Mobile TV: where we are and where we are going

Bartley Boston
University of Bristol
Email: boston5@gmail.com

Summary

The article presents (1) the technical characteristics of Mobile TV [Mobile TV] and how it differs from IPTV and Internet TV [Internet TV], (2) network, spectrum and equipment issues that will influence the regulatory framework, (3) the opportunities created for Mobile TV when migrating to digital TV, and (4) a case study in Mexico concerning the regulatory framework for telecommunications and broadcasting services, market players, spectrum availability, migration to digital TV and other issues prominent for Mobile TV.

Keywords: *Mobile TV; IPTV; regulation mark; Mexico.*

A. INTRODUCTION

From a legal and regulatory perspective, mobile television - TV Móvel [Mobile TV] - certainly presents new challenges. Many prominent issues need to be addressed as mobile technologies continue to evolve and are accepted by society. Questions that do not have a single correct answer have characterized the current situation of Mobile TV in the world. Thus, it is important to know the technical characteristics of Mobile TV, its distinction from other types of video services, such as IPTV and Internet TV [Internet TV], a theme presented in section I of this work. Network, spectrum and equipment considerations will shape the regulatory framework for Mobile TV, while the transition to digital TV may open new and real opportunities for Mobile TV in certain countries, as described in sections II and III of this paper. This article therefore presents a case study of Mexico, referring to the regulatory framework applicable to both broadcasting and other telecommunications services, market actors, spectrum availability and the transition to digital TV, as well as the other issues relevant to Mobile TV. There is no precise and universal definition of what IPTV (internet protocol television) should be. Consequently, IPTV is often confused with Internet TV and Mobile TV. Furthermore, such concepts tend to change constantly as the technological substrate changes. Although such services share common characteristics, each one has certain peculiarities that authorize their differentiation. Such peculiarities produce impacts on the regulatory and legal framework applicable to each of the aforementioned services. Therefore, the explanation of some practical definitions, as well as the identification of configurations and common characteristics, will help in understanding where we are and what path to take in Mobile TV regulation.

B. METHOD

IPTV

IPTV, so put, means video services delivered over internet protocol platforms. A broader definition of IPTV is "the provision of a video service (eg live television channels, near video-on-demand or pay-per-view) over an IP platform. However, there are those who define IPTV services in order to encompass all the possible functionalities that can be offered on an IP platform. For example, some identify IPTV services with multimedia services, a category that can include television, video, audio, text, graphics and data, encompassing not only unidirectional broadcasting services but also ancillary interactive video and data services such as video-on-demand (VoD), internet browsing, advanced messaging and messaging services"1. The IPTV service can be provided either to a fixed point (eg, IP television via fixed broadband access) or to a mobile device (eg, IP television to a PDA [Personal Digital Assistants]).

Internet TV [Internet TV]

Internet TV or Internet video [Internet video] are services provided over the public Internet. The content (video) distributed by Internet TV is either generated by Internet users (eg YouTube) or by specialized companies. Internet TV may or may not be mobile, depending on the device employed (eg, PDA with wireless Internet access).

Mobile TV [Mobile TV]

Mobile TV "is the wireless transmission or reception of television content – video and voice – to platforms that are mobile or capable of mobility"2. It is important to note that television content to be delivered via Mobile TV has to be adapted to a ubiquitous mobility environment, mainly due to the size of mobile terminals and for technological reasons. The following configurations and features are applicable to IPTV, Internet TV and Mobile TV in some or all cases, depending on the specific type of service provided.

