

Strategic considerations on the future of Terrestrial broadcasting

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EBU project group SP-TB was given the task of assessing the role of terrestrial broadcasting in the future. As a first step, it prepared a survey to get the views of EBU Members, commercial broadcasters, network operators and manufacturers.

The responses to the survey contain two fundamental messages, namely that (i) terrestrial distribution will be crucial / indispensable over the next 10 years for broadcasters, in particular for radio services but also for television, and (ii) hybrid solutions consisting of broadcasting technologies, complemented by broadband (fixed / mobile) services, are expected by broadcasters in order to adapt to changing consumer's demands and habits.

This article reports on the results of the survey carried out by SP-TB.

1. Introduction

Terrestrial distribution has been the backbone of broadcasting for many decades. Traditionally, radio and television programmes have been transmitted in terms of a transmitter using AM or FM modulation within a given appropriate frequency range. Listeners and viewers had to employ an appropriate receiver together with a corresponding antenna installation. Actually, in the early days it was expected that consumers would accept a certain effort on their part to be able to listen to radio programmes or watch television.

In the second half of the last century, distribution across analogue cable networks appeared and some decades later, satellite distribution was introduced to provide radio and television services on a large scale across Europe. Currently, Internet distribution is gaining more and more ground and several broadcasters are claiming that the Internet will be the dominating distribution platform for broadcasting in the long-term future.

In many European countries, terrestrial broadcasting is still considered the primary means of distribution for broadcast content. This is particularly true for radio where FM without any doubt still plays the major role. The situation is different with respect to television. While there are countries where more than 50% of the population rely on terrestrial reception of television services, this figure has dropped to below 10% in other countries, because of high penetration of cable / satellite services.

The digital revolution that started roughly some 20 years ago has revised the way media content is produced and also the way it is being consumed. Consumers' habits and expectations have dramatically changed, as can be easily seen when looking at the current penetration of mobile phones and computers in any European population. Even though most adults still remember times when com-

munication and access to information was not available at *any time* and at *any location*, it sometimes feels that this was ages ago. We could be forgiven for wondering what people spent their time on in the days before mobile phones and omnipresent access to the Internet.

Today's broadcasting receivers are turning more and more into powerful computer systems, thereby providing access to a variety of services with broadcasting being just one of them. Being dominated by computer technologies, the life cycles of broadcasting devices are going down and consequently the broadcasting sector is no longer static as it used be for a long time.

Without any doubt, these developments will have an impact on the distribution mechanism for broadcast content. Thus, it is absolutely crucial for broadcasters to start thinking about the benefits and drawbacks of these trends. More than ever, it is vital to sketch a vision of the future of broadcasting and, in particular, the future of the terrestrial distribution platform. Trying to predict what kinds of measures will be required over the long term will be a crucial task for broadcasters. In other words, a strategy has to be defined which is able to answer the fundamental question that broadcasters need to address: *How do you want to distribute content to your listeners and viewers in five, ten and 20 years ... by what means ... under what conditions ... and at what costs?*

2. Burning questions

Many important issues emerge from reflecting on this basic question. One of the central aspects is naturally the role of the terrestrial broadcasting platform in the future. But this is just one side of the coin. Some of the most burning questions stirring up the broadcasting community are listed below, in no particular order:

- The way audio and video content is consumed is changing. This will have an impact on the broadcasters as well. What kind of services will broadcasters therefore be offering in the future? How much linear programming will they still want or need to offer? How much non-linear programming is envisaged and what types of non-linear programmes are relevant?
- Terrestrial broadcasting is a one-way communication mechanism, i.e. content is delivered from one to many. Confronted with the capabilities of individual communication technologies, will broadcasters be in a position to sustain such a distribution platform? To what extent can the terrestrial platform provide a distribution mechanism for non-linear content and for what kind of non-linear content?
- Terrestrial broadcasting networks can provide services for fixed, portable and mobile reception. In particular, indoor coverage is challenging both from a network design point of view as well as from a cost perspective. Could indoor coverage be achieved by complementary ways of distribution? In other words, should terrestrial broadcasting networks be targeting indoor coverage at all? With more and more fixed broadband connections delivering data and content into our homes, couldn't it be possible to exploit such technologies, rather than broadcasting, to provide indoor coverage?
- Providing indoor coverage by means other than terrestrial broadcasting is a special implementation of the concept of **hybrid distribution** under certain conditions. Generally speaking, broadcasting and broadband delivery mechanisms could be exploited in a complementary way to provide traditional linear broadcasting together with true on-demand functionality. What would be the role of terrestrial broadcasting in such hybrid scenarios? What kinds of hybrid distribution scenarios are conceivable?
- Hybrid distribution presumes the availability of appropriate receivers. Multi-standard receivers are certainly a solution. Another solution might be Software-Defined Radio (SDR) devices that are able to receive any kind of broadcasting signal by virtue of a universal HF front end while demodulation / decoding are carried out entirely in terms of software implementation. Should broadcasters actively promote and support the development of SDR receivers? Should they be spending money on R&D for these devices themselves, maybe together with manufacturers?
- Combining different distribution platforms into a single hybrid picture raises the question of how to make it happen from a practical point of view. How should the collaboration of different plat-

forms be organized between different operators? Part of a hybrid distribution world is that broadcasting content is distributed across networks which are not operated by broadcasters. How can they ensure access to distribution platforms that are not controlled by themselves? Are must-carry rules for any kind of distribution a viable option and if yes, how can they be achieved?

