

CHALLENGES AND PERSPECTIVES OF DIGITAL MIGRATION FOR AFRICAN MEDIA

By Guy Berger



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Author: Guy Berger
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Panos Institute of West Africa
Dakar, Senegal.
www.panos-ao.org
6 rue Calmette, BP 21132 Dakar (Senegal)
Tel: (221) 33. 849.16.66
Fax: (221) 33.822.17.61

Highway Africa, African Media Matrix, Upper Prince Alfred Street
Rhodes University
Grahamstown, 6410
South Africa

Design and layout Kaitlin Keet
kaitlinkeet@coza

Text editing and proofreading: Danika Marquis

Panos Institute West Africa (PIWA) has pleasure in welcoming this booklet. It is work commissioned by PIWA in collaboration with Rhodes University as a knowledge resource especially for those working in community radio in Africa.

The publication takes a complex subject, digital migration, and seeks to explain it in language that non-experts can understand. This accords with PIWA's interests in spreading knowledge to make a difference to media in West Africa as well as more broadly around the continent.

Digital communication technologies as well as the convergence of telecommunications and the media have changed the media sector completely. In terms of media development, we are currently witnessing progressive migration from analogue to digital production and broadcasting, hence the appearance of radio and digital television. Terrestrial digital television encourages an increase in the number of programmes available, improves quality and accessibility and creates new media services. Digital radio offers improved sound and reception, new multimedia functions - receivers can be equipped with screens to broadcast images and texts (programme or song titles, etc.).

Digital migration also offers a solution to frequency congestion and encourages more programmes. In addition, digital broadcasting (radio and TV) offers other benefits in terms of managing the frequency spectrum available, regional planning, a reduction in energy consumption and costs, etc.

Today, these various benefits make a move to digital broadcasting (known as digital migration) imperative for television and radio. This is why the International Telecommunications Union has recommended all countries to move to digital broadcasting by the year 2015.

While the West had already begun this process several years ago, in Africa this issue has rarely been discussed or taken into account, except in rare countries such as South Africa. The end of analogue broadcasting and the production of dedicated equipment are likely to give rise to serious problems in Africa such as: problems of maintaining infrastructures which remain analogue and the further 'Balkanisation' of African production, etc. In addition, the move to digital broadcasting brings with it other crucial challenges regarding regulation planning, pluralism of information, media development and access for all to new digital equipment, and increasing dependency beyond national borders in the sector.

With deliberate implementation, digital migration could lead to greater information pluralism and more diversity, and it could also

assist civil society and good governance. What will make such a positive difference is the way that law, policy and practice evolves. On the other side, uninformed policy, law and practice will reduce, rather than expand, the role of African media in informing the peoples of the continent.

This booklet aims to contribute to awareness-raising in West Africa (and beyond), of the importance of digital migration and the need to create appropriate strategies in order to maximize benefits and limit risks. It contributes towards evolving best practice governance for African communications in regard to digital migration. What it reveals is that the phenomenon, which is part of the digitalisation of communications more generally, requires regulation systems to adapt change.

While the views in this booklet are those of the author and not necessarily of PIWA itself, we are pleased to make it available to a wider audience of media stakeholders.

Diana Senghor, Director, PIWA.

The Panos Institute West Africa (PIWA) is a regional non-governmental organization, which contributes to democratising communication, and consolidating public space for open African societies, where citizens' opinions are illuminated, and their voices amplified and heard.

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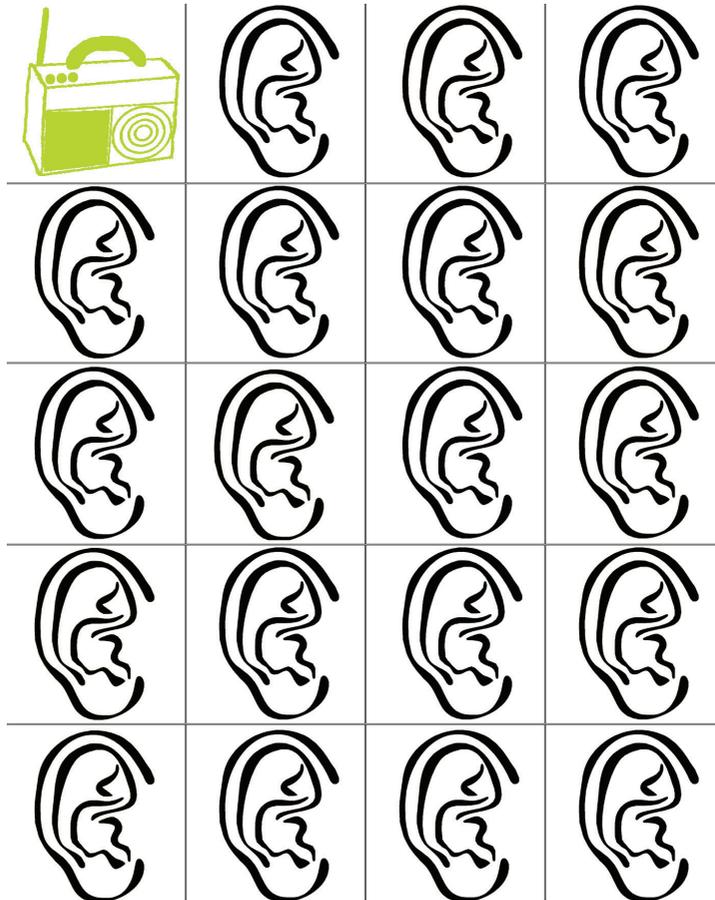
- Public debate and political dialogue on key development issues in Africa;
- Creating a body of knowledge on media development and the challenges of communication for development;
- Producing and disseminating quality media content, produced by Africans themselves;
- Capacity building of actors of social change to be heard.

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- A leading institution in the sector of communication and information in Africa, committed to excellence.

PIWA is based in Dakar, Senegal, and is a member of the global network of Panos Institutes.

Panos Institute West Africa, 6 Rue Calmette, BP 21 132 Dakar Ponty, Dakar-Senegal.
Tel + 221 33 849 16 66, Fax + 221 33 822 17 61,
Mail: panos@panos-ao.org Web: www.panos-ao.org



Executive Summary

This booklet sets out the issues involved in digital transformation in broadcast media from the viewpoint of African media stakeholders and, especially, community radio stations. It aims to correct widespread misconceptions that analogue radio will have to be switched off in the next five years as part of “digital migration”. At the same time, it warns that the digitisation of broadcast television signals has implications for radio stations around the continent.