Interactivity [Interactivity]. Unlike what happens with traditional broadcast television, IPTV, Internet TV and Mobile TV can be interactive. For example, the user of such services can play a decisive role in defining the content to be viewed and when it will be viewed. Uni-, multi- and broadcast transmission. Unidirectional, multidirectional and broadcast transmissions have the common characteristic of transmitting content by a single source at a given time. They are distinguished by the users enabled to receive the content. Therefore, one-way transmission (unicast) comprises the transmission of content directly to a specific user; multidirectional transmission (multicast) refers to the transmission of content to a set of users; while broadcasting means the transmission of content intended to be received by all users on the network who have the appropriate receiving endpoint. Video on demand [Video on Demand – VoD]. Video on demand is a unidirectional transmission and is one of the most common examples of television content personalized by the user. Mobility [Mobility]. Mobility is at its peak. People want communication services anywhere, anytime, and with all types of telecommunication devices. Technological development has provided mobility capable of providing ubiquitous communication, including television, as a reality in the near future. Such

common characteristics, possible in IPTV, Internet TV and Mobile TV, contrast with the characteristics of the networks used to provide these services. IPTV generally uses dedicated networks to provide video services. They can be landlines, cable TV or satellite networks. Internet TV, in turn, promotes transmission through the public Internet, while Mobile TV can be provided both by cellular networks and by dedicated broadcasting networks, as will be discussed in the next section.

C. RÉSULTAT ET DISCUSSION

cellular networks

Cellular networks for Mobile TV (eg, 3G) benefit from the use of pre-existing infrastructure, although Mobile TV requires considerable bandwidth to provide video services with satisfactory quality, under penalty of becoming a video service fragmented and slow motion rather than a streamlined television service. Furthermore, when cellular operators are required to comply with minimum quality of service standards in their data and voice services, the use of bandwidth for Mobile TV can compromise such quality. The Multimedia Broadcast Multicast Service (MBMS) is an example of Mobile TV technology over 3rd generation cellular networks. Dedicated broadcast network Currently, the provision of Mobile TV through a dedicated broadcast network requires the construction of a new network (terrestrial, satellite or a combination of these). The advantage is that the transmission of content can be given to several users at the same time without reducing the quality of the service. The technological standards used for dedicated broadcasting networks are DVB-H (Digital Video Broadcasting-Handheld, predominantly in Europe), DVB-SH (Digital Video Broadcasting – Satellite Services to Handheld Devices, which uses a hybrid satellite/terrestrial network) 4, DMB (Digital Multimedia Broadcasting used in Japan and South Korea), ISDB-T (Integrated Services Digital Broadcasting-Terrestrial developed in Japan), and MediaFLO, which has been implemented in the United States of America.

Spectrum

Mobile telecommunication services depend on the use of spectrum, which consists of a limited and scarce resource, through which the transmission or distribution of signals is possible without the use of cabling (eg, without the use of optical fiber or coaxial cable) . The spectrum is divided into frequency bands according to the characteristics of each band (eg, whether or not waves of a given frequency can pass through walls, whether there is a need for there to be no obstacles [line of sight] between microwave antennas) . In each frequency band, one or more services can be provided (eg, broadcast service and mobile service). At the International Telecommunication Union Radiocommunication Conference, countries agree to assign certain service(s) (eg, mobile service) to a given frequency band (eg, 1.9 GHz) in each of the three regions in that the world was divided. Such decisions are incorporated into the international frequency allocation table6, and from there, each country will prepare its own frequency allocation table.

Mobile TV frequency bands

Consequently, there are two fundamental questions regarding the spectrum for Mobile TV, namely: whether a specific spectrum band has been allocated [allocated] for such a service; and if there are frequencies available for that. The most relevant frequency bands that have been identified for the provision of Mobile TV in general (which may vary depending on the world region or country) are the 470-650 MHz bands (eg for the DVB-H system), 700 MHz (UHF, used by channels 52 to 69 of broadcasting services), 800 MHz (cellular services), 1.9 GHz (PCS), L-Band, 2.1 GHz, S-Band, and 3.4-3.6 GHz (C-Band). Frequency availability is crucial for Mobile TV. Each country faces its own challenges and opportunities. So, should a certain frequency be assigned to traditional broadcasting operators, mobile services in general or Mobile TV? When should such frequencies be assigned? Should this be done now or is it advisable to wait for new technological advances? Is there enough spectrum for its distribution to several operators? These and many other questions arise when trying to clarify whether there are frequencies available for Mobile TV in a given country.