- Commercial broadcasters are looking for new business opportunities. In particular, they are interested in IP-based systems that allow personalized services, tailored advertising and encryption to pave the way for paid-for content. On the other side, unbarred free-to-air distribution is crucial for public service broadcasters. How can these different interests be satisfied on a joint distribution platform?
- In case this cannot be resolved on the terrestrial platform, commercial broadcasters might start turning away from terrestrial broadcasting as can be observed in some European countries already. Is it nevertheless conceivable that the terrestrial distribution platform might remain successful when only serving the interests of the public broadcasters. If not, what could public broadcasters do in order to enable an attractive platform jointly used by all broadcasters?
- Distribution of broadcast content is an expensive matter. So how can distribution costs be controlled in the future? Is a terrestrial platform the most cost-effective platform, or under what conditions is this the case?
- In general terms, the importance of broadcasting is currently not fully recognized and supported by European administrations. How can broadcasters increase their influence on national administrations in Europe in order to change the administration's perception of the relevance and importance of broadcasting? Are there promising measures to do so? What needs to be done at the EU level?

Even on a first glance, it is obvious that any attempt to find satisfying answers to such questions requires bringing together experts from different areas in broadcasting. This is not just a spectrum issue, it is not only about system technologies and it is not about regulation alone. Naturally, it also touches upon content issues.

3. The strategic programme for terrestrial broadcasting

It has become apparent in recent years that broadcasters must put some effort into trying to find answers to this kind of questions. The discussions and activities with respect to the Digital Dividend have very clearly demonstrated that a more forward-looking attitude of broadcasters is crucial if they want to shake off the defensive role they were playing for too long.

In the meantime, more and more broadcasters are realizing that the future of broadcasting will be at stake if they don't become more proactive. However, what was and still is missing, is a strategy for

Abbreviations

3DTV	3-Dimension Television	HBB	Hybrid Broadband / Broadcast
4G	4th Generation mobile communications	IPTV	Internet Protocol Television
AM	Amplitude Modulation	ITU	International Telecommunication Union http://www.itu.int
BB	Broadband	LTE	Long Term Evolution (4th generation mobile networks)
BC	Broadcast	MPEG	Moving Picture Experts Group http://www.chiariglione.org/mpeg/
DTT	Digital Terrestrial Television	QoS	Quality of Service
DVB	Digital Video Broadcasting http://www.dvb.org/	SDR	Software Defined Radio
DVB-T	DVB - Terrestrial	UHDTV	Ultra High Definition Television
DVB-T2	DVB - Terrestrial, version 2	WRC12	(ITU) World Radiocommunication Conference 2012
EU	European Union		
FM	Frequency Modulation		
FTTH	Fibre To The Home		

future distribution of radio and television content, a vision of how broadcasting should look like in the decades to come.

3.1. EBU Project Group SP-TB

When re-organizing its structure, EBU TECHNICAL took the opportunity to cast this perception into a new project group. Naturally, the first step was to have a closer look at terrestrial broadcasting from a strategic point of view. This gave birth to the so-called Strategic Programme on Terrestrial Broadcasting (SP-TB). The highest priority level was given to tackling the issue on an interdisciplinary basis as a consequence of the questions on hand (see Section 2). A holistic approach should be followed in order to appropriately reflect all relevant elements determining the future development and relevance of the terrestrial platform. Obviously, the Strategic Programme would need to consider content-related aspects, spectrum availability, technological perspectives as well as regulatory and market constraints, from the outset.

The Terms of Reference for SP-TB were defined, which tasked the group to deal with three main topics. These were called *analysis*, *synthesis* and *recommendations* including action plans.

The analysis consisted of three tasks:

- The current and expected role of terrestrial broadcasting should be explored. To this end, the views of EBU Members and other interested organizations and / or administrations would need to be collected. In particular, the key values of the terrestrial platform should be identified.
- Relevant ongoing technological developments and trends and, in particular their impact on the terrestrial platform, should be compiled. It should be clarified which developments would enhance the position of the terrestrial platform and which would possibly diminish its importance. Cost implications as well as regulatory issues needed to be considered too.
- The analysis part concluded with the definition of use-cases of media consumption from the user's point of view, together with profiles of media services.

Under synthesis, three tasks were to be addressed:

- a set of scenarios regarding the future of terrestrial broadcasting should be formulated;
- for each of these scenarios, the potential evolution of the terrestrial distribution platform was to be assessed;
- finally, the implications in terms of actions and resources in EBU TECHNICAL needed to be identified.

