CUADERNOS.INFO VOL° 33
ISSN 0719-3661
Versión electrónica: ISSN 0719-367x
http://www.cuadernos.info
DOI: 10.7764/cdi.33.503
Received: 07-08-2013 / Accepted: 11-14-2013

The Television Audience Measurement in the Digital Age

La medición de las audiencias de televisión en la era digital

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ABSTRACT

The introduction of the digital terrestrial television (DTT) in Chile brings new problems to the television audience measurement process. In a multisignal context, with the emergence of new contents and squarely in front of the contemporary technological convergence, the correct representation of the viewing behaviors faces unprecedented methodological challenges. This creates the conditions for developing new methodologies as a result of professional experience and research in the field itself. Thus, the TV audience measurement in Chile takes a new methodological approach, through the *"Audio Matching"*. With this, the measurement through audimeters (people meters) enters a new era, facing the dual challenge of analog and digital measurement in a mixed television broadcast. In addition, it does respond effectively to the new realities in the television consumption related to the time shifted television viewing. In turn, this new methodological approach is compatible with future measurement systems for other areas and consumption platforms.

Keywords: audience measurement, television, people meter, audimeter.

RESUMEN

La introducción de la Televisión Digital Terrestre (TDT) en Chile trae consigo problemáticas nuevas para el proceso de medición de audiencias en televisión. En un contexto multiseñal, con la aparición de nuevos contenidos y enfrentando de lleno la convergencia tecnológica contemporánea, la correcta representación de las conductas de visionado enfrenta un desafío metodológico sin precedentes. Esto propicia las condiciones para desarrollar nuevas metodologías, fruto de la experiencia profesional y de la propia investigación en el campo. En el caso de Chile, en la medición de audiencias de TV se ha optado por un nuevo enfoque metodológico, a través del "Audio Matching". *Con esto, la medición a través de audímetros (people meters) entra en una nueva era, enfrentando el reto de la medición dual –digital y análoga–, en un escenario mixto de emisión de televisión. Además, logra responder efectivamente a las nuevas realidades de consumo de televisión en el hogar, relacionadas al visionado diferido y la televisión grabada. A la vez, este nuevo enfoque metodológico es compatible con futuros sistemas de medición para otros ámbitos y plataformas de consumo.*

***Palabras clave**: medición de audiencias, televisión, people meter, audímetro.*

•How to cite:
Buzeta, C. y Moyano, P. (2013). La medición de las audiencias de televisión en la era digital. *Cuadernos.info*, 33, 53-62. DOI: 10.7764/cdi.33.503

BACKGROUND

In September of 2009, the Government of Chile enacted the standard of Digital Terrestrial Television (DTT) under which was set the way in which will take place television broadcasts in the country, through the ISDB-Tb[1] standard. This definition opened a range of possibilities for the whole national broadcasting industry, given the feasibility of transmitting in a better technical quality, with a greater range of content, signals and channels to a myriad of technological platforms that are now within its reach (Godoy, 2009). In addition to this, the increasing consumption of digital pay TV through paid television systems and the enormous amount of live and recorded content available over the Internet provide an opportunity to delve into the characteristics of the local consumption of television at the level of households and persons.

Against this new horizon which opens, it is worth remembering that only ten years ago the scenario was completely different. Television consumption was mainly made at home, through an analog-normed TV that only served as a screen displaying contents on a standard definition quality. Although there was pay television, the number of channels in Chile was fairly limited, with only 27.8% penetration in Santiago (Time Ibope, 2002). Thus, the possibilities of broadening the contents were subjected to what was available in the video store, either in format VHS or DVD (Consejo Nacional de Televisión [CNTV], 2005).

Nowadays the reality is quite different. The possibilities for consumption inside and outside of the home have increased. Even the consumer has individualized, becoming even mobile, according to what is reported in much of the world (Casalegno, Susani, Frigo, Kaman & Wallen, 2010). The TV went from serve just as a screen to become the multimedia center of the home. Audiovisual content to which is possible to have access have multiplied thanks to the increase in the supply of producers and distributors of TV –more channels, better Internet access, among others–. Currently, there is a significant number of TV broadcasts in high definition (HD) by air, cable and satellite, and these contents can even be downloaded on a hard disk for later review (CNTV, 2011a; Santiago & González, 2011).

