Oliveira, M.; Portela, P. & Santos, L.A. (eds.) (2012)
Radio Evolution: Conference Proceedings
September, 14-16, 2011, Braga, University of Minho: Communication and Society Research Centre
ISBN 978-989-97244-9-5

Digital radio in Brazil: analysis of an unfinished debate

CARLOS EDUARDO ESCH & NÉLIA DEL BIANCO
University of Brasília
caduesch@hotmail.com / nbianco@uol.com.br

Abstract:
Government and radio broadcasting stations have been debating the model of digital transmission to be adopted in Brazil, without having come to a consensus. The impasse is related to the technological characteristics of the available systems (HD Radio, DRM, and DAB) that are not integrally adaptable to the model of radio broadcasting, to the regulatory laws, and to the rules of the radio market in the country. Tests done with HD Radio revealed that the digital system does not provide the same coverage as a quality analogical AM radio. Other aspects are the technical conditions of the Brazilian broadcasting stations and their adaptability to a digital system: 37% of them still function with valve transmitters, most of them being between AM commercial and public radios. As they are broadcasting stations with few resources for investment in transistorized equipment, it will be necessary to create public policies of incentive for digitalization, which would collaborate to the sustainability of the sector. The data are integrated into national research, based on a sample of 750 stations, which corresponds to 96.42% of the profile of the Brazilian radio market.

Keywords: radio broadcasting, digitalization, communication policy

"...friends, I can tell you of the last 30 years. The years to come... humm, we do not know anything."

"..Right now we do not have any view of the future..."

"...I see the radio as the unknown in the face of such significant changes for the future and the little orientation that we have in the present... after all, how do we prepare for it?..."

(Testimonies of radio broadcasters about the digitalization of the radio in Brazil)

Throughout the last two decades, there has been a growing of a consensus within the radio broadcasting media on the imperative necessity to digitalize sound radio broadcasting, as a strategy that will allow for its integration into the new multimedia profile that should emerge from the incessant marching towards a convergence. This true combination of techniques implies sensitive changes in production, commercialization, and distribution of information and communication services. It will mean making the same information available on different network platforms (mobile phones, Internet) in different languages (text, image, sound) and in different modes of interactivity. This also means altering the logic of how the mediatic industries operate, namely, the form of how they process and distribute information and entertainment to the public of these media.

The new resources made available by technology have radically increased the way in which the public has access to the means of communication, including our good and old radio. In the past, the transmissions of the vehicle were limited to the part of the radio electric spectrum that had AM and FM frequencies. Today, the possibilities of listening have been extended and the radio has been absorbed by the digital platforms: Internet, MP3 players, mobile telephones, and satellite. This situation led the American research institute – Arbitron – to name this phenomenon as "radio without limits". The growing integration of radio into Internet and onto the digital platforms is confronted with the process of migration of the media to a system of digital transmission that has been showing itself to be slow and irregular in most of the world.

This context of uncertainties is also replicated in Brazil. Doubts, a lack of perspectives, apart from anxieties about the economic difficulties faced in the present and the uncertainties with the real benefits that the technological changes could offer, are some of the feelings expressed by Brazilian radio broadcasters when questioned about what they think about the process of digitalization of the radio in the country. A process that has encouraged a growing sensation of deadlock in the owners and professionals of broadcasting stations and of an indefinite prolonging in the track to be adopted for technological change and operated in radio. These are uncertainties fed mainly by the difficulties found in the development of a new technological standard that could fully attend to the basic technical regulation established by the Ministry of Communications for the full functioning of the Brazilian System of Digital Radio. Furthermore, the uncertainties are fed by the inadequacy of the new transmission systems in existence to the reality of the Brazilian radio broadcasting market. Moreover, they are fed by the absence of public policies to promote the transition from analogical to digital, and finally by the political disputes among the different actors involved in the process to guarantee political positions already historically reached.

From a historical perspective, although not less paradoxical, the sector developed from an initial moment marked by euphoria and hope, due to the advertising of potential innovations offered by the new technology, to a more recent one that is proving to be a moment of great indetermination. Uncertainties that have offered perplexity, in a larger proportion to the small and medium radiobroadcaster, in relation to the immediate future of the stations, to the model of business, and to survival as a medium of popular reach in the Brazilian scenario.

The market of which we are talking

The Brazilian radio market is the second largest in the Americas, being one step behind the United States. According to the data from the Ministry of Communications, updated in 2011, there are 9.184 stations in operation in the country, 49% being communitarian, 46% commercial, and 5% educational. The communitarian radios, stations under the administration of segments of civil society or of resident associations without any profitable aims, with a potency of 25 watts, have had an accelerated growth since their regulation in 1998, going from 542 in 1998 to 4.526 in 2011.

Although there is no central position in an economic sense in the mediatic scenario evermore convergent and characterized by the diversity of players in the offer of content, the radio in Brazil is still a very popular medium. According to data from the Brazilian Institute of Geography and Statistics (IBGE) of 2009, radios are present in 88% of homes, 80% of cars in circulation, and in 36% of mobile telephones. The penetration of the radio reaches 90% of the population and the average rate of audience reaches 12 to 15%[1.] The commercial stations have a yearly invoicing of more than a billion dollars, and receive just over 4% of the advertising sum destined to all the communication vehicles (Antonik, 2011).