Once all of this has been accomplished, a set of recommendations relating to the different scenarios, together with the corresponding priorities and action plans for the EBU community and EBU TECHNICAL, was to be developed and presented to the EBU Technical Committee.

A tight time schedule was set up for the group. In February 2012, the World Radiocommunication Conference of the ITU (WRC12) will be held in Geneva. Several of its agenda items touch upon spectrum issues crucial for broadcasting. Therefore, it was decided that SP-TB should finalize its work by the end of 2011. EBU Members could then make use of the outcome when lobbying for broadcasting at a national or a European level. The final report and recommendations should be presented to the EBU Technical Committee also at the end of 2011 and to the EBU Technical Assembly during its 2012 meeting.

However, due to current discussions on a second Digital Dividend and the Digital Agenda 2020 of the European Commission, the Technical Committee requested that the process should be hastened. Therefore, SP-TB presented the Committee with an intermediate report in February 2011.

4. The questionnaire

The first task dealt with by the SP-TB group was the development of a questionnaire about several aspects of terrestrial broadcasting. It consisted of 13 questions that were grouped in three parts which can be called “state of the art”, “future expectations” and “strategic considerations”.

The questionnaire was targeted at EBU Members, commercial broadcasters, network operators and manufacturers. Deliberately, administrations were not included in the list because it was decided to gather views on the future of terrestrial broadcasting in the first place from those organizations that are directly involved in broadcasting. Administrations might attribute a different relevance to broadcasting, depending on their national telecommunication policy.



Figure 1
Overview of the countries that responded to the questionnaire

By the end of 2010, SP-TB had received 35 answers from 20 countries in Europe. *Fig. 1* gives an overview of these countries. The respondents consisted of 30 public broadcasters, one commercial broadcaster, two network operators and two manufacturers. Ten of the 30 public broadcasters were from Germany. The responses to the questionnaire are summarized below ¹.

4.1. State of the art

In a first set of questions, the current situation and switch-over issues were addressed in the survey. Concerning the primary means of reception for radio and television services, the responses can be summarized as follows:

- in most countries terrestrial radio is by far the most popular way of receiving radio services (e.g. up to 100% of the audience uses terrestrial as their primary means of reception).
- although radio is available on other platforms, they are used only marginally in most countries (with the exception of cable reception in The Netherlands).

In the case of television the situation is obviously different. The responses indicate three different groups of countries, namely countries where:

- terrestrial is the dominant platform (having the largest market share);
- no single dominant platform exists, i.e. television is distributed by a mixture of terrestrial, cable and satellite; and

1. More information on SP-TB and the survey (in particular, a more detailed analysis of all 13 questions) can be found on the wiki site of the group under <http://workspace.ebu.ch/display/spgbroadcast/SP-TB+Home> However, the site is accessible to EBU Members only.

- terrestrial broadcasting has a small market share.

In most European countries, terrestrial broadcasting networks provide near universal coverage (e.g. more than 98% of the population).

Fig. 2 gives an overview of the primary usage of terrestrial television in the countries responding to the survey.

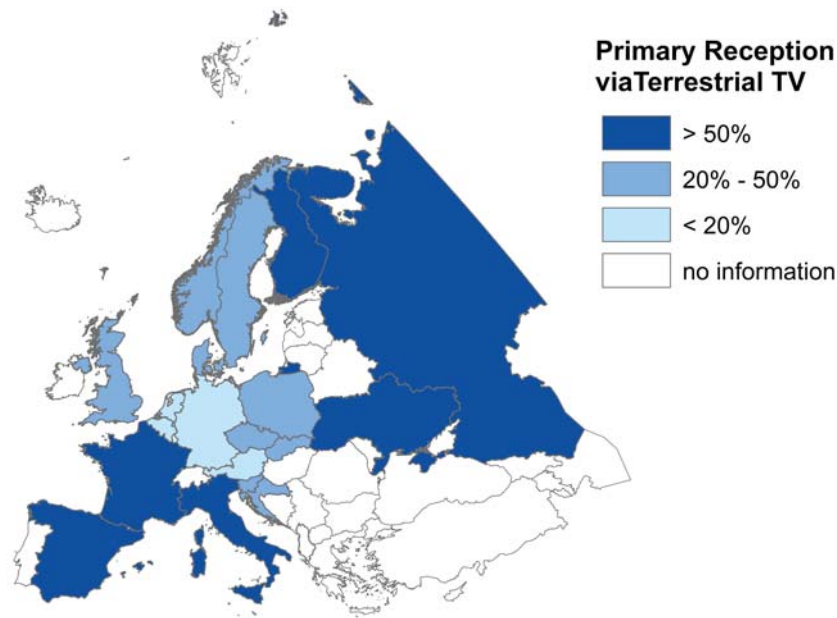


Figure 2
Primary usage of terrestrial TV in the countries responding to the survey

Obviously, there are several reasons why an organization is using terrestrial distribution for broadcasting services. The most frequently indicated reasons were:

- free-to-air access;
- delivery to all reception modes, especially mobile;
- near-universal coverage;
- affordable costs (in comparison with other platforms);
- direct access to audiences – no gate-keeping;
- legal obligations – terrestrial transmission is mandatory;
- suitable for regional / local coverage;
- reliability (e.g. in emergency situations);
- simplicity of use for the viewers.