Digital transition [digital switchover]

The availability of spectrum for Mobile TV is linked to the so-called digital transition. It refers to the transition from analogue open television to digital TV. Broadcasting has been provided using analogue signals and is still broadcast in most countries. People in general have analogue televisions and broadcasters have implemented analogue networks. In this way, the installation of new digital broadcasting networks and the acquisition of digital television devices by users will not happen overnight. Governments will have to implement a plan for a transitional period where both analogue and digital television signals are transmitted simultaneously. Consequently, governments have granted a "mirror channel" to provide digital television during the transition period. For example, broadcaster ABC has been using channel 2 for several decades, through which it broadcasts content over analogue signals. For the digital transition, it received channel 55 as a mirror channel, on which the same content as channel 2 will be transmitted, but with digital signals. When the transition period ends, ABC will only transmit content through one of the channels, using digital signals and will return the other granted channel to the government. This is called "analog switch off". With the interruption of analogue transmission, there will be spectrum available that can be used by Mobile TV, especially when it is verified that channels 52 to 69 (700 MHz) are in frequencies that are considered appropriate for the provision of Mobile TV. Again, each country has its own challenges and opportunities. In some countries or in some regions of a country, perhaps there are currently no frequencies available on channels 52 to 69, and therefore, the digital transition presents itself as a concrete opportunity. In other countries, even if such channels are not occupied, the economic situation and, on the other hand, deficiencies in the telecommunications infrastructure can guide public policy in a different way from Mobile TV, towards the provision of broadcasting. In summary, the digital transition and the digital dividend will have an impact, in some countries, on the promotion of Mobile TV, while in others, they will not generate opportunities for Mobile TV.

user terminal

The user terminal can take the form of cell phones, laptops, PDAs (Personal Digital Assistants), televisions in cars, among others. Despite the fact that there are many types of devices from different manufacturers, there is no guarantee that they are suitable for Mobile TV. Such equipment was planned without considering Mobile TV, which will generate the need for future adaptations with regard to screen size, battery capacity (eg, video services consume more energy than voice or data transmissions), to tuners of different frequencies (eg, mobile TV broadcast [broadcast Mobile TV] can be in the 700 MHz band, while Mobile TV through cellular networks can use the 800 MHz, 900 MHz or 1.9 GHz bands). In addition, depending on the technology adopted for Mobile TV, the equipment [hardware] and programming [software] can be different in the cellular network and in the broadcasting network, requiring technological modifications for the provision of Mobile TV. Mobile TV is a new service that has characteristics of traditional broadcasting, telecommunications services (eg, cellular and cable TV services), and information services (eg, the regulatory difference, in the United States of America, between information services and telecommunication services8). Few countries in the world have already defined how Mobile TV should be specifically regulated or have already adopted a light-handed regulation approach, while others are not even discussing how to regulate Mobile TV. However, the questions that will have to be decided in the end will be Type of service. This issue is essential for Mobile TV regulation. Traditional broadcasting has been heavily regulated from different angles (eg, foreign investment, content, cross-ownership), while other telecommunications services benefit from a regulation that was conceived to have a space of isonomic conditions of performance [level playing field] and the necessary protection of users (eg, quality of service [QoS], information requirements and clarifying announcements). Therefore, the decision on whether Mobile TV should be considered a broadcasting service or a telecommunications service for regulatory purposes has consequences for the rest of the questions. Market entry. Assuming that some broadcasters, TV retransmitters [broadcasting operators] and cellular operators already hold a license, would an additional authorization or license be required to provide Mobile TV in addition to the current license? In some countries, a notice to provide a new service would be sufficient, while in others a new license would be required. Spectrum caps [spectrum caps]. A spectrum cap is the limit imposed by antitrust or telecommunications regulators on economic agents to acquire spectrum at certain frequencies. The spectrum limit, as a regulatory measure, can have different purposes, such as preventing the hoarding of spectrum or allowing new players in the market, for example. Convergence continually challenges such spectrum boundaries as frequency bands that are not traditionally used by a given service (eg, video services) and therefore are not considered within a specific spectrum boundary (eg, in a public offering for PCS frequency bands at the beginning of the century) can now be used for such services. In the case of Mobile TV, its classification will have an impact on spectrum limits whether it is classified as a broadcasting service or as another telecommunications service. Certainly, the determination of spectrum limits will be more complex and will be discussed in the courts.