In this scenario, the television audiences measurement faces a great challenge. Multiple changes converge in a short time, forcing to rethink the way in which such measurement is made. In this regard, it is necessary to consider that the data from the audience studies is used as the media currency among the participants of the industry (media, advertisers and agencies). Because of its own characteristics, these studies drives the media investment. In addition, this industry is inserted in a society that moves forward in the transformation of media consumption platforms. Under these conditions, the correct representation of media consumption behavior is unavoidably relevant to all actors: broadcasters, advertisers and regulatory agencies (Lamas, 2004).

Considering the above mentioned, this article will briefly review the challenge posed by new technologies, and in particular DTT, to the measurement of TV audiences. It will begin by describing the way the measurement is performed in our days, and stating the reasons affecting to continue to do so. New methodologies in operation will be revised and we will exhibit the methodological option chosen by IBOPE Media, and Time Ibope as its affiliated company in Chile, to address the problem. Such an option, supported by a review of several systems and methodologies used internationally, involves the use and development of new technologies. Finally, this report will end with a small revision of the achieved learning outcomes and a reflection regarding the direction in which the measurement of audiences should point in contexts of high technological complexity.

METHODOLOGIES OF MEASUREMENT: PAST, PRESENT AND FUTURE

THE PAST OF AUDIENCE MEASUREMENT

The way in which the studies of television audiences measurement are developed around the world has evolved since its inception at an accelerated pace. Since the beginning of the 20th century, particularly from the 1920s, there was a growing interest in knowing the characteristics of the audiences attending to radio broadcasts. There was an attempt to respond to the information needs of the industry, first through studies face-to-face or by telephone; then, by applying the coincidental techniques developed by Gallup in the 1930s, and finally, by studies of consumers panels that informed their behavior through the use of diaries (Navarro, 2010). However, it was not until the 1940s when the first "electronic" studies of radio audiences began in the United States, using behavior recording devices. For this purpose, "measuring apparatus"

were designed making possible to know if a particular station was being tuned into a home. These first *set meter* devices only recognized the turning on/off of the equipments and registered the tuned signal, and were not able to identify people who were part of the audience (Navarro, 2010). Other countries, like Brazil, promptly began their radio measurements based on similar technologies (Instituto Brasileiro de Opinião Pública e Estatística [IBOPE], 2012).

Already in the 1950s and 1960s, when television became the mass media par excellence, the knowledge gained from the radio measurement was transferred to the new media, with similar limitations: it was only possible to establish the signal consumption and if the receiver was on or off. It was only in 1970 that the "audimeters with buttons" or *people meter* were developed. This meant access to a large amount of new information and data, mainly linked to the socio-demographic characteristics of consumers, such as their age, gender and socio-economic status (SES). The new technology arrived to Latin America in 1988, when Brazil began measuring television audiences through people meters, in a study deployed by IBOPE (Navarro, 2010).

In the Chilean case, the measurement of television audiences began in 1986, through data collection by consumer diaries in a panel of households in Santiago. This technique was used until 1992, when it was replaced by the electronic measurement (Cofré, 2011).

CURRENT MEASUREMENT OF TV AUDIENCES

Today, more than 70 countries use the audimeter technology to measure the audience of television (Santiago & González, 2011). Since 1992, in Chile the television audiences study is conducted electronically by Time Ibope (subsidiary of IBOPE Media Brazil) through people meters in its *Overnight* and *Realtime* variants (Martínez & Masot, 1993). Originally focused on the metropolitan area of the country, the study has been enhanced to represent a larger number of people belonging to other regional contexts. Thus, and unlike those early years, today it has an urban sample of 600 households and 2,400 individuals in the communes of Antofagasta, Valparaíso, Viña del Mar, Concepción, Talcahuano, Temuco and Santiago (Julio, 2005). In fact, it is the larger field study developed in the country. It includes the consumption of TV at household and individuals scale, characterized by age (from the age of four), gender, SES (excluding the segment E) and subscription to pay television. Today the study represents an urban universe close to 6,511,540 people (Time Ibope, 2012).