Throughout history, a contiguous relation between the communication companies and the political agents molded the Brazilian radio broadcasting market. This proximity established a system of public concessions

1 National Research by Sample of Homes Summary of Indicators 2009 available at http://ibge.gov.br/home/estatistica/populacao/trabalhoerendimento/pnad2009/default.shtm

through time, constructed and operated from political party interests and conveniences, by means of obtaining incentives and fiscal subsidy, of privileged participation in the distribution of publicity sums from the government, or by the achievement of advantages for the planned development of telecommunication infrastructure, as well as by the establishment of regulatory acts that guaranteed the free flow of capital. The symbiotic model between communication and politics established a dense concentration of economic, political, and symbolic power in the hands of private entities concentrated in the South and Southeastern regions of the country, where there is a strong consumer market that demands vigorous advertising investments, especially in the larger radios in size and audience that act online via satellite. In opposition, the commercial stations of the other regions in the country, highlighting those situated in small interior towns, face serious difficulties to obtain sponsors and guarantee economic sustainability.

In addition to this aspect, the model of channel concessions depends on the approval of the National Congress, which, without the supervision of an independent regulatory organ, promoted a representative distortion in a market, in which deputies and senators, in full exercise of their popular mandates, directly or indirectly explore radio or TV channels. This situation flagrantly disrespects article 54 of the Constitution, which forbids them to maintain contracts or have paid posts, functions, or jobs in companies that are public service concessionaire (Lima, 2005). Parallel to this, members of the Congress who are owners of stations integrate the Commission of Science and Technology, Communication, and Computer Science of the National Congress, where the requests for concessions and renewal of conferrals are approved for the channels of radio broadcasting. Article 223 of the Constitution determines that the responsibility for the conferral belongs to the Executive Power but it also states that it is only true when approved by the Legislative Power. However, the same article establishes its own rules for renewal. It does not occur only if two fifths of the National Congress, in nominal voting, pronounces itself against it. This procedure of exception makes the appreciation of renewal of radios and TV conferrals rare in a different way to other kinds of public concessions. During its validity, the conferral can only be canceled by a legal decision. Therefore, different from other public services, the renewal of radios and TV concessions is practically automatic and without more thorough evaluation.

Digital radios: paths of the debate

The configuration of the market of Brazilian radio broadcasting established its own dynamic for the discussion on the digitalization of the spectrum molded by the historical process of its formation. Having established a closer relation with the political and government agents, the more economically powerful radio entrepreneurs have demonstrated preferences in the attempt to influence government decisions, in relation to the technological profile to be adopted in the digitalization of the sector, with the intention of preserving current positions and, at the same time, regulating the public debate on the subject beforehand.

On the other hand, sectors of the civil society, like the social movements related to the communitarian radios, put pressure on the Ministry of Communications to establish adoption parameters for the new technical standard, which will promote enlargement, diversification, and democratization of the model of radio broadcasting and the emergence of sustainable forms of financing. At the root of the arguments of the civil society is the comprehension that the use of technology cannot be an element in the increase of differences in technological standards, in production resources, and in financing, which are already currently faced by the stations. Moreover, they also argue that the technological transition should create opportunities to incorporate new actors into the scenario of radio broadcasting, being they educational, cultural, institutional, or communitarian.

The Brazilian Association of Radio and Television (ABERT) has led the discussion on digitalization since 1998, when it held the first demonstration of the functioning of DAB (Digital Audio Broadcasting) technology at their yearly congress. The radio broadcasters had the opportunity to see the prototype in landline and mobile

reception modality of DAB. At a Technical Seminar of ABERT held in 2000 representatives of Ibiquity, detainers of IBOC – currently named *HD Radio* – and *Dibeg*, responsible for the publication of ISDB-Tn (Services Digital Broadcasting – Terrestrial Narrowband), showed how these systems function. In 2001, the entity created a Technical Group to study the introduction of digital radio with the mission of accompanying, researching, and subsidizing a future decision by the government, and of maintaining the radio broadcasters informed in relation to the model to be chosen. In the next year, ABERT put out an informative primer about the active systems in the world, pointing out the challenges for the future of the radio. The technological demonstrations were frequent at the yearly congresses held from 2000 to 2010, spanning all the digital transmission formats, including the novelties of DRM (Digital Radio Mondiale).

The debate was intensified in the period between 2006 and 2010 when 28 tests (23 with HD Radio and 05 with DRM) were held. Of this sum, 14 tests presented final reports and 14 were not concluded. Some factors prevented half of the stations from finishing the tests, amongst which the lack of a standard methodology defined by the Ministry of Communications. The situation was only solved in 2007, when the Department of Electrical Engineering at the University of Brasilia established criteria and procedures for tests similar to some used in the United Stated by NRSC (National Radio Systems Committee). The aim was to evaluate the quality of audio in the system, an area of coverage compared to an analogical reach, robustness of digital signals, and the degree of coexistence without mutual interference between analogical and digital signals.