The same goes for digitisation more broadly, as internet growth also has implications for radio stations. The study has been commissioned by the Panos Institute West Africa, which has a particular interest in community radio.

In the nature of the subject matter, the scope of this study has had to be wider than community radio – precisely because of the impact of the larger transitions on this sector.

As background to these issues, the booklet outlines the origins and meanings of “digital migration”, and analyses the technical, policy, and economic implications of the process. There is information about preparedness in several African countries, with particular reference to lessons arising from South Africa as one of the frontrunners.

One key recommendation of this booklet is that there is no rush for African countries to undertake the very costly and highly complex move from analogue to digital TV. Another is that this particular transition is just one process (albeit a very important one) in the wider perspective of building the African Information Society by means of many digital-related changes to communications.

It is further recommended that each country needs a broad-based and inclusive stakeholder forum so as to formulate comprehensive policy for the whole digital panorama (involving both broadcasting and internet sectors, and their stakeholders).

For those with interests in community radio, in particular, there is a need to widen horizons in order to plot a way forward through ever-more complicated terrain.



Introduction

The world of broadcasting is going through a profound change, due to the development of digital technology. There is a lot of misunderstanding around this, with even government ministers such as South Africa's late Ivy Matsepe-Casaburri sometimes proclaiming that broadcast digital migration will end the digital divide and give African audiences access to the Internet. That's not correct. There is a very big picture of digital communications that does cover both broadcasting and internet access, but broadcast digital migration on its own does not automatically mean that these two issues become a single thing, nor even that they become integrated developments. There can be a connection, but most of Africa is still operating in separate silos for these two digital developments.

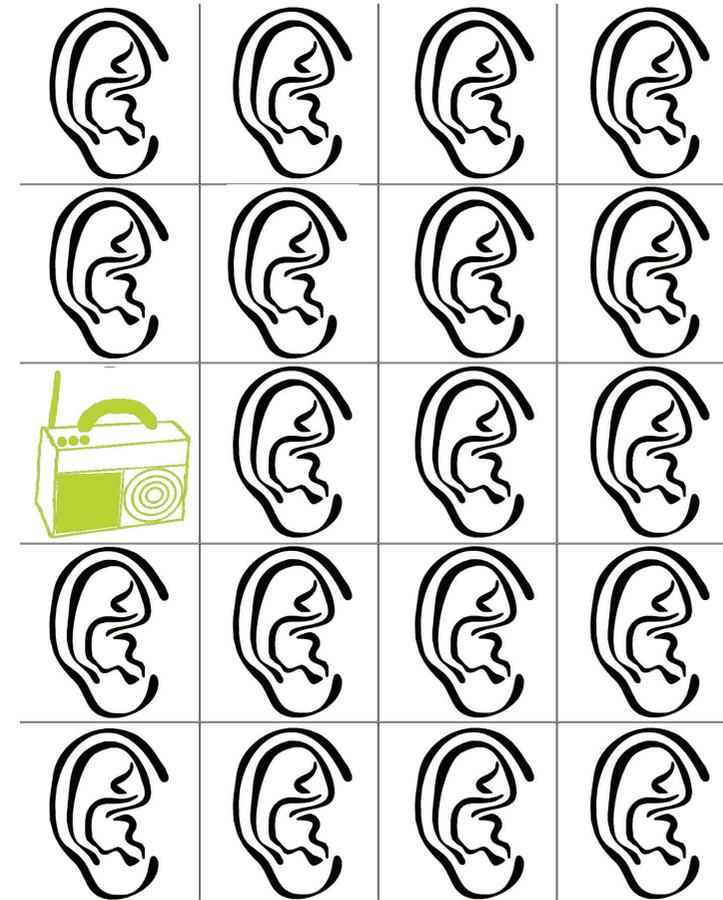
For broadcasting, digital change over the next ten years impacts primarily on television (TV) – and not just TV by any method of delivery, but especially that which is broadcast by ground-level signals. In other words, satellite TV (which today is generally digital anyway) is a different story, and is typically not seen as part of digital migration. Thus, the new era is more accurately dubbed the transition to “Digital Terrestrial TV” (DTTV or sometimes abbreviated to DTT) to distinguish it from digital TV by other means (eg. satellite, cable or internet).

However, it would be a mistake to think that what happens in DTT is an absolutely separate world from radio, or that the impact of DTT is irrelevant to radio. Instead, the changes have a lot of significance for the extent to which TV serves as a rival or a complementary medium to radio. There is also the question of whether digital TV can even be a new additional platform for radio, where people use TV sets as radios. Furthermore, what happens with regard to spectrum frequency with digital TV also has implications for radio (and for wireless internet). Thus, as elaborated later in this booklet, DTT impacts on the role and prospects for radio, including community radio.

Meanwhile, outside of how digital television can impact on analogue radio, there is also a level of direct digitisation of radio broadcasting, in limited degrees around the world. This process is also something of interest to the radio sector in Africa.

The purpose of this booklet is to serve as a guide for every person with an interest in the whole subject of digital change in Africa, and especially in digital broadcasting. It is written to assist anyone who feels confused or ignorant about what the changes are about. And even those readers with some expertise on the subject will still likely find points of interest in these pages. Ultimately, knowledge and understanding about this epochal transformation can help all stakeholders better engage in the process, and even help to steer it.

Whether you are a policy-maker, a manager of a community radio station, a media educator or simply a user of broadcasting, you are affected by these historic developments that are shaping African and global communications as a whole.



Digital migration
(definitions and issues)

This section of the booklet clarifies the concept and practice of digital migration with regard to the whole broadcasting value chain. It summarises the social, policy, regulatory, technological and economic challenges for the whole media sector and for the key stakeholders on the continent. In so doing, this section also examines the opportunities and constraints, and possible alternatives. These have a strong bearing on the issues of media and information pluralism, North-South and South-North dynamics, and access to public information issues, especially for disadvantaged communities. These important matters are returned to in the conclusion of the booklet.