Currently, the continuous minute-by-minute audience registry for each person watching TV is made through model DIB-4 audimeters installed in TV sets of participating households (figure 1). This, thanks to a prior cadaster of individuals made in the participating home and a code that must be selected with the remote control when their individuals are watching television.

Figure 1. DIB-4 people meter currently operating in Chile

Source: IBOPE Media.

The current *meter* can make the transmission of data in real time, collecting 'what' and 'who' is watching television inside the panel (Fuenzalida, 2004).

The measuring devices operating today were designed under the analog standard, which allows to seamlessly collect the tuned channel, considering that its location in the radio spectrum is defined and that it is only possible to send only one signal per channel (unique content) (Lamas, 2002). This paradigm changes dramatically with the development of different digital environments. Today, a multimedia card processing images (IMM) is incorporated identifying the tuned channel allowing to resolve the difficulties associated with the measurement of the digital environment. However, while this solution is efficient in configurations with external decoder (pay TV, mainly), it cannot be extended to DTT, on the scenario of equipments with the technology and standard integrated in their manufacture. We will delve into the details of this method later.

DIFFICULTIES FOR MEASUREMENT IN A DIGITAL ENVIRONMENT

The sources of difficulty for the measurement of television audiences today, although limited, are relevant. It is possible to delimit these difficulties according to their origin, either in the technological change to digital signals, in the audiences' attitudes or their level of fragmentation.

In the transmission of digital television, the meters ability to identify the channel tuned is invalidated, given the multitude of available signals with zero interference perceived between different broadcasters. At the same time, each broadcaster has the ability to divide its band, generating secondary channels where they transmit different contents, as a dual broadcasting strategy. It is the case of the experimental transmissions of Canal 13, Chilevisión or TVN, in where –in addition to the main channel– a secondary associated channel coexists in the same band, but with alternative content. With these developments, the proper identification of the content played through the tuned channel is not as simple as it was in the analog context (Lamas, 2002; Santiago & González, 2011).

On the other hand, also given to the development of digital technology, what is known as simultaneous transmissions (or simulcast) have emerged forcefully, involving the transmission of different and alternative content by the same media, such as the transmission of a film with its original soundtrack, and another with local language dubbing. In this way, the identification of viewed content through the recognition of any section of the information (for example, the pattern of audio content) is significantly difficult. The emergence of high-definition signals or proprietary digital signals of pay TV complicates even more the situation (MedTV, 2005).

Another source of difficulty comes from the audience that will be measured, because their habits and behavior regarding the consumption of media –and particularly television– have changed significantly in recent years. People have learned that the contents can be watched in a deferred way through the use of Personal Video Recorder (PVR) devices or other players that record programs on their hard drives. In addition to this, the consumption of television is not performed exclusively through the TV screen. Mobile devices with decoder, along with greater use of the Internet as a communication channel, are transformed into points of access to television content (Casalegno, Susani, Frigo, Kaman & Wallen, 2010).

In addition, audiences not only have been divided into ever smaller groups, by a wider range of channels available, with profiles and content offers attractive to rather more limited groups; they have also been fragmented by a relevant increase of devices to consume television (*cross-platform* consumption), as already noted (CNTV, 2011b; Santiago & González, 2011). Audiences have increased in size, depending on the increase in the number of available media and channels through which its contents are broadcasted. At the same time, they have increasingly diversified between different alternative media, in function of their multiplication, fragmenting themselves (McQuail, 2000). Today there are a greater number of different audiences, but increasingly small and homogeneous.

NEW ALTERNATIVES FOR MEASURING TELEVISION AUDIENCES

Considering the challenge which the previously raised elements imply for the television audiences measurement, media researchers have developed some methodological alternatives to deal with these major difficulties, in a way such that DTT measurements were consistent with the principles already adopted in the industry (Asociación para la Investigación de Medios de Comunicación [AIMC], 2003). In this sense, there is no doubt for the need to continue taking into

account the existing standards for the measurement of television audiences, expressed in the Global Guidelines for Television Audience Measurement (GGTAM), which, since 1998, are the ultimate guide on the necessary, desirable and permissible items to any audience measurement of international class (World Federation of Advertisers, 2008).