With the standardization of the tests, the federal government, ABERT, and the Mackenzie Institute of São Paulo performed the first reliable test with the system HD RADIO in the period between 2007 and 2008. The North American system operated experimentally in five AM and FM stations. The transmission and reception conditions were analyzed during nine months, as well as the robustness of the digital signal, accompanied by engineers from the Ministry of Communications and from the National Agency of Telecommunications (ANATEL). The technical report of the Mackenzie Institute (2008) concluded that the digital reception offered a leap in quality in relation to the analogical system, especially well for AM in points where the quality of analogical audio was considered fair or very bad. The results pointed to the fact that the real coverage of analogical stations, especially AM, remained below what was estimated by the models of determination of field intensity currently adopted. Serious problems of broadcasting in this technology were detected with areas of larger shadows than those that are observed in analogical systems when AM is used. That is, the HD Radio did not provide the same coverage of the analogical AM radio with quality, being susceptible to urban noise. In relation to robustness, the tests indicated an improvement of the signal in relation to the analogical modulation, although the AM band still requires a lot of perfection (Mackenzie, 2008)[2].

The tests revealed that the range of the discussion has always been circumscribed to the choice of a standard and to the technical capacities for a transmission of quality audio in any reception situation. Furthermore, it has also been restricted to satisfactory levels of efficiency in the capture of the signal in cities with different topographic characteristics, and the conditions of use of the electromagnetic spectrum, as well as providing the maintenance of the original area of coverage of the signal of the station.

The testing phase consolidated, among many commercial stations, the choice of the North American standard HD Radio, due to the advantages that it offers, mainly in the sense of the preservation of the business and the brand, in view of offering a hybrid transition of the system. The American standard allows for the mutual existence of the analogical AM and FM channels with the new digital mode, without needing to change the frequency on the dial. Once the digital signal is transmitted from an adjacent channel, an additional channel is not necessary, nor is it necessary to require new bids or conferrals. Another advantage is to favor the use of existing infrastructure. The changing of towers does not seem to be a necessity, nor changing the places of transmission,

[2] The tests with DRM done by the University of Brasília – UnB – for the Brazilian Communication Company were not conclusive and because of this, they are not mentioned in this paper.

although some stations only need a new exciter of digital radio broadcasting and some equipment and attached devices.

The critical point, which is feared, especially by the small and medium sized stations in the interior of the country, is the possible payment of royalties in the use of the technology. Most of them claim not having additional financial resources to maintain the payment and have suggested the interference of the central government in the sense of negotiating an alternative with the consortium detainer of the technology.

Nevertheless, we believe that a subject relative to the current process of technological change in sound radio broadcasting has not been very well discussed: the real conditions of adaptability of the Brazilian stations to the new digital technology. We should consider that the reflection on this issue is complex, and should be developed from the understanding of different aspects that mark the action of the stations, in an integrated manner. This also includes the comprehension of the models of exploring radio frequency, the forms of financing, administration and insertion of radio in the different local and regional markets, which compose the varied marketing universe of Brazilian radio. Faced with this preoccupation, fundamental questions emerge that mark out the research done, and which are concentrated on surveying the current state of preparation of the national stations, to face the changes in the process of digital migration; the different degrees of adaptation of the stations that are now in the debate; and the public policies needed to guide and support this change in a sustainable way.

What radios do we have?

The research project "Mapping Technical Conditions of the Stations of Brazilian Radios and their Adaptability to the Standard of Sound Terrestrial Digital Transmission"[3] worked on at the Laboratory of Communication Policies of the University of Brasilia (LAPCOM-UnB), under the leadership of the authors of this paper, approaches and analyzes these subjects. It is a new diagnosis in the country that reunited data, which encompass the technical, productive, and physical infrastructure characteristics of the stations. These uncover the profile of the professionals, who act there within and that explain and allow for the comprehension of the technical and economic strategies of confrontation of the process of digitalization, being planned, or not, by the radio broadcasters.

With the information obtained from the survey, we produced an analytical reading of the multiple operational conditions presented by the stations in the country. The objective of generating this knowledge is to constitute a bank of information that can collaborate with the realistic design of public policies applied to the process of technological transition, to encourage and stimulate the discussion among the different sectors – radiobroadcasters, industry, citizens and the State – involved in the chain of radio broadcasting value. With the data collected and interpreted, we established standards of general classification of the stations in relation to their adaptability to the digital transmission system.

To develop the mapping, a database was constituted with 6.338 AM, FM, OC and OT stations of a commercial, educational, cultural, public and communitarian character. For this, we used the record from the registration of the Ministry of Communications, from ANATEL and from the catalog of Media from the Media Group of São Paulo[4]. The data used were those related to items like the identification of the radio, its locality, address, prefix, type of concession, and type of frequency among others. For the research, we created a computer system that permitted the automatic generation of access passwords aimed at the exclusive use of stations, which agreed to answer an electronic questionnaire, made available on the site www.lapcom.unb.br. The survey was complemented by the distribution of a printed questionnaire to the registered stations with a pre-paid envelope. This allowed those radios that do not have access to Internet to answer the form and send it by mail without any

[3] The research project was financed by the Ford Foundation.

[4] It was necessary to obtain information on the stations in other non official databases, considering the high level of not updated data in the registrations of the stations within the Ministry of Communications, available on the System of Control of Radio Broadcasting.

cost. During the survey, more than two strategies were used to guarantee a larger participation of radiobroadcasters: personalized marketing e-mails, as well as continuous actions of telemarketing were sent to those stations that had not answered the questionnaire within the stipulated deadline.