2.1 What is digital migration?

Until the 1990s, broadcasting was mainly a matter of transferring sound or video streams through the airwaves (or in some developed countries, through cable as well) by means of analogue signals. This was a linear process, with each element in the content stream taking its turn to transmit behind the one that went before it. This worked well enough, except for one thing: it required a lot of bandwidth, i.e. a lot of capacity was taken up on wireless electronic frequencies in order to carry signals in this manner. The knock-on effect of this was that in the realm of the airwaves, this meant that only a limited number of stations could be accommodated on the radio spectrum. A radio frequency like FM 105.7 would, for instance, be available for use by a single analogue radio station. Other frequencies were often unsuitable for audio transmission, or were better used for TV or cellular telephony, or were reserved for military communications. In TV, which uses UHF and VHF frequencies, it was the same story: one station, one frequency. With limited frequencies, the effect was a limit to the number of stations.

Much of this changed with the advent of digital electronics. These technologies meant that sound and video, as well as text and still images, could be stored and transmitted in the form of binary digits. These “one’s” and “zero’s” correspond to on-off electrical pulses. It is easy to see the advantages this has for

electronic communication:

* First, there is a common currency – audio, pictures, text are all reduced to binary data. That’s why software programmes can change the size of text just by applying a mathematical formula to the foundation data. It’s why music can be represented as rhythmic images, and why software can automatically read written text out loud in audio form. It is also the reason that a programme like TinEye image identification can map where, within a massive amount of images on the Internet, duplicates are to be found (whether authorised or pirated). (Google’s Picasa programme for indexing photos on a computer can similarly work with image recognition – find a face, name it, and the software finds other pictures of the same person on your hard-drive). Digital is also why you can find cellphone services that let you save music on your mobile device, let you find the name of the tune online and even link you through to similar kinds of music.

* Second, digital data can be compressed through algorithms. Simply put, this means that large patterns of “ones” and “zeros” can be mapped and called into action through much smaller patterns of “ones” and “zeros”. For example, code to represent a shade of blue on a computer screen does not need to repeat the sequence for every pixel of space on the screen – instead, it only has to set out a blanket instruction for every pixel to invoke the same code (for blueness). This means that more content can be stored electronically on less space than previously. What such compression also does is to allow for more content to be transmitted on the same bandwidth than would otherwise be the case. Many digital television technologies today use MPEG4 compression. And in digital radio, the DAB (Digital Audio Broadcasting) standard still uses an outdated MP2 compression codec, while the newer DAB+ is far more efficient with MP4.

* Third, digital compression also means that data can be broken up into in many separate and simultaneous “packets”. These “packets” can be re-assembled in the right order (according to

the code instructions) at the destination. Thus, there's a torrent of small signals of data bits that are unleashed through the system simultaneously, instead of being in the form of stitched-together and sequenced messages that have to wait their turn in a linear queue. By contrast, the old analogue flow wasted bandwidth with pauses and blank spaces between electronic data signals. In other words, digital distribution gives us much greater efficiencies in the use of bandwidth.

The significance of all this for broadcasting is that, presto, many more radio and TV channels can be squeezed into the exact same frequency space than is possible under analogue transmission. For instance, a digitised signal can allow for up to ten TV channels (standard definition) to be broadcast, whereas a single analogue channel would require the whole frequency. For this to happen, several streams of broadcast content have to be combined into the single signal, in a process known as Multiplexing (elaborated later in this booklet). The space freed-up by switching to DTT is known as the "digital dividend" and it means that some of the vacated bandwidth can be used for other purposes. For instance, the "dividend" can allow for broadcasters to introduce multiple sound-tracks and language subtitling as part of the video channel on digital TV. Similarly, with the case of digital radio, a Multiplex can facilitate an ensemble of up to 50 channels on a single signal.

What digital also makes technically possible is flexible use of the airwaves – for example, a TV broadcaster can decide to increase the compression (and quality) of most of its TV channels for a particular event, so as to make some extra space available for a bandwidth-hungry High Definition (HD) broadcast of that specific occasion. Technically, the same TV broadcaster could also run radio services at certain times of the day on the Multiplex, and switch to TV or data streams at others. In this way, digital broadcasting allows for channels within channels. This, in turn, has a bearing on licensing – for example, whether a broadcaster should be entitled to do its own thing, or simply notify a regulator when it exploits flexibility (to deliver a changing mix of audio

and video channels), or whether it needs to go through time-consuming licence amendments each time. This further relates to whether licenses are given out in terms of use of a total amount of megabits per second on a Multiplex, without specifying categories and quotas for this use, or whether there are also particular obligations (such as minimums for local content, language or programme genres, requirements around election periods, etc.). Digital streams of content are also amenable to being stored on the receiving device, providing the user with the power to pause and even rewind up to a point.

Against this whole backdrop, digital migration is the process by which broadcasting around the world today is switching from inefficient analogue signals to more efficient digital ones. This is primarily in the distribution (transmission) of broadcasting. In fact, without digital transmission, you don't have digital migration, even if production and reception are digital. Digital distribution, however, has a major bearing on both the production and consumption dimensions of broadcasting. The phrase "digital migration", strictly speaking, should designate the value chain as a whole, and what this means is that digitisation of just one single stage (eg. digital capture and editing of audio) is still very far from being fully-fledged migration. Many radio stations in Africa, for example, already use digital equipment for producing programmes. But contrary to some misconceptions, this does not equate to readiness for digital migration. The radio signal distributors and the radio audiences also need to be digitally migrated, and that is at least a decade away.

What also merits mentioning is that most cases of digital migration do not mean that analogue transmissions (whether TV or radio) cease one day and digital broadcasting begins the next. There is typically a lengthy overlap envisaged. This is because a long process is needed in which broadcasters, signal distributors, regulators, manufacturers, governments and the public align themselves so that the digital transition will work successfully. This is especially acute on the consumer side, where millions of people are saddled with analogue sets that were never designed to receive digital signals directly. Until a threshold of public uptake

is reached during a transitional period, it is not possible to reach the final moment of “digital switch over”, where the analogue transmissions are turned off and the “digital dividend” can be released for other purposes. To have a premature analogue switch-off would leave millions without access to broadcasting.

2.2 The broadcast value-chain

As already noted, transmitting (sending out) broadcast content is a central element in a wider chain of broadcast communication. But it has a relation to what happens before and after transmission. First, there is the prior or “live” (simultaneous) process of production (often drawing on content that has been stored or archived). All this needs to be in digital format or, alternatively, convertible into digital signals capable of digital dissemination over the airwaves.