A first methodology sought to achieve identification of the origin of TV signal through the addition of a specific piece of information in the signal emitted by the broadcaster, which was recognized by an audimeter installed in households. The first tests were conducted with marks in the video signal, but in analog technology. After digitalization, these marks in video have been replaced by the inclusion of inaudible pattern codes in the audio signal, thus saving the problem of digital compression and making it possible that this mark was even recognized by portable measuring devices (as it is the case of the Portable People Meter of Arbitron).

Currently, the systems based on inaudible and invisible code reading, by way of sound bar code that incorporates data on the chain of broadcast, program, time slot and others, are used in countries such as the United States, Canada, Great Britain, Kenya and Norway. This requires the inclusion of these codes by the collaboration of the broadcaster. On the other hand, the company AGB developed a system called UNITAM that does not require the intervention of the broadcasters in the integration of codes in the programs. Viewed contents are automatically identified through content codes and taking samples of audio of the channels, in order to not to require their collaboration. It is nowadays operating in the panels of Great Britain and Italy (Matilla, 2008; Navarro, 2010).

Although the inclusion of audio marks achieves excellent results in the identification of the tuned channel and the watched program, and that it is possible to integrate them in a robust way with demographic data previously registered on the panel, it has some relevant limitations. Firstly, it requires the indispensable collaboration of all broadcasters, which affects all of its programming, with a relevant cost. Secondly, it exposes the measurement to non-recognition errors due to failures in the origin identification, which affects the strength of the information and exposes the reliability of the data in a process not directly controlled by the measuring company.

Because of these problems, it was understood that it was necessary to move the identification of the signal from the source to the destination, as done in the current analogues audimeters. In this way, the possibility of working with systems that would allow comparison of audio or video samples with those existing in a centralized database was analyzed at first. Thus, efforts were directed towards the deployment of a system that compares the fingerprints of a broadcast, and based on them, identifies the tuned channel and the displayed content.

In detail, the audimeter takes samples of the video and/or audio of the channel being watched or listened by the panelist and compares them with the signal of the original broadcast, every certain interval of time (in general, a minute). This technology, called *audio matching* or *picture matching*, as the case may be, is independent of the technology of broadcasting and of the analogical/digital character of the transmission. It is even able to recognize the time-shifted viewing, because it performs a process of continuous contrast to a centralized database of video or audio. Among its main advantages is its methodological centralization of the viewed content. However, particularly in the case of the comparison of videos and the existence of multiple signals due to digital technology, it becomes a little scalable method in an industrial context with greater saturation of signals, in contrast to the comparison purely by audio. Both technologies are currently used by GFK and TNS in some of their operations around the world (Navarro, 2010).

Thus, the *audio matching* as a comparison methodology allows to effectively recognize the signal. Centrally, the audios of each broadcast are registered, which enables comparison with those recorded every certain time interval by the equipment installed at households. The system grants the match that identifies the signal that issued the content when it exceeds a minimum threshold of likelihood and matching between the broadcasted and the recorded by the audio fingerprint. Thanks to a previous survey and a suitable device, it is possible to determine the consumption at households and individuals, simplifying the information aggregation. With certain difficulties, as the identification of contents transmitted simultaneously by more than one signal, it is the more robust system among those who use the comparison of fingerprints.

In addition, the adoption of the *audio matching* based system will in future provide measurements out of the TV. In this sense, the field tests of the software called Virtual Meter have recently completed. This application is capable of reporting the measurement of live broadcastings, as well as those made in time-

Figure 2. DIB-6 visor and equipment

Source: IBOPE Media.

shifted viewing on a computer. It is even able to recognize the source of the content through the contrast with videos available on Internet sites. In this way, viewing through the Web could also be integrated within the measurement of TV audiences on a regular basis (Hunter, 2011). Finally, in São Paulo, Brazil, the measurement tests of mobile TV have also begun based on the *audio matching* system (IBOPE, 2013).