Apart from these main reasons, some other reasons were also indicated in the responses to the survey, such as:

- the market share of public service broadcasters is higher on the terrestrial platform than on other platforms;
- terrestrial delivery is the least expensive way to provide mobile coverage;
- in some countries, terrestrial is the only free-to-air platform – all others require subscription;
- terrestrial TV and radio are the only primary distribution means, i.e. all distribution via cable, satellite and IPTV is “redistribution”;
- for radio, there is no real alternative to terrestrial distribution;

- terrestrial broadcasting corresponds to nationally-owned infrastructure, independent from foreign companies;
- this is the simplest way to achieve digital switch-over (the viewers can use existing aerials).

4.2. *Future expectations*

In the second part of the survey, questions were asked about future expectations over a time period of 10 years and beyond, with respect to technological development, competition of different distribution platforms and future services.

Concerning the role that terrestrial broadcasting is playing in Europe, it is expected in the next five years that:

- digital TV switchover will be completed;
- terrestrial radio will remain dominant, but it will also remain analogue;
- more / new content and services will be offered;
- there will be a shift towards HDTV;
- market share of DTT will increase or at least remain stable;
- in an increasingly mobile society, the importance of mobile and portable reception will increase;
- there will be a growth in pay-TV on DTT; and
- DTT may lose market share to IPTV in the fixed-reception market.

In addition, further expectations were expressed by individual replies covering the next five-year period. It was stated that the legal obligations will remain as they are at the moment. In some countries, AM radio will be switched off. In the case of television, there seems to be a trend that the importance of DTT as a secondary reception platform is growing in particular European markets. Furthermore, changing viewing and listening habits may favour platforms that offer greater choice and more sophisticated services.

For the period between five and ten years ahead, it is expected that some of the trends will be more pronounced:

- HBB will become commonplace, possibly also including wireless broadband networks;
- terrestrial radio will remain dominant, but a transition will be seen from analogue to digital terrestrial distribution;
- the majority of TV content will be HD;
- DTT will migrate to DVB-T2; and
- there will be a possible decrease of the DTT market share, depending on (i) the penetration of IP networks achieved by then, (ii) the capacity and coverage of wireless broadband networks and, last but not least, (iii) the telecom operators' business strategies.

Again, there were a number of expectations that were expressed by only a few of those responding. First of all, it was said that DTT will remain important, in particular for mobile services. It was noted that indoor coverage may become difficult because of new building materials (e.g. metal-coated windows). When it comes to services, there were individual responses pointing out that a migration to MPEG-4 will come, as well as mobile TV services offered via DVB-T2 networks. Some even see 3D TV being offered on terrestrial networks.

Beyond a period of 10 years it seems to get very difficult to make any sound predictions. This was explicitly spelt out several times in the answers. Connected TV might be a viable option at that time, granting seamless access to a multitude of networks. Some see hybrid multipurpose networks in operation. Others expect full convergence of BB and BC. New standards beyond DVB-T2 and mobile 4G might be introduced, which might open the door to new ways of sharing the spectrum between different users. It seems to be taken for granted that radio will be fully digital beyond ten

years from now, and DTT will be pushed back to geographical areas without sufficient broadband infrastructure and for some portable / mobile services.

It was very interesting to see how all these technological developments relate to the relevance of the terrestrial platform. A number of replies suggest that new technological possibilities (e.g. hybrid, mobile) will enable broadcasters to extend their offering beyond traditional broadcasting services. That would effectively complement the terrestrial platform without replacing it. Therefore, the analysis of the responses was split into technologies complementing or really replacing broadcasting.

Fig. 3 gives an overview of the complementary technologies that are expected to emerge over the next 10 years and beyond. The height of the bars corresponds to the number of responses.