Second, the sense for shifting to digital transmission only makes sense if there is also a digital reception, or conversion to analogue reception, at the end stage of consumption. This is not only the receipt of content by the audience, but also affects its possible “fixation” (recording or storage) and its re-use. As regards the stage of TV (and even radio) broadcast production, many stations in Africa have already been moving away from analogue systems – for example, leaving behind linear tape-based editing and storage (even where the tape was digital, it was still nevertheless linear). This transition has been in favour of bringing in computerised newsgathering, editing and archiving on a harddrive or flashdrive digital basis. Newer stations have even started life with this technology.

However, as stressed above, achieving or having digital production, as important as it is, does not amount to “digital migration”. The phrase must also cover movement in signal distribution and in how audiences receive and use broadcast content. If the end destinations of digital distribution cannot be reached, the whole transition process is meaningless.

In fact, digital production is quite compatible with analogue transmission and reception, as happens in much of Africa

currently. The digitally-generated content is converted back into analogue format for sending out on the airwaves – for the reason that most signal distribution equipment and most receiving devices (like TV sets) are still limited to analogue capabilities.

Although the end goal of digital migration is to digitize the entire process, the initial focus of digital migration tends to be on the distribution dimension. There is no point in audiences having digitally-enabled receivers, if the signals they receive are still analogue. The emphasis on digitising signal distribution is the case even where the transmitted content is originally produced in analogue (no longer so common). However, the switch-on of digital transmission generally begins at a time when most receiving devices still remain analogue. In fact, in television, digital signal transmission can proceed at a much faster pace than digital consumption. This is because an analogue TV set can display digital signals if their owners insert, between it and the digital signals, a convertor box that translates the digital feed into analogue signals that show on the existing equipment. In this way, it is even possible to conceive of switching off analogue TV transmission with most receiving devices still remaining analogue. In short, the two stages – digital transmission and digital reception – are interdependent in some ways, but they can also be de-linked in others, thanks to the intervention of set-top boxes. (The case of radio is more complicated, as discussed below).

There is a very particular reason why digital migration is targeting TV long before radio, and why it is prioritising the transmission stage over and above the production and reception stages. This reason is because the switch to digital television signals is the one big thing that will free up lots of space on the airwaves. This outcome is a burning need in developed countries where big broadcast industries want to run more channels (including for High Definition TV and for 3D TV). They cannot do so in these countries, because analogue transmission methods are hogging the frequencies. In addition, in developed countries there are further strong demands on bandwidth from cellphone companies and wireless broadband providers. Lastly, manufacturers in those parts of the world are also dead-keen to sell consumers digital

TV sets that can receive a digital feed directly (rather than selling mere “set-top boxes” – STBs – to convert the digital signal to display on the analogue TV set).

It may be asked why this quest to free up the airwaves is relevant to Africa. After all, this is a continent where TV broadcast industries are generally weak, and often don't even have enough quality content to fill up existing opportunities for analogue broadcasting. The answer is a harsh one: freeing up airwaves is actually not of urgent relevance in Africa. There is not a burning scarcity of frequencies on the continent. However, the driver of digital migration internationally is not the conditions and needs in Africa. It is, instead, the way that developed country agendas impact on globalisation, international regulation and aspirational trends (see next section). On the other hand, even while digital migration in Africa is objectively not a pressing matter today, it is also something that is going to be hard to avoid in the medium term. This is why most African countries have begun taking tentative steps. This ‘tentative’ character is fine; there is no life-or-death reason for Africa to move any faster than this. As discussed later, this is one case where lagging behind could even be to the continent's advantage in the longer-term.

If worldwide, the digital transmission of broadcast signals is the priority part of digital migration, then the task of digitising past content archives is likely to be last in line. It will take a long time and lots of money to digitise all old analogue content, even in developed countries. Once broadcasters put the technology in place, forthcoming content can be generated digitally, but until then any analogue content they have needs to be digitised for digital transmission. However, much more important for digital migration than the sphere of digitising broadcast archives, is the way in which digital transmission impacts on distribution and reception.

Ultimately, analogue transmissions will be switched off, which in turn will instantly make the TV sets owned by millions of viewers redundant, unless all of them have acquired a “set-top box”. Rather than forcing everyone to buy a whole new TV set, the transmitted digital content will for a long time still be converted

back to analogue for consumption through this STB. This gadget needs to be manufactured or imported, and then promoted, marketed, distributed and acquired by viewers. But it's a lesser change than requiring the scrapping of most existing TV sets. With the box, consumers can continue to view broadcasting on the screens of their analogue TV sets. Eventually, viewers are likely to upgrade to digital-receiver capable TV sets, and at that point will have a range of benefits of not only getting, but also displaying (and storing), signals that are digital. Without reaching that point, digital migration as a whole is not finally complete, although the signal transmission stage may be.

Radio is much more complicated than TV in terms of digital migration. For a start, a conversion device to play digital signals on analogue radio sets does not make economic sense. At the same time, digital radio sets will take a very long time to disseminate. Secondly, and probably more importantly, the key difference to TV is that there is no urgency in digitising radio transmissions in order to free up frequencies for other uses. This is because, far from freeing up airwaves, most digital radio distribution technologies do not operate in the place of FM frequencies – they need to use other frequencies (in particular those used by analogue TV). So, even if all FM radio broadcasting was closed down tomorrow, its frequencies are generally not suited to digital audio. This is unlike television, where the same analogue frequencies are needed for re-use so as to carry multiple digital channels. Thus in the UK, for instance, there is no alternate purpose that has been specified by the regulator Ofcom for vacated AM and FM frequencies.

It is in this light that the taskforce on digital migration in Kenya has stated: “The switchover of existing sound broadcasters from analogue to digital transmission is not required since AM and FM broadcasting will not be affected by the transition.” The TV transition generally requires squeezing in digital TV alongside analogue TV on UHF frequencies until such time as the analogue transmissions can be terminated with the effect of freeing space for additional digital use. In contrast, most digital radio technologies do not operate on analogue radio frequencies – as stated, they also need access to the same TV spectrum. What that means is

that digital radio transmission is therefore, to an extent, hostage to the completion of digital signal migration in television. This is for example the case in Ireland.

Although the current era of digital migration is about TV, ultimately, the aim is that content should be born digital and remain digital for whatever kind of broadcasting is involved – and still be digital for the consumers. This is the point at which things begin to get really interesting, because the audience receiving digital content can easily save it, make identical copies, amend it, blend it and bounce it on to others – by CD, DVD, MP3 player, internet or re-broadcast. At this point, digital broadcasting can begin to interface with internet-delivered and mobile-delivered audio and audio-video content – something elaborated upon later in this booklet.

