is regulated by the subscription TV code.

⁸ Singtel's mio TV, a kind of three-screen TV, offers the same content/packages to be viewed on PCs, TVs, and mobile platforms. It is categorized as Type II which is subject to IPTV's national licensing (relatively strict) and paid TV and VOD content regulation.

⁹ Although RazorTV's is free access, its content is created and aggregated by SPH professionals. It is different from UGM, like YouTube. Hence RazorTV is categorized as Type II.

¹⁰ MediaCorp's OTT service, Toggle, is a subscription service available on TV, PC, and mobile. Its wall-gardened system shows audiovisual content, including FTA channels, paid premium programming, and online videos. It should be regulated as a Type II service.

information services. MediaCorp's XinMSN and M1's MeTV and 1Box which offer varieties of videos (professionally made channels and UGC) and innovative services (e.g., EPG) belong to this category. However, there is no Type III audiovisual service available in Singapore. Future mobile broadcasting TV services belong to this category.

6. Conclusions and recommendations

When examining complex media convergent and regulatory issues arising from multi-screen TV services, the latest legal developments suggest “platform neutrality” is the best approach to regulate different audiovisual content classifications regardless of delivery platforms, networks, or technological standards. Minimizing platform-based distinctions in the context of media convergence is advisable for maintaining an adaptive regulatory framework for fast-changing cross-platform audiovisual media (ALRC, 2012). To foster nascent cross-platform audiovisual services, light-touch regulations for information services are suitable for encouraging new entrants, investments, and innovation. In addition to audiovisual content/service classification, content regulation, competition, and copyright issues are identified as key factors shaping the development of fast-growing cross-platform audiovisual media. Therefore, this study proposes a pro-innovative and platform-neutral multi-screen TV regulatory scheme to concentrate on audiovisual service/content classifications in order to respond to fast-changing technological advancements and market development. Under the proposed regulatory scheme, different content and license regulations are applied to four types of TV-like services which are categorized by their “socio-cultural impact” (i.e., broadcasting and mass market vs. VOD and niche market) and “content production/aggregation model” (i.e. gatekeeping vs. participatory mechanism).¹¹

Besides, this study analyzes market development, regulatory issues, and national plans of multi-screen TV services in Singapore and examines them under the proposed regulatory scheme. With a planned digital economy and controlled media ecology, the government plays a crucial role in deciding the directions for future media in Singapore. TV innovations in Singapore rely more on policymakers' decisions than industry initiatives. To integrate multiple screens and create audiovisual content involves inter-industry, inter-disciplinary, and international collaboration among TV, computer, internet and mobile industry players. Such large-scaled integration cannot be successful without strong government support as industry stakeholders with conflicting agendas and interests rarely work together toward common goals with high uncertainty. Seeing increasing cross-platform video consumption and its economic potential, the Singapore government¹¹ launched several national media plans (i.e., STMP and Project NIMS) to facilitate the technological trajectory of the next generation TV. For example, MediaCorp's OTT and FutureTV partner network are heavily supported by MDA and IDA. Without clear regulator endorsement, local industry players tend to take conservative attitudes toward emerging media businesses.¹²

To develop uncertain emerging audiovisual businesses, it is essential to make policies that offer incentives to stimulate new entrants and incumbents to participate. This study suggests TV-like services at the infancy stage or with a small audience size should subject to a light-touch regulatory framework in licensing and content regulation similar to information services. By doing so, the nascent audiovisual media will have a better chance to flourish. In Singapore, “pro-innovative” media policies emphasize the significance of boosting the digital economy and improving social well-being. Contradictorily, emerging audiovisual services in Singapore are subject to strict TV content codes and licensing which restrict their innovation, creativity, and market competition. Thus, loosening regulatory control for nascent cross-platform audiovisual services, especially on-demand or participatory video services serving niche markets, is essential to facilitate their future development.

Prior studies and legal development advise against regulating audiovisual services on the same platform homogeneously (ALRC, 2012; Flew, 2012). However, MDA's new mobile TV policy requires all mobile audiovisual services (i.e., mobile cellular TV and mobile broadcasting TV) to apply for licenses under the digital broadcasting scheme and obey content rules under TV programming codes (MDA, 2011b). Although a two-tiered framework provides some flexibility for new or small entrants, this policy, which decides strict licensing and content regulations for all mobile audiovisual media, results in deferring industry investment and slowing down technological diffusion. As such, there is still no commercialized MTVS available in Singapore. This case again demonstrates the inappropriateness of regulating audiovisual services based on delivery platforms.

Moreover, protecting digital copyright becomes very hard to handle when videos flow across platforms and across border lines. Existing audiovisual and copyright regulations are criticized for their inadequacy in addressing the complexity of copyright protection and in keeping up with technological advancements for rights clearance and content licensing (Ganley, 2007; Geach, 2009). When this study proposes its multi-screen TV regulatory scheme, the classification of audiovisual media's content production/aggregation models has put “copyright protection” into consideration. That is why it imposes strict content regulation on the traditional top-down model as it has a well-established gatekeeping mechanism to protect the creation and distribution of copyrighted videos. Comparatively, when audiovisual service providers adopt a participatory mechanism in producing and aggregating programming and interactive services, they should be subject

¹¹ As multi-screen TV is likely to bring strong competition and convergent challenges, IDA and MDA control its development by launching national projects, developing new policies, and opening dialogs with industry players to cope with future changes.

¹² During market trials of DVB-H mobile broadcasting TV, the incumbents showed hesitation in developing this new service and hoped the government would build costly infrastructure to reduce their risk (Lin & Liu, 2011).

to less strict content regulations as it is difficult to prevent copyright infringement, to judge infringement behavior, and to examine public interest content due to prevalence of UGC and file sharing, open infrastructure, and quick technical developments.

As there is no universal model to manage multi-screen video services, this study elaborates complex convergent and regulatory issues arising from global audiovisual services and analyze Singapore's future media blueprint, policymaking, and industry responses to shed light for other countries to plan the future trajectory of multi-screen video services, applications, and platforms. Under a pro-innovation and technology neutral approach, the proposed multi-screen TV regulatory scheme which focuses on content rather than platform is helpful for policymaking in regard to the evolving, complex, and convergent audiovisual services. In the light of fast changing technologies and convergent services, the government and policymakers that foster the growth of multi-screen TV or other emerging audiovisual media are recommended to adopt a "platform neutrality" approach and impose minimal rules on new media content and licensing in response to quick technological and market changes.

Acknowledgment

This article is revised from a conference paper entitled "Media fusion and futureTV: examining multi-screen TV convergence in Singapore" which was presented at the 2011 regional International Telecommunications Society in Taipei, Taiwan. The author appreciates constructive comments and insightful feedback from the special issue's guest editor, Prof. Liu Yu-li, and reviewers.

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