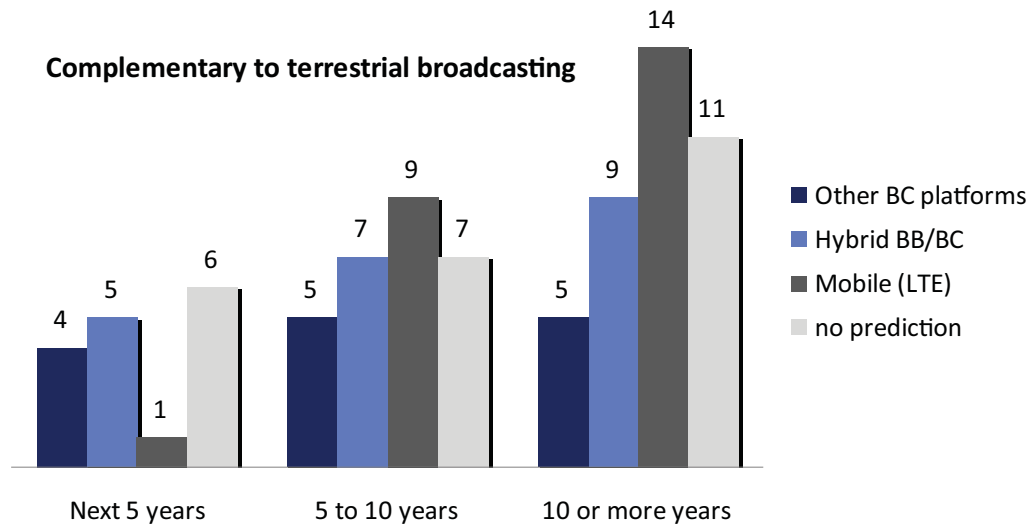


Figure 3
Technologies that are expected to complement terrestrial broadcasting in the future

It can be seen that, in general, terrestrial distribution will remain a significant delivery platform but will be complemented by hybrid BB/BC systems and mobile (LTE) networks. Their importance will grow over the years.

In the next five years the introduction of DVB-T2 alongside DVB-T is expected. There will still be a marginal use of non-broadcast technologies (mobile networks) for linear services. Furthermore, IPTV is expected to grow rapidly.

Over the next 5-10 years, LTE will be available, but its capacity may be insufficient for significant delivery of linear services. Hence, it is expected that hybrid solutions will be adopted which will employ the terrestrial platform as one delivery mechanism. Clearly, there will still be an increasing importance for IP-based distribution over the Internet. At the same time, some of those responding felt that the importance of FM radio will decline, to the benefit of digital radio. Several respondents expressed the opinion that there will be continuing political and economical pressure, leading to a further reduction of the available spectrum for DTT.

Beyond 10 years, the main role of the terrestrial platform will be to constitute the BC component of hybrid solutions and to provide services for mobile reception. It is commonly expected that there will be multi-standard (both broadcast and broadband) networks and receivers around. However, the view that broadcasting technology will remain optimal for the delivery of linear services to large audiences is shared by most. Few mentioned that services such as UHDTV and 3DTV should be available on the terrestrial platform as well.

The answers to the survey which make explicit statements about conceivable replacement options for the terrestrial broadcasting platform are sketched in Fig. 4.

When looking into the different time periods, a glance at the prediction for the next 5 years says that most of the respondents do not see any technology being capable of replacing terrestrial broadcasting in the short to mid-term.

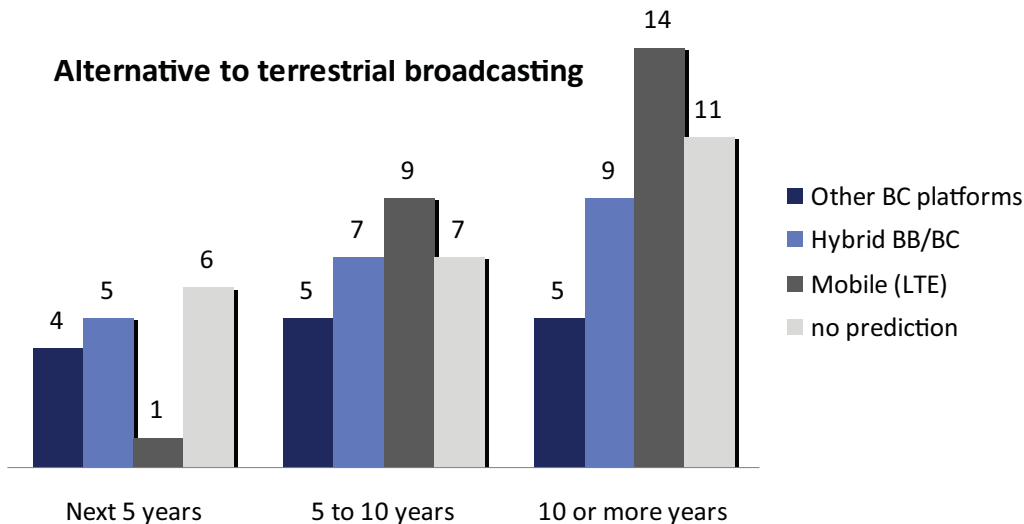


Figure 4
Technologies that are expected to replace terrestrial broadcasting in the future

The situation changes slightly for the period covering 5-10 years ahead. Fixed broadband networks could start to be considered as a substitute for fixed reception. At the same time it is believed that a wider use of cellular networks for the delivery of radio services will be a reality.

Beyond 10 years some respondents suggest that wireless broadband technologies may be sufficiently developed to replace terrestrial broadcasting. The existence and role of terrestrial broadcasting will depend on the available spectrum. But, there is also a common feeling that any prediction beyond 10 years will be highly speculative.