2.3 Digital migration – an answer to what problem?

As indicated above, driving digital migration is the agenda of the developed world and how this impacts on globalisation and international regulation. The pressure on African countries to undergo and conclude TV digital migration is linked to a decision made at the United Nations agency, the International Telecommunications Union (ITU). The widespread understanding of this decision is somewhat erroneous (see below), but it is that all African countries have to meet the deadline for finishing the process by 2015. The resolution on this apparent deadline was adopted in 2006 at a meeting referred to as the Regional Radiocommunications Conference (RRC-06), and agreed by 101 nations in Europe, Africa and the Middle East. As argued earlier, the decision was mainly in response to the interests of the European sector, because there is certainly no major pressure to free up airwave spectrum in Africa, and nor are there strong consumer electronics industries or consumer markets in African countries.

What this background also reveals is that the pressure for digital migration in developed countries is not demand-led, i.e. a response to the consumer market-place, but mainly supply-side

driven. This in turn accounts for the imperative to build marketing and consumer-awareness into digital migration policies and strategies, persuading people to buy a STB or upgrade to a digital TV set. It also explains why, even in the developed economies, there has not been success in radio migration, where this has been attempted, despite the excess enthusiasm of broadcasters and manufacturers for this development (more detail on this is provided later in this booklet). As argued in this booklet, in many ways, digital migration – especially in regard to analogue radio in Africa, but also with analogue TV – is a solution in search of a problem.

Backing the ITU decision on a timetable for digital migration is the accompanying decision that, after the defined cut-off date, this international organisation will no longer intervene to protect a country's TV broadcast signals in any instances where these are being swamped by a neighbour's, unless those signals have been switched to digital. In reality, however, this issue of signal swamping or cross-border interference with signals is not a serious issue in most African countries. On the contrary, huge swathes of the African population still do not even receive TV broadcasting signals of any sort, or at best can pick up a single national TV channel. In other cases, African audiences welcome spill-over across borders, which may offer a little more choice. The point then is that African countries can probably still continue analogue TV long after deadline without really any incurring serious disadvantages in terms of aggressive neighbouring broadcasters bothering their national signal space. The few disputes that may occur will not necessarily even require ITU intervention to resolve.

It is also a little publicised fact, but the 2006 treaty allows for an additional five years for a total of 30 African nations beyond the 2015 cut-off point. (Most Latin American countries, incidentally, have agreed to a switch-off of analogue TV transmissions around 2020). In other words, more than two-thirds of the countries on the African continent are exempt from the 2015 deadline, and instead have a 2020 switch-off date, even though some have voluntarily committed to the earlier time in agreements in regional fora and/or through domestic policy decisions.

The 2020 list includes: Algeria, Burkina Faso, Cameroon, Congo, Côte d'Ivoire, Egypt, Gabon, Ghana, Guinea, Mali, Morocco, Mauritania, Nigeria, Chad, Sudan, Togo, and Tunisia. The 2020 cut-off was also agreed for countries not at the 2006 conference: Benin, Central African Republic, Eritrea, Ethiopia, Guinea-Bissau, Equatorial Guinea, Liberia, Madagascar, Niger, Democratic Republic of the Congo, Sao Tome and Principe, Sierra Leone and Somalia. It is mainly southern African countries that are committed to 2015 under the ITU decision.

Despite all this, many African governments seem to feel that they have no choice but to rush to be part of the world of DTT before 2015 – despite the huge costs that will be involved in changing production, transmission and reception. Meanwhile, as analyst Ben Akoh has pointed out, 2015 is also the deadline for the Millennium Development Goals, and he rightly expresses concern that this coincidence will leave policy and decision-makers overwhelmed as they try to meet both massive requirements.

There are answers to the puzzle of why much of Africa is trying to move to complete DTT by 2015, when there is not a pressing matter of frequencies, when many are exempted from the ITU deadline, and when the consequences of missing the due date are minor anyway. Here are some of the reasons:

- * There is a grave lack of understanding about the First World character of the drivers behind the process, and their inapplicability to African conditions.
- * Reinforcing this is a susceptibility to succumb to global hype about digital benefits.
- * There is also a sense of paranoia about the continent falling further behind developments elsewhere, and an aspiration to keep up (even when it does not make short-term strategic or economic sense).
- * Feeding all this are many consultancies and signal equipment manufacturers, who have a vested interest in digital transition happening sooner rather than later.

The effect of these factors on African decisions about the desirability and the deadlines for digital migration is evident in various statements and decisions by African actors. A 2008 study for the African Union on harmonising policy and regulation on the continent suggests in its programme of action that there should be “acceleration of migration from analogue to digital broadcasting systems”. Significantly, this was without an elaboration of why envisaged benefits of this would outweigh the costs at this stage of the continent’s evolution. The Nigerian National Broadcasting Commission has termed the migration an “inevitable global phenomenon”, by implication saying that Africa cannot stand aside. The Southern African Development Community (SADC) agreed in 2009 that the Southern African region should work towards completing digital migration by 2013 (South Africa has actually set 2011 and countries like Nigeria, Tanzania and Kenya have targeted 2012), and they also agreed that there should be a unified standard for the STB receiving devices.

It is true that the rest of the world is going ahead, but what is far from true is that African countries will lose out if they do not try to keep pace. On the contrary, a case can be made that the longer African countries wait (and after all, there is still often analogue spectrum available for additional TV channels), the more they can benefit from standardisation and cheapening of equipment elsewhere – leaping ahead to the very latest and cheapest equipment when a decision is finally made to make the change. The experience of the UK in being an early pioneer in pushing digital radio (elaborated below) is a good lesson: you get saddled with outdated standards (DAB in this example) if you try to be among the first-movers.

Four objections are made to the argument that Africa should go slowly on TV digital migration:

- * Even if African broadcasters are not exactly clamouring for more TV channels, the pitch is sometimes made that digital migration of analogue will free up some spectrum for cellular telephony expansion and for wireless broadband. This argument is not without substance, but equally, in most of Africa, there is still ample

space for these services to be deepened (and cheapened) within their existing spectrum allotment.

* Another argument in favour of a short deadline to digital switchover (i.e. 2015 or earlier) is that the shorter the time, the lower the cost of having to operate both analogue and digital signals over the transition period. What this ignores, however, is that too short a timetable can also mean getting stuck on a standard that is being superseded (eg. DVB by DVB +), and/or that many consumers do not buy STBs ahead of switch-off time.