Between April 2009 and December 2010, fewer than 750 Brazilian stations participated in the investigation, 76.44% of which named themselves commercial, 10.06% educational and 13.50% communitarian. Of this group, 56% are FM (including the communitarian ones), 43% AM and only 1% presented themselves as OC and OT. Most of them are installed in the South and Southeast regions. The values collected, compared to those registered in the database allow us to state that the partial results here within, practically correspond to 96.42% of the profile of Brazilian radios.[5]

Profile of Brazilian Broadcasting Stations

The data collected allows us to state that the majority of the participants in the research is constituted by small and medium stations with a very limited physical infrastructure. In general, the sectors of these radios are installed in spaces that do not go beyond 7 rooms, the spaces destined to the administration, to the production of content, to the studios and technical and administrative areas there included. Most of them only have two studios, one for transmission (79.61%) and another for production (77.75%); one room dedicated to journalist editing (74.46%), one room for the production of programs (71.31%) and one for musical production (68.87%), one destined to the commercial management (84.46%) and one dedicated to the general management (84.95%). A little more than half the stations have rooms for programming management (57.85%) and for the technical director (58.88%). We also observed that little more than a fifth of the stations surveyed stated not having a production room (21.07%), one fourth do not present a room for musical programming (26.82%) and little more than a sixth do not even have an editorial office (16.67%). In the radio broadcasters' manifestations, we could also register that the installation conditions of these sectors very precarious and the available resources to work are greatly reduced. This context indicates a profile of the conditions of production that are very limited, determining anchored programming, primarily in the communicative capacity and personal charisma of the communicators and in the use of music, with little production of programs and of journalism itself.

In general, our respondents are local stations, considering that 74.06% do not integrate the satellite network. Moreover, of the 25.94% that are on the network, only 13.37% are heads of networks. Most of them appear as affiliates (86.63%). The predominant characteristic of the programming is a combination, balanced up to a point, between journalism (27.21%) and music (27.86%), tacked by services (17.68%) and variety programs with popular communicators (11.52%). The fact that little less than 5% of them declared having communitarian programs in their programming comes to attention, and of those who do have them, most concentrate on the specific segment of communitarian radios.

The profile of the professionals found until now, allows us to confirm the diagnosis of another research project developed by FGV for ABERT in 2008: more than half of the people employed by the commercial radios are only of a high school level[6]. In the UnB-LAPCOM survey, of the 750 participant stations, just under 38% do not have any journalists at higher education level, and 27% of the stations also inform that they do not have producers. Of the stations that have journalists, 47% only have from one to three undergraduate professionals, and 53% state having from one to three journalists without a higher education level. In the stations that register the presence of producers, 34% present from one to three producers graduated in Communications, and 66% have from one to three producers without any university degree. These indicators suggest unfavorable conditions for production of journalistic, informative, and even entertainment content, especially if the strong presence of

[5] The survey presents around 3.50% of sample error.
[6] Analysis of the Socio-economic Profile of Radio Broadcasting in Brazil, FGV, available at http://www.abert.org.br:8080/abert/?q=biblioteca_Censo_Radiodifusão

announcers and the importance of announcers and communicators are considered within the staff at the stations, as well as in the structuring of their programs. Approximately 68% of the stations have from one to 6 announcers, and 70% from one to 6 communicators. Another interesting datum is the reduced presence of advertisers in the commercial radio segment: 50% of the universe surveyed does not have one of these professionals, and 39% said they had less than three in the staff.

Digitalization of production processes

The mapping of the stations draws a panorama in which most of them have already incorporated digital resources to the processes of content production, be it by the disseminated use of computers in the main sectors of the radios, or in the use of transistorized equipment. The large majority of the stations has at least, one to three computers in the following installations: transmission studios (72.56%), production studios (84.29%), production room (70.84%), editorial offices (59.46%), and rooms for general, technical, and programming management (67.34%).

In terms of studio equipment, we observed a considerable decrease in the presence of analogical technology resources: 51.53% do not have a K7 reproducer, 84.53% do not use DAT, 80.76% have abolished roll ribbon recorders, and 92.08% have already removed the old cartridges from operations. Replacing this equipment, the computer occupies the space left and has become the central machine in the measures used, in which 83.12% of the radios use from one to three computers in the production studio, and in both cases, a system of automation in the programming has been installed. A little below 13% of the radios heard, stated having no computers.

In the editorial part, 80% of them said they had at least one program for the processing and edition of sound in the computers that they used in the productions. From the data and the information collected from many professionals at the stations, it is possible to infer that computers still cohabit with analogical equipment, the entire and immediate substitution of which is considered by the radio broadcasters to be of difficult implementation, due to the high cost and the low investment capacity of most of the stations. An example of this cohabitation among technologies is the digital console table, an essential element in the new transmitting process. From all those who answered the survey, 52% stated not having one, while 48% informed us that they had from one to three in operation. The analogical console table continues in operation in more than 92.71% of the surveyed stations, cohabiting with the new digital equipment in most of them. Although the audio automation systems are already present in a representative segment of the stations, the use of recorders and mini disc reproducers (66%) and recorders and reproducers of CD (88%) is still reasonably common in the operating of the stations.