With respect to complementary or replacing technologies, answers were provided that expressed concerns but also mentioned benefits for the future of the terrestrial platform. On the upside, technological innovation might give rise to an extension of the service offer (choice), better quality and enriched user experience. On the downside, potential degradation of the QoS, increasing costs for broadcasters and viewers and also loss of control over distribution have been mentioned.

Broadcasters obviously are interested in introducing new broadcasting services which offer higher quality or new user experiences. This was clearly reflected by the answers to the questionnaire.

Figs 5 and 6 highlight the results.

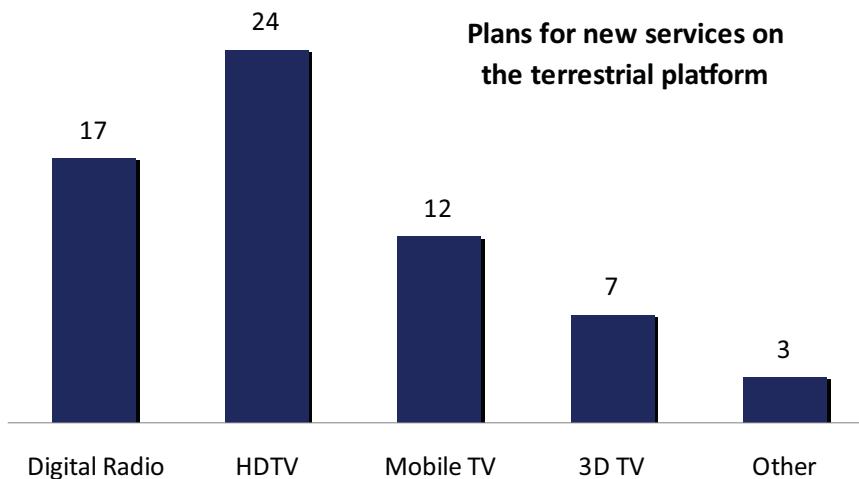


Figure 5
Number of responses with respect to the kind of services that will be introduced in the future

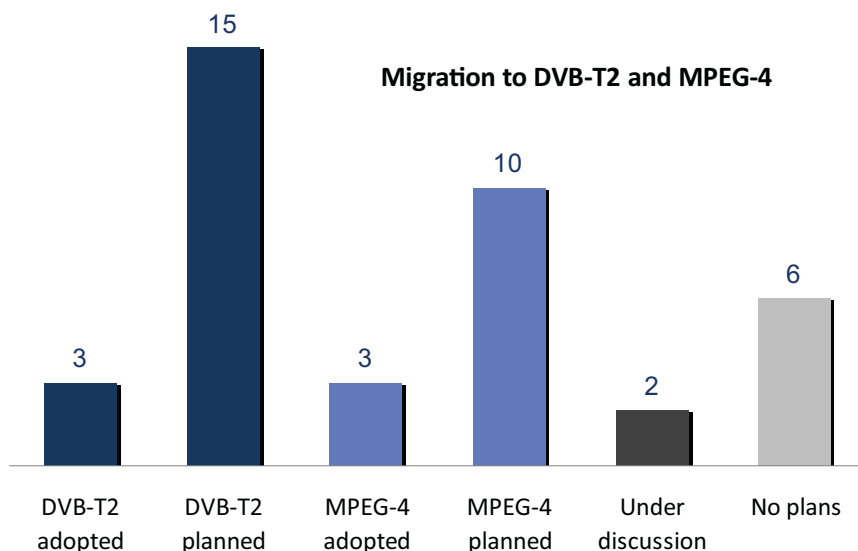


Figure 6
Responses concerning the introduction of DVB-T2 and / or MPEG-4

Even though the answers shown in *Figs 5 and 6* were more or less expected, some more background information is needed to fully understand the situation. In some countries (e.g. Italy, Sweden and the UK) there are already DVB-T2 networks in operation alongside DVB-T networks. Where DVB-T / MPEG-2 networks are already in operation, migration to DVB-T2 and / or MPEG-4 is often linked with the introduction of HDTV services.

In some countries, premium services (e.g. HD pay-services) are – or will be in the future – provided using MPEG-4 whereas the existing free-to-air services will remain on DVB-T / MPEG-2 networks. A simulcast period would be required if all services are to migrate to DVB-T2 and / or MPEG-4.

Concerning the costs of migration, it is important to bear in mind that in general the costs of migration for the transmission part are borne by broadcasters whereas the costs of upgrading the receiving equipment are covered by the viewers. Only in some countries (e.g. France) are special funds provided in some specific cases to compensate the viewers or listeners for any costs arising.

The survey also posed questions relating to expectations over future types of services. The answers were quite homogeneous in the sense that time-shifted, catch-up and on-demand services are expected to grow. Mobile multimedia will be increasingly important and interactivity associated with media services will be essential. Nevertheless, there is also widespread conviction that linear services will remain strong.