* Some people argue that completing digital migration for TV will free up some radio-wave spectrum which governments could then sell through auctions or a “beauty-contest” licensing regime, thereby adding to state coffers. Such revenues, however, depend on investment and successful business prospects in utilising the prospective airwaves, and there are question marks over these. In addition, any revenues would need to be balanced against the enormous costs incurred by the African state in reaching this point.

* It is also argued that existing analogue technologies for TV transmission are likely to become obsolete. This will indeed ultimately be the case. But at the same time, a lot of perfectly usable equipment has been made redundant in developed countries – providing a wealth of second-hand spares and replacements for those countries that are biding their time. It may offend African pride to get hand-me-downs, but that would certainly be a viable lesser-cost strategy in the short-term than one of trying to play catch-up.

* Delaying digital migration, in the view of some, is depriving African audiences of extra TV offerings for them to choose from, but, as mentioned, African broadcasters can barely fulfil their current potential on analogue TV channels. Technically, more channels are available on a digital signal; practically, who is going to supply and pay for the content – unless no one cares about

the source, quality, and agendas of programmes on offer. Do we really need more rightwing televangelism channels from the USA?

The point being made here is that the merits of TV digital migration for Africa are not simple and clear-cut. The same financial resources going into the process could instead be allocated to other broadcast or digital access projects. These could include support for local content (whether digital or analogue) for community radio stations, or advancing satellite TV. They could go into promoting universal access and affordability to cellular telephony or wireless internet, or into linking up every school, clinic and community centre through a mix of cable and satellite connectivity.

To give Africans more and better video choices does not depend exclusively on TV digital migration. The choice is also not between digital TV and the analogue dark ages. There are many options to advance digital communications across many fronts, and no reason why digital TV transmission should get the lion’s share of limited resources.

This point of view suggests that it is not too late for a re-think – at least about the proposed pace towards digital switchover. It also suggests that even though the digital migration horse is no longer in wholly in the stable, the beast has not yet bolted. There is only some resource that has gone into getting its head out the door.

The point being made here is that the world of broadcast and digital possibilities is a lot bigger than only digital migration. In this light, the question is how African communications might make the best of what could be a bad deal for national expenditure priorities with regards to the roll-out of digital migration. The answer: proceed with caution.

2.4. The regulatory environment

Having made a decision to proceed with digital migration, governments have to begin moving to the stage of policy formulation. As will be argued later, the policy needs to avoid being a silo that confines itself only to broadcasting, and thereby misses

potential digital interfaces with the internet. To date, however, the silo approach has prevailed generally in Africa.

It is critical to have policy attention to digital migration because of immensity of the change. An example here is that, because of the expense involved, it is unrealistic to expect the broadcast industry to take any serious steps towards DTT unless there is clear and specific government policy on the subject of migration. The same goes for signal distributors. Likewise, manufacturers and retailers will not act in terms of making or distributing set-top boxes until there is policy certainty around specifications and costs. And, of course, why should the public bother at all if it is yet another government decision that remains empty in practice? Policy needs to set out a rationale and objectives for the transition, and deal with the diverse interests and actors involved, the resources required and responsibilities entailed, and the timeframe.

There needs to be hard strategy arising from policy. For example, will government guarantee an initial order so as to stimulate the supply of set-top boxes? And how will these boxes be distributed? Can a nation's post-office play a role, or is it only up to private sector retailers? Is there going to be a plan for e-government services via DTT? Will there be new compelling digital channels on air that will entice consumer uptake over time? If not, will a country face a disruptive stampede to acquire boxes just before switch-off because they don't want to lose their existing channels? Will there be a period where the information divide actually deepens because analogue TV transmission is terminated while many viewers have not acquired the STBs to keep watching on their existing analogue TV sets?

In many cases around Africa, there is neither policy nor strategy. At best, some preliminary technical work is being done by a small team of officials confined within a particular ministry. But best practice on the continent has seen wider stakeholder forums being established in order to develop a comprehensive approach to the challenge.

One initially successful example of this approach has been the Digital Dzonga in South Africa. It brought together all the broadcasters, as well as government, signal distributors, and

consumer appliance manufacturers and sellers. There was also a representative of consumer interests involved. These representatives attempted to co-ordinate the process amongst themselves as stakeholders. The body, however, was years in the making. It was announced by government in May 2007, but its members were only named a year later. It was a formalisation of a less established body dubbed the "Digital Migration Working Group" that had been set up by government in 2005. Over time the forum developed a recommended strategy and timetable for digital migration, which in turn formed the basis of government policy (a draft was announced in 2007, and finalised in August 2008). This policy sets out roles and responsibilities regarding law, regulation and state-subsidy for digital migration. The work of the Dzonga helped ensure that in 2009, there was a test roll-out of DTT in selected areas, and associated piloting of set-top boxes, plus research into consumer behaviour. The body was also charged with developing consumer awareness about the transition. (The importance of this awareness is that unless the end-users are made aware of the need to adapt to receive digital signals, the entire process is doomed to failure.)

At the same time, the Dzonga has also displayed some limitations. Even by 2009, it still lacked proper capacity or practical governmental support in the form of a secretariat and implementation staff. Its warnings to government (and the country's independent communications regulatory body) to undertake various actions and end delays in the migration were not always acted upon. There was almost no communication with the public about what to expect, although a marketing and advertising campaign was commissioned by the Dzonga. A further limit was that the Dzonga's members did not seriously include telephony and internet industry interests. This is a major gap, because the South African digital migration strategy has therefore developed within a narrow and outmoded traditional broadcast paradigm of exclusively one-way communications.

Entirely separate to this has been a digital broadband strategy for interactive internet communications, which has been gathering momentum in South Africa. These two universes of broadcast and

broadband seem almost oblivious of each other, and therefore blind to the convergence that characterises the Information Society. In particular, the set-top box that will be needed to change digital signals to analogue TV is being designed without, for instance, a sim card capacity which could have otherwise enabled viewers to interact with broadcasts and even to access the internet via the TV screen.