Contents. Content is a hot issue for Mobile TV. If content on Mobile TV is treated in the same way as content on broadcasting is treated, then Mobile TV will be subject to heavy regulation, whereas if it is treated in the same way as video over the public Internet, regulation it

will be much lighter. Some countries (eg, European Union member countries, New Zealand) have made some distinctions between linear (eg, real-time programming organized by an operator) and non-linear (eg, VoD) services. In the European Union, the Audiovisual Media Services Directive9 provides that the difference between on-demand audiovisual services and broadcasting lies in the fact that the user of on-demand services have control and can choose the content. Thus, the European Union has adopted a lighter regulation for on-demand audiovisual media services, contrary to what happens with broadcasting. Independent production. Many countries have regulatory provisions that require broadcasters to transmit a certain percentage of national and regional productions. If Mobile TV is considered a broadcasting service, these predictions will likely apply to content broadcasts on Mobile TV. Must-carry and must-offer. Several countries have applied must-carry and must-offer obligations on broadcasters and cable TV operators. As Mobile TV is a new service with a promising future that is still uncertain, the imposition of must-carry and must-offer obligations at this stage could negatively impact the development and expansion of service availability. Standards. For Mobile TV broadcasting, governments can choose to choose a mandatory usage standard in their countries (eg, MediaFLO, DVB-H), as has been the case with digital terrestrial television, or they can let operators define the technology that deem more convenient. Property. Nationality, foreign investment and cross-ownership are issues that must also be addressed. Should Mobile TV be provided only by citizens of the country? Can there be foreign investment? What percentage of foreign ownership will be allowed? If Mobile TV is treated primarily as broadcasting, there will be limits to cross-ownership.

Such prominent questions do not have a simple or single answer. Each country will have to assess a myriad of issues involving technical, regulatory and policy considerations before determining next steps in their national contexts. Furthermore, the stage of development and implementation of the telecommunications infrastructure in each country is what will or will not, in the near future, provoke discussions about Mobile TV and each country will have its own schedule. It is important to note that the Broadcasting Law has not undergone any significant changes, except in 2006. The 2006 changes were questioned before the Supreme Court of Justice and the most relevant changes were declared unconstitutional, with the exception of the public offer requirement [public bid] as the new process to be followed for granting commercial radio and television licenses. The Supreme Court ruling of 2007 is presented as a historic ruling11, since, for the first time, the court issued considerations on relevant aspects of radio broadcasting and spectrum in light of the Mexican Constitution. Such considerations will certainly have effects on Mobile TV if it is considered a broadcasting service. Historically, the players in the broadcasting market and other telecommunications services were different. Telecommunications liberalization in Mexico and technological convergence have facilitated the massive entry of commercial television broadcasters (Televisa and TV Azteca) into the telecommunications market. As commented in section II.B above, the spectrum for Mobile TV can be in the 1.9 GHz band (PCS) and in the 700 MHz band (channels 52 to 69). Spectrum availability differs in each of them, and is also influenced by the region in Mexico.

In March 2008, the Ministry of Communications published the spectrum auction program, which includes certain blocks in the 1.9 GHz band. The next step is up to the telecommunications