4.3. Strategic considerations

Finally, several questions were added to the survey in an attempt to see what actions would be required from broadcasters to ensure the competitiveness of the terrestrial platform in the future. In particular, we wanted to understand what broadcasters and others consider to be the prerequisites for the future development of the TV and radio terrestrial broadcasting platforms.

Several respondents gave identical answers. Therefore, these issues are relevant for more people than other issues. Hence, it could be seen as an implicit priority of prerequisites. In general, the answers were quite similar for radio and television.

For radio, the responses were (in declining number of mentions):

- compelling new content / services;
- digital switch-over;

- availability of new (affordable) receivers;
- public financing of the development (subsidies);
- availability of spectrum;
- common standards;
- sustainable distribution costs;
- regulation;
- political support.

For television the list looks like (again in declining order of mention):

- availability of spectrum;
- compelling new content / services;
- new standards, including for HBB;
- sustainable distribution costs;
- public financing of the development (subsidies);
- transition to DVB-T2 / MPEG-4;
- digital switch-over;
- availability of new (affordable) receivers;
- regulation.

Even though the result looks very similar, the most striking difference is that obviously the broadcasters take spectrum for radio as granted. Apparently, they do not foresee a situation for radio as it is encountered for television services due to the Digital Dividend discussion.

Moreover, a very clear and very strong message can be extracted from the answers to the survey. Apparently, the terrestrial distribution platform is very important and will be indispensable even beyond a 10-year period in time. This might be even more pronounced for radio than for television services.

Figs 7 and 8 give an overview of these results.

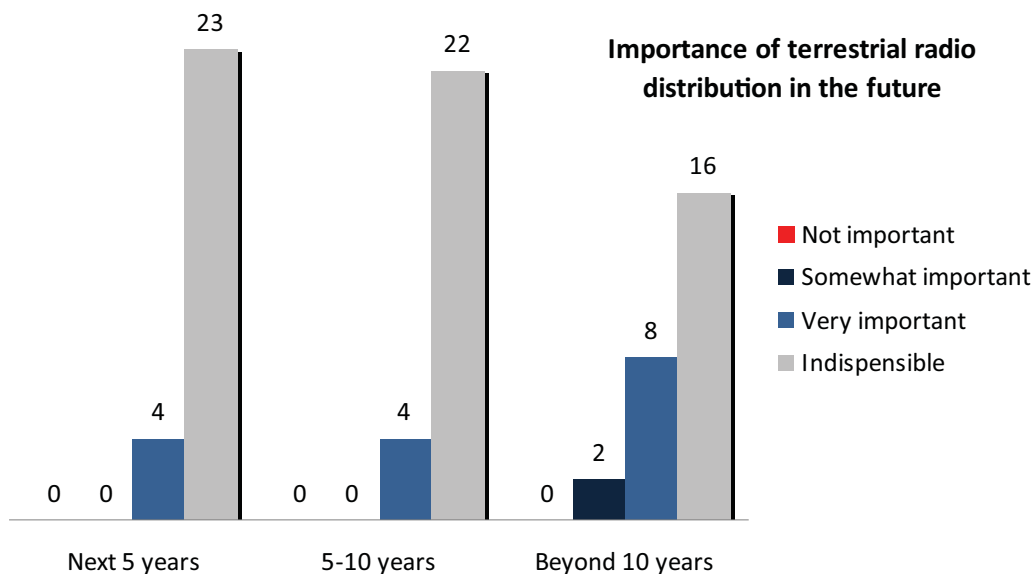


Figure 7
Importance of the terrestrial distribution platform for television services in the future

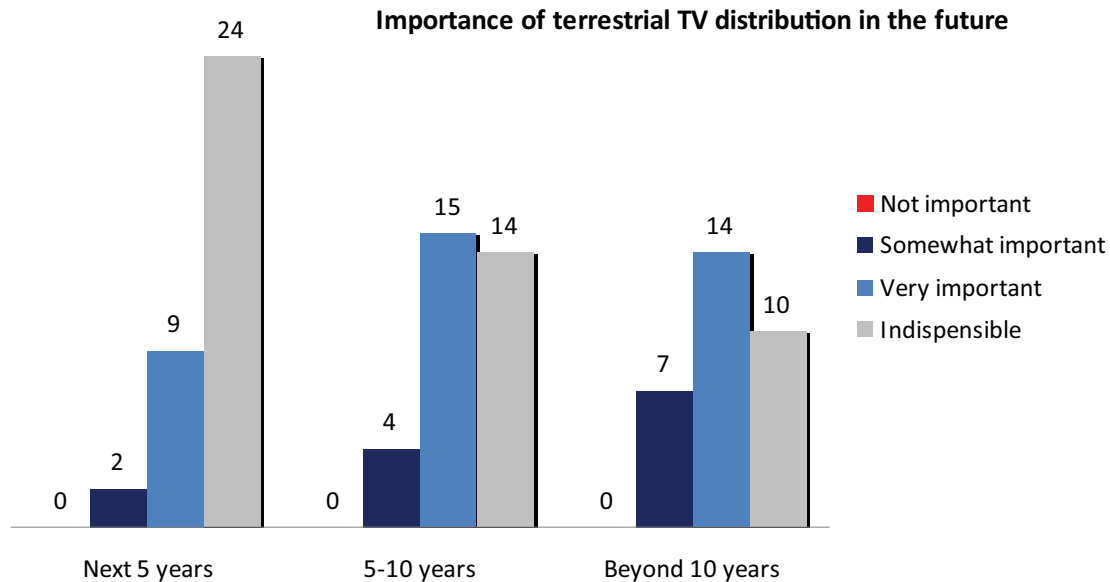


Figure 8
Importance of the terrestrial distribution platform for radio services in the future