Compounding the whole Dzonga initiative was a surprise decision by the country's new Minister of Communications in early 2010 to disband the council. He argued that the membership had led to industry self-serving policies (although, arguably, one of the precise roles of the body had directly been to aggregate industry interests). Subsequently, the Ministry also decided to re-open much of the work of the Dzonga around the DVB standard for digital TV, putting on the table the possibility of changing to the Japanese standard ISDB-T (which is also utilised as the basis for a Brazilian standard known as SBTVD). This provoked fierce criticism from companies that had developed prototypes for set-top boxes on the DVB standard. In the absence of a reconstituted Dzonga, the Ministry convened an industry workshop to discuss the standards issue in the first half of 2010. In the medium term, however, whether through a new Dzonga or another body, it seems clear that the South African government needs an institutionalised forum that not only provides feedback, but also helps to align the key actors along the many aspects of digital migration roll-out. The same goes to other African governments.

If broad-based policy development is critical to digital migration, this is partly because of the politics of who benefits, and who pays. Government decisions in this regard affect all the stakeholders – the broadcasters, signal providers, technology companies, other media companies, content producers (like small independent production companies), audiences and taxpayers. And unlike the realm of the “old” broadcasting world, there are also now new stakeholders, sometimes with multiple roles (eg. a telecoms company in the businesses of both transmission and content). The time will eventually also come in Africa where there are many diverse claimants for the “Digital Dividend” – any frequency that

is freed up when the bandwidth-hungry analogue television is finally switched off. These will be not just broadcasters who, once strengthened, may want some space to run more channels, but also telecoms companies and internet service providers (ISPs). There are also entities with interests in data traffic, like banks, scientists, and the military. What this boils down to is the politics and processes around spectrum management, and who will cover costs and reap benefits from the digital migration.

Besides all these issues and interests that are relevant to policy, one can also identify more immediate parties that have interests in digital migration. Content rights holders and their agents, many operating internationally, are vested in trying to ensure the transition does not enhance unauthorised use and reuse of broadcast content distributed in digital format. The migration is part of the reason why the World Intellectual Property Organisation has been debating a possible new treaty on protection of broadcast signals from piracy, in the context of the digital age. The public themselves have a stake in the reallocation of frequencies, in that some users may want to see the airwaves put to use to allow for peer-to-peer use (akin to Citizen Band radio-style communications) or community TV utilisation. Parents and NGOs may want restrictions on what they see as harmful content that could become available on broadcast in the new digital era.

As people become accustomed to information and communication technologies (ICTs), so they also develop “digital behaviour” which involves users wanting more content, and more control over how they can interact with content. With relevance to DTT services, this entails viewers wanting to self-select (rather than be channelled from the supply-side), such as via on-demand broadcast content. Digital communication implicates the whole content arena in personalised services. It also goes hand-in-hand with content being transformed and redistributed elsewhere in the digital circuit – for example, saving a DTT broadcast, editing excerpts and putting these out on the internet. In this way, while digital migration does not mean delivering internet access, it is part of a bigger picture in which people seek the experience of being not just receivers of digital broadcasting, but also interactive

creators and senders of digital content. This is part of the reason why government policy should not be limited to broadcast digital migration, but should encompass the digitisation much more widely – including promoting digital telecoms and internet access.

In aggregating all these stakeholder interests overall, the rationale and consequent outcome is supposed to be “public interest” – the general interest of all is supposed to be the guiding principle of what policy finally gets decided. One such consideration in this is the notion of “universal access” – meaning that benefits of policy should be available to every person living in a society, even in the most rural districts. The notion here, when applied to digital migration, is one of rights and benefits – of all citizens enjoying equal rights, and the entire society benefiting because no one is left behind or on the sidelines in terms of access to digital broadcast signals. A related consideration is “universal service”, and this refers to which actual broadcast services are delivered to everybody – something that is particularly seen as the duty of a state-owned broadcaster as part of its “public service” mandate. In some countries, special agencies have been nominated to play a role in ensuring that universal access is delivered (whether analogue or digital).

But even where the principle of “public interest” rather than single-group interest is upheld, the specific interpretation often depends on who gets involved in the politics of the process. This relates to the most active participants within elite interest groups, and the extent to which there is also grassroots and civil society involvement in policy making. Also playing a role in the political decisions around digital migration are dominant traditions and cultures about the role of the state, and conceptions of the need for regulation or not. Examples of two extremes here are: government-driven transition in South Africa (related also to the pressures of providing digital transmission during the World Cup) versus leaving it up to the market in countries that are more laissez-faire. The national capacities for implementation are also critical. Generally, best policy practice is based on participation by all significant interest groups, and prudent anticipation of implementation issues so that policy is not a wish-list or just an

irrelevant piece of paper.

In democracies, it is generally agreed that governments should act according to the broad policy principles on which they were elected. Accordingly, while consultation is best practice, the right to make final decisions on national policy is granted to these authorities. Such policy should, in turn, inform law-making and subsequent regulation, and also provide the context within which self-regulation systems may operate. To give an illustration, the ruling party in South African came to power in 1994 with a media policy that promised, amongst other things, diversity in broadcasting and ending the near-monopoly of the airwaves that the SABC had enjoyed up till that point. The country's constitution enshrined an independent broadcasting regulator to implement this, with Parliament nominating council members to this body. Over the years, the South African government has made policy that has set priority areas for the regulator to address, as well as some constraints – such as the budget of the institution. Government policy also later led to the merger of this institution with its telecoms counterpart, forming a single body operating under a converged law, the Electronic Communications Act. Today, government continues to make broad policy, but the Independent Communications Authority of South Africa (Icasa) implements in the form of decisions on who can get broadcast licenses and under what licence conditions. At the same time, Icasa also delegates a degree of its statutory authority to an industry self-regulatory body called the Broadcasting Complaints Commission of South Africa.

When it comes to digital migration, it follows that democratic governments similarly operate the final right to make policy, even if they do not necessarily directly implement it. In the words of the Nigerian National Broadcasting Commission:

...Government has the greatest role to play in actualising the migration. It is the role of government to lead the movement by fashioning out appropriate policy on methodology and pace of migration, acquisition of set-top boxes for existing receivers already in the country and generally giving direction to the industry in the

interest of the nation.

In this way, digital migration is shaped profoundly by national policies (or the absence of thereof). But apart from a general responsibility to facilitate technological progress in communications, governments also have a direct stake in digital migration inasmuch as the change might help to advance e-governance and administration. For example, opening up frequency space for more TV channels allows for a parliamentary service to be broadcast. Digital broadcasting also provides space to transmit information on government services, and even documentation such as forms to fill in. At the highest end, interactive digital communications (like SMS), intersecting with digital broadcasting, can enable e-voting. These are also important policy considerations.