A combination of the systems of recognition by the integration of inaudible codes along with the comparison of audio/video signals is used by Nielsen in its active/passive audimeter (Navarro, 2010). Additionally, other audience measurement solutions are those which could deliver the own pay tv digital decoders available on the market, which offer interesting possibilities to solve problems in measurement. Whether through the identification of codes in the signal or the access to "service information" from a port of the equipment using probe or Return Path Data (RPD) systems, the information that could deliver an equipment already installed in the home is relevant, especially considering that it does not affect the normal interaction of the viewer in the process of watching television. This solution, however, involves the installation of additional software on digital decoders, with the problems this has in order to coordinate with the manufacturer. One not minor issue is the data protection on the habits of the household, along with the possible difficulties in the measurement of analog channels, to which is added the failure to integrate this solution in closed pay digital systems.

Finally, digital decoders do not deliver data at the individual level, but always at household level by each measured decoder. Some providers of cable outside and inside Chile implemented measurement systems based on the information provided by their decoders, with the possibility of access to census information, but dealing with the problems of confidentiality and lack of individual information already mentioned (Navarro, 2010).

THE MEASUREMENT IN THE DIGITAL ERA

THE DIB-6 DEVELOPMENT AND ITS ADOPTION BY TIME IBOPE

Considering the described reality, and based on international experience and internal tests, in 2008 Ibope Media began in Brazil the development of a technological tool that could ensure the measurement of TV audiences in the digital context. From that project emerged the digital audimeter called DIB-6.

The DIB-6 (figure 2) is a state-of-the-art people meter, more similar to a laptop than a traditional audimeter, given the technologies used in its development. It has an Intel® processor and Linux operating system, and performs the data transmission through Ethernet, WiFi, and/or Bluetooth connections.

This new audimeter uses three different methodologies to properly perform the recognition of audiences, alternatively:

- **Channel Grabber**: through the technology of optical character recognition (OCR), the device detects the tuned channel, reading the channel from the screen when it appears visible in a strip or *infobox*, whether at the switching-on or channel change. This method is the same one currently used by the audimeter DIB-4, and is used in households with a decoder of pay TV (set top box), with the people meter located between the TV and the set top box of the operator. Since this solution is for pay TV viewing topologies, the channels are homologated through a equivalence table in the data collection central.
- **On Screen Viewer:** through a device similar to a camera installed on the TV, the DIB-6 can recognize the tuned channel. This system involves the location of the visor of the DIB-6 in a specific sector of the screen, which allows recognizing the tuned channel in the powering or the change of channel. It is preferably used in contexts of viewing of analog broadcast television.
- **Audio Fingerprint:** it is a system with two main components, in successive steps. First, the device sample a "digital fingerprint" of the audio captured from the television broadcast. Then, the system compares this fingerprint to a database of fingerprints centrally taken, recognizing the tuned channel. While it is a more complex than the previous method, it is the most modern and widespread in other operations around the world, as previously outlined.

In this way, this audimeter is ready for the measurement of audiences in the same way that the current systems does it, adding capabilities for the measurement of digital terrestrial television. In fact, for the specific case of the measurement of DTT, audio fingerprint method is the most appropriate, with the best performance in field tests conducted in Brazil and Chile. Indeed, this technology has been under examination from 2012 in Chile, involving for Time Ibope the implementation and installation of three centrals of digital audio, whose main function is the digital record of samples of audio from the television channels in the measurement. Then, this information is sent to a central storage, creating a database of the registered audio fingerprints. Each station independently collects audio from the channels that reach their location, assuming that not in all locations the digital television signal are fully available. This maximizes the opportunity to effectively collect the broadcasts signal for their further centralization and comparison.

Once the DIB-6 in households locally compares their own fingerprint against those available in the centralized base, the audimeter identify and record the tuned channel independently from a proposal of channels centrally given whose are consistent in probability with the sent audio fingerprint. Finally, the DIB-6 resolves the tuned channel. Based on this system, the device is capable, moreover, of recognizing if the content corresponds to an emission of live or pre-recorded broadcast, or if comes from a different source, such as a peripheral device.