regulator (Cofetel), which should publish the invitation to obtain the term of reference for participating in the public offer, which is scheduled for 2009. It is possible that the current mobile service operators want to acquire more spectrum for provision of Mobile TV and 3G services. However, some of them may exceed the spectrum limits defined for the sector. Spectrum limits and the economic situation may slow down your Mobile TV deployment plans. Mexico has published its digital terrestrial television policy16 (Acuerdo TDT), whereby the Mexican government will provide a "mirror" channel to existing television broadcasters to transmit content via digital signals in addition to the analogue channel signal. The expected date for the digital transition is 2021, however, this date may be postponed by the Ministry of Communications. If the deadline for the digital transition is 2021, does that mean that Mobile TV in the 700 MHz band (channels 52 to 69) will have to wait until then? Not for the Mexican case, as there are few concessions in Mexico, both for analogue and digital signals, for the use of channels 52 to 60 by television broadcasters and such licenses are found predominantly on the border between Mexico and the United States of America. Consequently, from the point of view of spectrum availability, Mexico could initiate a public offer for Mobile TV in the 700 MHz band in practically all of its territory. Finally, with regard to the 700 MHz band, Mexico's Frequency Allocation Table (Cuadro Nacional de Atribución de Frecuencias) indicates that such channels may be used for radiocommunication services (eg, Mobile TV). Mobile TV in Mexico will fundamentally depend on whether it is classified as a broadcasting service or as another telecommunications service. One of the main features of free-to-air TV in Mexico is that it is a free-of-charge service, while other video telecommunication services are offered for a fee. Thus, in my opinion, Mobile TV's commercial scheme will be a key factor in its consideration as a telecommunications service governed by the Telecommunications Law. Mobile TV, as a telecommunications service, will benefit from the sector's pro-competitive mold, and from foreign direct investments, whereas if it is considered a broadcasting service, its dissemination will be postponed for economic reasons. In addition, the television broadcasting service is considered, according to the judgment of the Supreme Court, "an activity of public interest that serves a social function of transcendental relevance for the nation, insofar as the media is an instrument for the realization of human rights". fundamentals of the citizen. Radio and television are mass media, which have a transcendental importance for the daily lives of individuals, so the State, when regulating the use of the public good used in this activity, must guarantee equal opportunities for access and provide a pluralism that ensures to society respect for the right to information and the free expression of thought". Given the meaning attributed to broadcasting services by the Supreme Court, Mobile TV can be separated from them in order to be considered a telecommunications service. Content transmissions via Mobile TV should be subject to a minimum regulation [light-handed regulation], which governs only issues of protection of minors, prohibition of incitement to racial/religious hatred, and advertisements (eg, related to health). Must-carry and must-offer obligations are not provided for in the Broadcasting Law, nor in the Telecommunications Law. Only Televisa submits to some must-offer obligations imposed by the Antitrust Commission (Comisión Federal de Competencia), whose concrete effects are questionable. Consequently, no must-carry or must-offer duties should apply to Mobile TV.

CONCLUSIONS

Mobile TV can be confused with IPTV and Internet TV, as they share some characteristics, such as being interactive and enabling unidirectional (unicast), multidirectional (multicast) or open (broadcast) transmission. Furthermore, the evident mobile feature of Mobile TV can be seen in IPTV and Internet TV (eg via a PDA or a laptop and wireless access). However, under a network approach, IPTV employs dedicated networks, Internet TV utilizes the public internet, while Mobile TV can be transmitted over cellular networks or dedicated broadcast networks. When using a cellular network for Mobile TV, there is an efficiency gain, since it will be using a pre-existing infrastructure. However, video services require considerable bandwidth, which can reduce the quality of voice and data services over the cellular network. The standard for Mobile TV on 3G cellular networks is MBMS and the spectrum frequency corresponds to the 800 MHz, 900 MHz, 1.9 GHz and 2.1 GHz bands. On the other hand, if the decision moves towards the provision of Mobile TV through a dedicated broadcasting network, the investment and installation of a new network will be mandatory. The advantage of this option is that it can serve several users simultaneously without reducing the quality of service. There are several standards used in the world for this purpose, such as DVB-H, DMB, ISDB-T and MediaFLO. Spectrum frequency ranges include the 470-650 MHz and 700 MHz bands. Frequency availability is a crucial factor for Mobile TV. Each country faces its own challenges and opportunities. For some countries, the availability of frequencies depends on releasing part of the spectrum in the UHF bands during the digital transition. For other countries, given the presence of free UHF frequencies or with a date for interruption of transmission in the next twenty years, the digital transition will not make any difference. For such countries, the key factors for Mobile TV will be the country's economic situation and the status of implementation of the telecommunication infrastructure. User terminals can be configured as cell phones, laptops, PDAs, televisions in cars, among others. However, not all will be suitable for Mobile TV as adaptations will be necessary (eg, screen size, battery capacity, difference in tuners and frequency receivers). Mobile TV shows characteristics of traditional broadcasting services, telecommunications and information services. Few countries in the world have already determined how to regulate Mobile TV specifically, or have even adopted a posture of minimal regulation, while some countries are not even discussing how to regulate this service. The main issue to be decided is whether Mobile TV is a broadcasting service, a telecommunications service or a hybrid type of service subject to its own regulation. The answer to this question will impact issues around market entry, licensing, spectrum caps, content, independent production quotas, must-carry/must-offer obligations, standards, ownership. There definitely isn't a single – and simple – answer. Each country will have to assess a myriad of issues involving technical, regulatory and policy considerations, taking into account the stage of development and implementation of the telecommunications infrastructure. In some countries, Mobile TV will be a concrete demand; in others, a luxury available only to a restricted part of the population.