Another relevant datum that conforms to the varying technological universe of the stations is the increasing number of radios with access to Internet (96.78%). Of this sum, 95.45% used dialed access, and 4.55% broadband. At half of the stations that already had Internet, the access is available in the entire facilities. The rate of computerization in the segment reflects the increase in amounts of computers in Brazil in the last 5 years[7,] and the heavy expansion of broadband access, which has been occurring in the country. This increase made the points of access leap from the near on eleven million and a half at the end of 2008 to just over forty five million at the end of August 2011, that is, an increase of around 400% in little over three years.[8] More than 4.600 municipalities,

[7] The number of computers in Brazil has reached the mark of 60 million, between corporative and residential machines. With this, proportionally speaking, there is one computer for every three Brazilians. The prediction is that, in 2012, the country will have 100 million computers, which would be equal to a micro for every two inhabitants. The data is in the 20th Yearly Research in Use of Computer Science, held by the Center of Applied Computer Science of the Getulio Vargas Foundation (FGV) of 2008. JB Online http://jbonline.terra.com.br/pextra/2009/05/26/e260510292.asp

[8] Data from the Brazilian Association of Telecommunications of 2011. Available at http://www.techtudo.com.br/.Acessado on August 31 2011.

which corresponds to 82% of the entire area of the Brazilian territory already have the infrastructure for fixed broadband access.[9]

The increasing computerization that we are witnessing, led 79.55% of the stations to create a webpage on Internet, 34.48% having started operations more than five years ago. It is in the communitarian radios that most of the stations have not yet opened their own webpage. The radio broadcasters consider a webpage mainly as a space of interaction with the listeners (44%), and as an alternative form of transmitting live programming (41%). Due to this, the most effective motivation of the radios to create their webpages is based on the idea of enlarging the proximity with the listener (33.68%) followed by the aim to increase audience (31.57%), and attract new advertisers (23.15%). The act that surprises us is the fact that only 2% use Internet as a space to make podcast productions available. According to the stations, the best benefits received from the creation of their webpages were the increase in publication of their events (54.36%), and a better proximity and interaction with the listeners (40.37%), as well as the growth in numbers of advertisers (3.63%). The radios that still do not have webpages justify that it is because of a lack of resources (38.26%), followed by the high cost of the infrastructure of communication and maintenance of the sites (30.43%), and, finally, because the profile of the audience does not require having a website on Internet (20.86%). Those who intend to create a website on Internet say that they will do so within the next six months at the most.

According to the stations that have already had sites for some time, the creation of webpages has not yet provoked a significant change in the way the listeners maintain contact with the stations. The audience still does not consider the sites to be the main reference to interact with the stations. According to the radio broadcasters, the traditional models of communication centered on the telephone (35.02%), electronic mail (18.97%), letters (14%), stations' sites (11.53%), and personal visits to the stations are still predominant. The service of SMS telephone messages and chats, mechanisms that are of late so popular as an alternate form of participation, reach 9.5% of the entire participation.

Transmission Structure

One of the tenets at the beginning of the survey was of a significant number of radios operating with valve transmitters, thus being necessary to change to another transistorized type with devices that could facilitate possible adaptations to the process of digitalization[10]. We suspected that the educational, communitarian, and commercial stations with low invoicing would have difficulties to invest in resources in the changing of their transmission parks. A national modular transmitter of 5 KW, with medium quality has a market cost of approximately three hundred thousand *reais* (US$200.000), while one of superior quality can reach the sum of seven hundred thousand *reais* (US$450.000).

The refined data show that our preoccupation was proceeding. After all, 35% of the stations still function with valve transmitters, while 65% operate with modular transmitters. On analyzing the data by way of the kind of transmission technology, we observed that 37% of the valve transmitters are within AM stations and 63% within FM. Although the communitarian ones are within the classification of FM, only five of the 84 surveyed said they had valve transmitters. Among the commercial FM, half of them have valve equipment, a third of the AM commercial ones, a little under half of the FM educational ones, half the AM educational ones, and all the OC and OT stations present this kind of technology.

Most of the transmitters are of national fabrication (89.54%) and can be considered new. Apart from this, we did not find the existence of a practice of buying used transmitters, seeing as most of the radios declare they

[9] Revista Carta Capital 29/07/2010.

[10] Modular transmitters use potency transistors in place of the old transmission valves. This allows for the decrease in size of the transmitter cabinet and a large economy in electric energy. Another important characteristic is to be able to connect via Internet, like this, permitting maintenance at a distance by the responsible engineer.

acquired their transmitters first hand (95%). In the analyzed context, stations that present transmitters with less than 10 years of use (68%) predominate. What becomes evident is that 11.33% of the stations have transmitters that have been in use for 20 years. Most of the stations operate with transmitters, the potency of which does not go beyond 10 KW (72.96%).

Faced with this framework, 52% of the stations would like to change their transmitters, to adapt to the requirements of digital radio (39.07%), enlarge the potency in which they transmit (29.07%), or, due to the advanced age of the equipment and difficulties in buying replacement parts (33%). Those who do not want to change allege that the buying of a used transmitter is recent (less than 5 years), or that the current equipment fully attends to the necessities of the station. However, 16% of the stations heard do not change due to the uncertainties of technology, the lack of resources, and the cost of the transmitter.

We must still consider that the capacity of manifested investment by most of the stations, to promote the adaptations to digital technology, does not come even near US$150.000 (81%). In this issue, the difficulty is generalized and no significant differences are seen among the stations in the kind of technology or in the region where they are located. Whoever already has plans to digitalize their station (52%), has a modular transmitter (31%), hence, consider they are a little more integrated in the new process. Among those who have less than US$150.000 to invest in digitalization, 53% operate with modular transmitters and 27% with valve transmitters. This indicator warns us of the low investment capacity of the stations that need profound and substantial changes in their transmission park to conform to the new technology, especially the AM commercial stations and the (AM and FM) educational ones, where the largest number of valve transmitters are concentrated. Little more than one tenth of the stations (13%) have an investment capacity of over US$200.000.