5. Conclusions

EBU project group SP-TB was given the task of assessing the role of terrestrial broadcasting in the future. As a first step, SP-TB prepared a survey to obtain the views of EBU Members, commercial broadcasters, network operators and manufacturers. The responses to the survey contain two fundamental messages, namely that

- terrestrial distribution will be crucial / indispensable over the next 10 years for broadcasters, in particular for radio services but also for television;
- hybrid solutions, consisting of broadcast technologies complemented by broadband (fixed / mobile) services, are expected by broadcasters in order to adapt to changing consumers' demands and habits.

Both messages perfectly fit in with the understanding that hybrid distribution means, on the one hand, to employ the terrestrial platform as a reliable downlink distribution technology for linear radio and television content. On the other hand, non-linear consumption of media content (such as time-shifted services, catch-up services or true on-demand services) will need to be an integral part of the entire media offer. This presumes access to corresponding broadband networks.



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Dr Beutler has been participating in EBU Technical activities for more than 10 years and has chaired several EBU groups dealing with the future of radio (S/FOR and S/FB2). Currently he is chairman of the Strategic Programme on Terrestrial Broadcasting (SP-TB) and the focus team ECS-SDB.

Roland Beutler is also involved in ITU and CEPT work and has been responsible for several of their working groups. He participated in RRC-06 and was heavily involved in the preparation of this conference. Moreover, he has published several articles and two books on frequency and network planning for digital terrestrial broadcasting systems.

Time-shifted and catch-up services could be made available today by employing smart receiver technologies to some extent. This would mean enhancing the receivers by providing enough internal storage and intelligent software that scans the available programme offer according to the user's personal viewing / listening profile. Clearly, the same functionality can be achieved by broadband access technology. Furthermore, it is obvious that only this technology enables true on-demand services.

In any case, such a hybrid scenario presumes a stable and reliable terrestrial platform having enough room for development both in terms of capacity as well as quality of offered services. In order to safeguard such a scenario, it is crucial that:

- sufficient spectrum for terrestrial broadcasting is available;
- broadcasting and broadband networks are designed and set up in a way to enable seamless switching from one to the other in order to access corresponding services;
- receivers are provided to take full advantage of all services on all employed distribution platforms; and last but not least
- broadcasters should provide services targeted at a multi-purpose, multi-platform consumption of media.

These requirements call for action by broadcasters. In particular:

- lobbying activities for broadcast spectrum are required;
- a common strategy concerning the roll-out of networks has to be developed jointly between broadcasters and broadband network operators; and
- future receiver design requirements have to be agreed between broadcasters and manufacturers, taking care of enhanced receiver functionality.

Broadcasters have been defensive for far too long. The discussion on the Digital Dividend was driven by other players such as the mobile industry and led to a situation where broadcasting fell behind. Broadcasters defended their position by basically saying that terrestrial broadcasting is important because it has been the backbone for radio and television services for many decades and it will remain like this. Therefore, all broadcasting spectrum is to be retained and cannot be given away for other usages. The more this argument was put forward, the less it was heard, mainly because it does not provide any perspective for those wishing to understand how telecommunication and broadcasting will evolve.

It is time for a change. Broadcasters have to recollect their roots and reconsider what they can offer to society. They are the ones that should be coming up with visions about future media production, consumption and distribution because they have the expertise in all those fields. As a consequence, broadcasters need to create a holistic vision of how they would like to see their products delivered in the future.

Broadcasters need to understand how concepts such FTTH, Cognitive Radio, Femto-Cells, self-organizing networks and re-distributing by converting² could be exploited for broadcasting purposes. Clearly, this might require giving up dear traditions, and totally new concepts might need to be developed to the extent that cost implications both for broadcasters and customers are bearable.

However, such an overall picture of broadcasting is required to convince regulators and politicians to take the right decisions in the future. It could help to lobby more pro-actively for broadcasters' interests at CEPT and the European Commission. Issues such as the Digital Agenda and, in particular, topics such as "broadband for everybody" are vital for broadcasters, once they know where their future lies.

2. This means that content is received in a particular way and then re-distributed on another distribution platform in order to provide indoor coverage under certain conditions. Examples could be a situation where a DVB-T signal is picked up and re-distributed as Wi-Fi, or using an Internet stream via FTTH and distributed indoors as DMB on a Band III frequency.

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