The Mexican case study reflects the complexity of pending government decisions and the current uncertainty for the private sector willing to invest in Mobile TV. In Mexico, there are two separate laws for broadcasting and for other telecommunications services. There are different regulatory provisions for foreign investment: the Broadcasting Law prohibits it while the Telecommunications Law allows up to 100% foreign investment in cellular services. With regard

to content, the Broadcasting Law has specific regulation, while the Telecommunications Law is silent in this regard. In addition to the telecommunications regulator (Cofetel) and the Ministry of Communications, the broadcasting sector is also regulated by three other ministries. With regard to spectrum availability in Mexico for Mobile TV, it is expected that during 2009 auctions will take place for the 1.9 GHz bands, and there is still a considerable amount of spectrum available in the 700 MHz band (channels 52 to 69). Consequently, from a spectrum point of view, Mexico could open a public auction for Mobile TV in the 700 MHz band at any time in virtually all of its territory. The future of Mobile TV in Mexico depends on its categorization as a broadcasting service or as another telecommunications service. The business model for Mobile TV will be a key factor in its consideration as a telecommunications service governed by the Telecommunications Law. In light of the Supreme Court ruling, Mobile TV can be differentiated from broadcasting services. The characterization of Mobile TV as a telecommunications service would benefit from the pro-competitive model and foreign direct investment. The transmission of content via Mobile TV must be subject to a minimum regulation. The final decision on Mobile TV in Mexico may take some time to arrive as the authorities' agenda is currently occupied by other priorities, however, the demonstration of concrete interest from the private sector and telecommunications operators could lead, in the near future , the taking of relevant decisions on the subject by the Mexican government.

REFERENCES

1. ALDEN, John. WRC-07 Results and impact on terrestrial wireless access systems. Presented at the 8th Global Symposium of Regulators, Pattaya, Thailand, March 2008.
2. ALVAREZ, Clara Luz. Derecho de las Telecomunicaciones. Mexico City: Miguel Ángel Porrúa/Cámara de Deputados, 2008.
3. COMMISSION (Mexico). Mobile Television. Mexico City, January 2008.
4. EUROPEAN UNION. Strengthening the Internal Market for Mobile TV. European Council/European Economic and Social Committee and Committee of Regions.
5. ⊚⊚ Directive 2007/65/EC. European Parliament/European Council, of December 11, 2007 as amended by Directive 89/552/EEC, Official Journal of the European Union, L 332/27, 12/18/2007.
6. INTERNATIONAL TELECOMMUNICATION UNION. Trends in Telecommunication Reform 2008: six degrees of sharing. Geneva: International Telecommunication Union, 2008.
7. ORGANIZATION OF COOPERATION AND ECONOMIC DEVELOPMENT. IPTV: Market developments and regulatory treatment. DSTI/ICCP/CISP(2006)5/FINAL, 2007.
8. ⊚⊚ Mobile Multiple Play: new service pricing and policy implications. DSTI/ICCP/TISP(2006)1/FINAL, 2007.