Knowledge on Transmission Digitalization

Another objective of the survey was to identify the level of knowledge of the radio broadcasters and of the technicians of the sector about the technology of digital transmission. We observed that 86.83% of the managers/directors and 76.46% of the technicians state that they accompany the discussion to a certain extent and a little under a fourth of the technicians declare that they are not informed in relation to the subject (23.54%).

The most common means that they usually use to get information are news from the press, followed by the reading of specialized magazines, through participation in technical congresses and through the information from the Ministry of Communications. Less than 8% of the technicians have already participated in some training and diploma course, or visited stations that are developing tests with digital systems.

The most frequent reasons, given by radio broadcasters, for not being more assiduous in discussions, are based on a perception that the debates are centralized in the hands of few (47%), in the belief that the technological changes will not happen within the next five years (32.35%), as well as in the belief that the process is being developed without the required caution and tranquility (16.91%). Moreover, this is due to the lack of seriousness in the discussions and the dissension in relation to path of the data by the government in the process of decision making about the new technological standards (4.00%).

The position of ABERT and, initially, of the government in favor of HD Radio system was much published by the media, and consequently contributed to form a climate of opinion amongst the radio broadcasters. We can see this in the answers and comments made by the radio broadcasters and professionals who demonstrate that just over a third of the technicians indicated that the system they knew best is the American one (39.17%), followed by the European DRM (18.85%) and DAB (7.83%) and finally the Japanese ISDB (6.72%). Less than a fifth of them state they know about all the existing current systems (19%), and a tenth completely ignore the technological standards that are being discussed. A little over one third of the technicians state they have knowledge, classified as introductory about the technology of digital radios (35.86%). Less than half (42.47%) say

they only have precarious knowledge in relation to the digitalization and just over one-fifth (22.11%) consider themselves informed.

Awaiting Digitalization

The country is going through a moment of uncertainty in relation to the standards of digital transmission. The Ministry of Communications promoted initial tests in search of a standard that could be adequate to the system of Brazilian radio broadcasting. Only two rules for digital radios were tested: HD Radio, the ownership standard in the United States, with unexpected results, and which deserves even more publication, and DRM (Digital Radio Mondale), of a European origin, done on a more inferior scale than the American one, and which has not even been finished, neither has it offered definite conclusions upto this moment.

The most recent action of the government in this process was the administrative rule n.290/2010 from March 31 2010 from the Ministry of Communications, instituting the Brazilian System of Digital Radio – SBRD. The document gives signs of the adoption of fundamental parameters for the process of choosing technological solutions, such as to provide the efficient use of the spectrum of radio frequency. As well as this, to also make the participation of Brazilian teaching and research institutions possible in the adjustment and improvement of the system, according to the necessities of the country. In addition, to make solutions for low potency transmissions feasible, with reduced costs, as well as to allow for the creation of a network of distance education. It also motivates the regional and local industry to produce digital instruments and services, allows for the transfer of technology to the Brazilian industry of transmitters and receptors, exemption of royalties guaranteed, where appropriate. The institution of SBRD by far ends the debate, as the model to be adopted has not even been determined in the administrative rule. Furthermore, in May 2011, the Ministry of Communications resumed the process of tests for the technologies of digitalization of radios, by means of the launching of a second public call, so that those interested in experimenting could do so upto March 2012.

This situation of uncertainty influences the way that radio broadcasters face the task of preparing themselves for the arrival of digitalization. Among the participants of the survey, 54% said that they already had "some type of plan" for digitalization, while 39% do not think about it because they are awaiting the technical definitions about the standard.

There is quite a positive expectancy among the radio broadcasters in relation to the possible profits that the new technology will give the stations. The hope that with the digitalization it will be possible to obtain a representative improvement in the quality of sound (37%), the increment in the offer of additional products (17%), the increase in audience (14%), and the desired growth in invoicing (10%). On the other hand, few see in technology a potential to acquire different listeners from the current profile (9.58%), nor do they believe in the improvement in the administration of radio as a business (7%).

This optimism in relation to the technical improvement goes against the critical analysis of the radio broadcasters, relative to the way the process of migration is being carried out. A little over one-fifth of the stations think that the process is slower than should be (21%) and just over one-sixth of them consider the discussions to be centralized and occur around very few radio broadcasters (16.19%). For approximately one-sixth of the radios, the process has not been developed with the appropriate quantity of information (15.71%), and has been marked by the absence of clear policies by the government (15%). A little over 25% believe that the process has had little participation of the radio broadcasters, that the discussions are centralized around the Ministry of Communications and that they have not be conducted with the deserved caution and necessary time.

The bottom line is that the radio broadcasters are awaiting public policies that, according to them, will help them face the enormous challenges that the transition will impose on the stations. The supporting measures that the radio broadcasters believe could be more important in this process are fiscal exemption in the purchase of equipment (36.28%), and the opening of lines of credit in official banks for the financing of the technological

modernization process of the stations (28.24%). The other measures also considered – and to be adopted by the radio broadcasters – are the reformation in the mode of administration of the stations as an enterprise (12.44%) and the establishment of a coherent industrial policy (6.11%). Nevertheless, it is necessary to consider that 17% of the stations said they were not sure which measures should be taken during the process of migration. It is important to perceive that the radio broadcasters in these data manifest a clear expectation not only in the definition by the government of a technological standard for transmission, but that it will create fiscal incentives and credit sources to subsidize the change.