It should be noted that the full cycle of capture of tuning is achieved in a single transmission of data via cellular signal (GPRS) from the DIB-6: this sends the fingerprint to the Match Station, which sends a response of the tuned channel. Finally, the DIB-6 people meter sends the information of the tuned channel, day, time slot and audience watching the broadcasting to a Process and Collection Central, where the audience for *Overnight* and *Realtime* measurements is recorded.

Technologically speaking, measurement through audio fingerprint allows collecting data that would be impossible to obtain in any other way. Because the fingerprint comparison is made against a centralized and historical database, this methodology gives the possibility of measuring the time-shifted viewing. Today it is common that households record some television content or its viewing is delayed. The DIB-6 can collect and measure this behavior, classifying it into three types of viewing: the next day, with small delay or on the same day. In fact, the norm around the world is to add this audience considering a maximum seven-day window.

DISCUSSION

Although in 2008 the Presidency of Chile estimated that the transition to digital terrestrial television in the country would take a minimum of five years[2], finally the process has taken longer. A series of political elements, along with an accelerated rate of technological replacement because of the offering of digital-ready television apparatus, modified the agenda that the television industry had drawn in a preliminary way to begin to operate fully with digital technology. Today, from the consumption side, the demand for television

is quite more prepared for the technological change. With this, television channels are waiting for definitions on the regulatory conditions that will regulate the broadcasting of television in the future.

The described situation sets a scenario with a relevant time frame for estimating and preparing the way in which the Study of Television Audiences will adapt to the new digital reality. We have already pointed out the relevant importance that has for the entire industry to count on a measuring instrument capable of adapting, in the less invasive way as possible, to the various possibilities of television consumption, whether analog or digital.

In the context of mass communication media which have financing needs, where the majority of resources comes from revenues for advertising, it is necessary to have not only accurate information of current users, but also of the mass audience that consumes television through new technologies. This enables the visualization of "new audiences", in terms of levels of penetration of television, the characteristics of its consumption, their television preferences, and the way in which they relate to the media. This information, as a standard industry measure, will allow in the future continuing to perform the correct quantification, assessment and appraisal of the value of such audiences. Thus, the information needs of the industry, which as a whole requires a reliable measure on which to base negotiations on the sale of advertising space, is covered.

Also, and beyond mere commercial information needs, the measurement of audiences in the digital context allows taking advantage of new data that complements the work of planning and design of the various programmatic contents which will be broadcasted in a given TV signal. Thus, the evaluation of the editorial content of different broadcasters may continue, now also in the characteristics of consumption that these "new audiences" have.

The measurement of television audiences is subject to a very important challenge. New technologies appear and the measurement must be able to take over them. The final objective, regardless the platform, is to know how many and who are watching television. To know the demands of the audience in terms of its volume and profile allows not only to adequately determine the efficiency of advertising investment, but also to properly assess the profitability of the business of television in all formats. In addition, the advances that are made on the measurement must be able to provide the indicators needed to effectively assess new forms of consumption, with the differences and special features offered, particularly in a scenario of delayed consumption (time-shifted viewing).

Finally, the audience measurement is by definition a study where the great mass of consumption is represented. However, and in particular the measurement of DTT enables the beginning of a different understanding, in the variety of signals that are transmitted,. Among the phenomena of mass, there are behaviors less notorious, but equally important, where it is possible to find fragments of audience with differential value for advertisers. A technologically advanced audience measurement makes it possible to deliver this type of data in a reliable, secure and transparent way.

FOOTNOTES

1. Decree 136, Chile. It defines the official technical standard to be used in the Republic of Chile for the transmissions in digital technology of the free reception broadcasting service. (Ministerio de Transportes y Telecomunicaciones. Santiago, Chile. Septiembre de 2009).

2. Message 942-356 of H.E. the President of the Republic, which initiated a draft law that allows the introduction of digital terrestrial television. Santiago, Chile, October 24, 2008. Retrieved from http://bit.ly/19w50ic

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