Optimism and Uncertainties

As well as the objective and quantifiable information, the survey had the intention of uncovering what radio broadcasters think about the process of choosing and implementation of a new technological platform for radios, and which would be the expectations that they have, in relation to the present and the immediate future of the stations. In addition, what the possible changes announced by the radio broadcasting market are with the approaching process of change. In general, it is possible, from the hundreds of manifestations by radio broadcasters, managers, directors, and professionals in the sector, to perceive feelings of hope and animation with the innovations to be offered by the new technology. However, this "state of animation", optimistic to a certain degree, cohabits with a profound sensation of insecurity, generated by the quest that exists about the survival of the media, by the doubts coming from the commercial and finance crisis faced by the sector, added to the lack of perspective of the current reality.

> *"...It is difficult to declare something, because of the uncertainties of the sector. The financial difficulties are never ending, and they do not allow us to speak of investments. The advertising market is slowly disregarding our capacity as a media vehicle, which is an enormous lack of knowledge about the behavior of the people, who have not stopped listening to the radio. However, there is still hope that we will be able to survive with this media in the next 20 years... Summarizing: with or without digital radio, the next 5 years will be very difficult, as were the last 5 years..."*
>
> *"...I struggle every day to cross the quagmire and maintain the radio on its feet. In relation to the future of radio, I see it with lots of difficulties and uncertainties to survive...*
>
> *"...the AM radio needs a solution that will put it on an equal footing with the rest of the Medias and the digitalization is our salvation and only path to survival...*
>
> *"...a closer relation with the ministry and producing the means to allow for the modernization of the stations in the country. Develop a policy that would help the radio broadcasters."*

(Excerpts of comments made by radio broadcasters who participated in the survey)

The manifestations of hope and optimism are based largely on the constitution of a positive view – and idealized to a certain point – in relation to what the digital technology can offer the radio. For the radio broadcasters, digitalization could be an invaluable instrument of economic recuperation, audience increment, and the redeeming of the importance that the vehicle has in day-to-day life. Besides, in several manifestations, the stations demonstrated a great preoccupation with a larger problem related to the fact that radio, notably the AM stations, and to a smaller extent, the FM ones, are not having the renewal of their public at a decent rhythm and in sufficient quantities. In this context, the technological innovations are seen by the stations as important and powerful instruments for the radio to again come closer to the younger segments of the population in an efficient and continuous way, and transform them once again in potential consumers of the programming.

Yet the insecurity of the radio broadcasters manifests itself largely in the analysis and negative values, as is happening in the process of public debates on the adoption of technology, of the (non)orientations of the responsible government sectors, for carrying out the process of discussion, and in decisions of which technology to adopt, and finally, in why many of the radio broadcasters believe that radio, as a business, is going through a difficult, problematic phase full of challenges. Technological stagnation and a persistent decadence predominate in the sector – quantitative and qualitatively – in the production of content. This is explained by the stations as a crisis context, as the sum of complex causes that are tied to issues like: a) a lack of support from the government by means of public policies of investment for the modernization and development of the sector; b) with the "disloyal commercial competition" which they denominate as "communitarian and pirate" stations all over the country; c) with the lack of an equal fiscal policy among the commercial, communitarian, and educational stations by the governments.

May it also be registered that part of the radio broadcasters also believe that the current crisis faced by the sector comes from a lack of more professionalism and a strategy of business planning of the radio broadcasting sector itself. From the point of view of these stations, the vehicle and its administrators should rethink the form of exploration of the so-called "radio business". In this case, the modernization of the sector would also go through the qualification of the production actions of content and the selling of programming to the publicity market. These changes are seen as enormous challenges for the sector, which should not think – according to the radio broadcasters themselves – that the technology will be the guarantee, in its own right, of the success and improvement that radio broadcasting is demanding in search of a sustainable future.

Concluding: Between Anxiety and Expectation

The reading of the broadcasters and professionals' manifestations in the sector and the analysis of the quantitative data collected by the survey permits us to point out some conclusions about the situation of the studied radios before the imminent process of digitalization.

The first perception is related to the infrastructure of the Brazilian stations. Our survey shows that most of the radios present limited physical installations, precarious conditions of production in the realm of technical possibilities, as well as in the existence of specialized human resources like journalists and producers. There is also a low invoicing; they do not present good rates of technological investment and renewal, and very little financial "working power" to face the enormous challenges, which the digitalization process will bring to the media, to its professionals and owners.

Regardless of the uncertainty, in relation to the adoption of a standard for digital radio, and consequently the uncertainty of the definite needs and possibilities of adaptation, which will be offered by the radios, the limited and precarious conditions found by the survey give us a profile of a complicated scenario, for the segments of sound radio broadcasting to face in an autonomous way and with the minimum of security, as well as the still unpredictable "rough sea" of digitalization and its many consequences. An outcry for the government to establish a group of coherent public policies in the industrial, fiscal, or credit scope, which would represent an effective support to all the sectors of the productive chain, and sustain the implementation of a new technological base in Brazilian radio are the main arguments that fundament the manifestations of small and medium radio broadcasters. This call for the government to act in an articulated way on several fronts of action also marks the discourse of the communitarian, educational, and public stations that were heard.

These conditions demonstrate just how urgent it is for the government and other actors involved to promote an ample discussion with the objective of thinking about the complex situation in which the radio finds itself, and how it will confront the different transformations that will come with the alteration of technology that is already on the horizon. The message given by the radio broadcasters is clear: there is no more time to lose, and the process of debate, tests, and definition of the technical system to be adopted in the digitalization of the

media, must occur as soon as possible, without interruptions, and with the appropriate support and development from the responsible government sectors.

The complexity of the future scenario of changes, to be put into operation in radio, also strengthens the need to establish strategies to be implemented, not only at the moment of choosing the new transmission system, but mainly in the later period of its adoption, the moment in which new production, commercialization and use of the medium will be being newly designed. These actions should be satisfactorily efficient to overcome the threats of sustainability of the medium as a business emerging from the deepening of the current economic crisis faced by the Brazilian stations. The manifestations collected demonstrate that the radio broadcasters have strong expectations about the future actions of furtherance for the sector. They should be of a wide spectrum, reaching from the technical capacitation of the professionals to the establishment of financial and fiscal measures, which will stimulate the capitalization of the stations, to attend to the investments required by technological migration, and at a second moment, to continue to exist in a sustainable way within the new digital system.

At present, the government spheres and, up until now, some of the sectors that represent parts of the radio broadcasters have manifested preoccupation in a predominant way, with the characteristics of each one of the technologies that are in the public debate. Nevertheless, from the point of view of the stations heard in the survey, these same actors forget and barely speak about the existing infrastructural conditions in the stations, spread around the interior of the country, and which barely show actions for the creation of real investment conditions and for government support required by the sector at the moment. According to the same stations, as from the choice of a new technological standard, there will actually be a possibility of a profound renewal of equipment, leading, in extreme cases, many stations to put their own transmission parks, literally in the "trash", faced with the impossibilities of providing technical adaptations.

Moreover, in the perspective of many of those surveyed, the process of technological incorporation and lack of investment, planning, and productive and commercial strategies, associated to the scarcity of adaptation to the conditions of the Brazilian market in technological standards, topography, geographic dimension, and demographic density could condemn the stations of Modulated Amplitude to isolation from a digitalized radio broadcasting system, if urgent measures are not thought up and put into practice.

Faced with a wide group of technical, political, and social interests, which are involved in the process of the digital radio debate, in an extent that can be perceived by the existing divergence among the different segments of sound radio broadcasting – commercial, educational, public, and communitarian –, it is imperious that the Ministry of Communications effectively take over its government role and carry out the public debate on digitalization. Like this establishing permanent forums for the discussion of parameters – technical, political, economic, and regulatory – that will provide the new system with social legitimacy. This value will allow the government to fulfill the difficult task of solving a complicated equation: carrying out the process so that we have a digital radio system, technically viable, efficient in reach and quality of audio, economically sustainable, representative of the social interests, and with parameters of democratic access. Even if the government must take measures – technical and political – that go against the interests of historically powerful segments of the national radio broadcasting. The path is uncertain, the needs are real, and the challenge has been launched…

References

Antonik, L R. (2011). *Tudo o que você precisa saber sobre rádio e televisão – licenças, outorgas, taxa de penetração, receitas e receptores*. Brasilia: mimeo

Atlas Brasileiro de Telecomunicações (2010) TELETIME

Bianco, Nelia Del (2010). 'O Futuro do Rádio no Cenário da Convergência Frente às Incertezas Quanto aos Modelos de Transmissão Digital'. Revista de Economía Política de las Tecnologías de la Información y Comunicación Volume XI, Numero 1, Ene. a Abr. de 2010. http://www.eptic.com.br

DAB gets a poor reception. *The Guardian*, (09.10.2006). Available at http://www.guardian.co.uk/media/2006/oct/09/mondaymediasection.radio

Digital Radio Working Group - Interim report for the Secretary of State for Culture, Media and Sport. Inglaterra, June 2008

Infinite Dial 2008: Radio's Digital Platforms Online, Satellite, HD Radio TM and Podcasting. Arbitron and Edson Media Research. Available at www.arbitron.org

Lima. V.A (2005). As bases do coronelismo eletrônico. Observatório da imprensa. Available at http://www.observatoriodaimprensa.com.br/artigos.asp?cod=341IPB001

Libro verde sobre la convergência de los sectores de telecomunciaciones, médios de comunciación y tecnologias de la información y sobre sus conscuencias para la regulamentación (1997). Comissión Europea. Available at http://europa.eu/legislation_summaries/information_society/internet/l24165_es.htm

Mackenzie, Instituto and ABERT (2008*). Relatório dos testes realizados em estações OM e FM que utilizam o padrão IBOC*. São Paulo, mimeo.

Order of Ministério das Comunicações do Brasil , Nº 290 de 30 de março de 2010

Pesquisa Anual do Uso de Informática, realizada pelo Centro de Tecnologia de Informação Aplicada da Fundação Getulio Vargas (FGV) de 2008. Jornal do Brasil Online http://jbonline.terra.com.br/pextra/2009/05/26/e260510292.asp

Perfil Sócio-Econômico do Setor de Radiodifusão no Brasil, FGV. Available at http://www.abert.org.br:8080/abert/?q=biblioteca_Censo_Radiodifusão

Sistema para radiodifusión sonora digital en las bandas de radiodifusión por debajo de 30 MHz (2001-2002) International Telecommunication Union - R BS 1514-1