2.5 The policy and regulatory issues around TV digital migration

The substance of government policy is critical to the shape and roll-out of digital migration. This is what decides if this costly process will be subsidised by the state or not, and whether such support will be at the stage of production, transmission or reception, or combination thereof. In the South African experience, policy decisions have been taken that public funds will subsidise the state-owned broadcaster SABC to digitise news-gathering (largely in the form of digital Outside Broadcast Vans) and editing equipment.

South Africa's government has also specified that the set-top boxes will be subsidised for the poorest sector of society. In addition, South African policy has also been set to require local manufacture of set-top boxes, rather than import. This serves the interests of local manufacturers, although it also means that the products are also more expensive than if they were imported. That trade-off in favour of local industry was a deliberate policy decision. A portion of subsidy could come from a South African statutory body distributing monies levied from the telecom

industry, the Universal Service and Access Agency of South Africa (USAASA). How it is administered to ensure equitability and effectiveness is also a policy issue.

Further South African policy on digital migration has involved subsidising the conversion of analogue transmission infrastructure to digital equipment. This means supporting the work of the state-owned signal distributor Sentech. However, this parastatal says it has only received two-thirds of what is needed for the roll-out, putting a question mark over the effectiveness of the policy. Meanwhile, what was still unclarified in early 2010 was whether there would be policy for state subsidy of any or all broadcasters who have to pay Sentech for distributing two sets of signals – analogue and digital – in the envisaged three year transition period of double transmission before analogue TV is finally switched off. Broadcasters have expressed unhappiness at the rates Sentech intends to charge for distributing digital signals, highlighting the need for policy to address this matter one way or another.

This points to another policy decision on digital migration: setting the detailed timetable to switch-off. Generally, the period of parallel transmission of analogue and digital TV (known as “dual illumination”) puts extra pressures on the use of airwaves, and licensing of new TV broadcasters is accordingly suspended until the end of the period. Digital migration also needs a new frequency plan that re-allocates spectrum to the users during the transition, and after it. There are some TV broadcasters for whom a “hard switchover” makes sense – here, they switch direct from analogue to digital – usually where (or once) their viewers have access to digital receivers. In South Africa, this is what the regulator originally proposed for the M-Net subscription broadcaster and to community TV stations. In Namibia, M-Net achieved a hard switchover by upgrading all subscriber boxes to receive digital signals and thereby being able to switch on digital and terminate analogue at the same time. Digital broadcasting to cellphones is another service that needs accommodating – sometimes during the dual illumination period. Digital migration policy has to address all these issues.

At stake in making policy on a timeframe for migration is a

calculation of possible benefit. Thus, a long period of “dual illumination” gives retailers reasonable time to acquire and market set-top boxes and for consumers to decide to buy them. The same goes for disseminating digital-ready TV sets that can receive digital signals without needing a converter device. As time advances, so these items also reduce in price. But a long period of “dual illumination” also means running two sets of signals simultaneously, analogue and digital, which is expensive for the broadcasters. They would prefer a shorter time for dual illumination, but this risks the danger that consumers will not have adopted the technology by the time of desired switch-off. Even in the USA, this outcome forced the administration to delay analogue TV switch-off for six months in 2009.

It is a complicated and interdependent matter for policy to anticipate: there’s no point in policy wanting broadcasters to start digital transmission if there are not even set-top boxes in the market for the public to receive the new signals. On the other hand, the public has no incentive to buy boxes if there are no digital broadcasts.

In South Africa, the migration policy initially envisaged a three year period as manageable for all stakeholders. But the anticipated digital switch-on that happened for some regions in the country on 1 November 2008 has been downgraded, more than once, into simple pilot testing of signals, rather than any mass transmission (known as a “market launch” that is broadly available to the public). This has been in part because of delays in the set-top box side of the equation. If nine million boxes need to be operational in South African homes before digital switch-off, it is estimated that an average of one every 1.5 seconds would have to be installed if the migration period was two years long.

Delays in South Africa have also been due to the country’s regulator ICASA foot-dragging on a frequency plan. A second draft plan was issued in July 2009. Only by year end had ICASA issued a detailed phased plan stating which localities should be exposed to switch on and off, and when. Because of these delays, the signal distributor Sentech has been held back from getting to work on the infrastructure conversions needed for achieving

near universal distribution of digital TV signals. It was expected that by June 2009, network planning delays meant that a commercial launch of services (even if the set-top boxes were available by then) would not be national, but limited to metropolitan areas only. By June 2010, this had still not yet come to pass. The scenario is that, even when it does happen, a third of the population might not be covered, which risks causing alienation and confusion in the consumer marketplace. As a result of all this, as well as the government’s 2010 decision to review the DVB standard, there is very little likelihood of South Africa making its policy deadline of envisaged analogue switch-off in November 2011. In this way, the policy framework has proved to be unrealistic in the face of the knock-on effects and complexity of forces within the process.

It was touched on above that digital migration policy should address the issue of who pays for the period of dual illumination, meaning the costs of dual transmission of the same station on two signal platforms (analogue and digital) rather than one. One of the policy stipulations that this often involves is granting broadcasters incentives rather than compensating them for extra costs. These incentives entail offering them extra licences over above the ones which they are expected to migrate onto DTT. In the South African case, it was proposed for example that commercial TV broadcaster, etc, get the carrot of another two or three TV channels. Subscription TV broadcaster M-Net was at first offered another five channels by the regulator – on condition that it vacated its analogue frequency within a year, but this incentive was reduced after complaints by rival broadcasters. SABC’s incentive was set at up to six new channels.

The implication is that broadcasters will be able to recoup the extra costs over the transition period by making money through newly-added digital channels. A different kind of incentive has been offered in the UK for encouraging digital radio. In that case, FM radio stations which agreed to also broadcast on DAB were granted 12-year licence extensions of their FM broadcast rights. This illustrates the complexity of radio migration: analogue audio broadcasting has been protected as a precondition for initiating new digital sound broadcasting. (The next section of this booklet

explains in more depth why there is no technical urgency to vacate the frequencies used for FM radio).

There is also policy to be made on standards – i.e. the kinds of digital technology options chosen for TV, radio, satellite and cellphone, and whether digital TV broadcast should be in Standard Definition or High Definition. For example, South Africa planned to distribute HD signals internationally during the World Cup, but not domestically. Subscribers to DStv's SuperSport satellite channels were expected to receive HD transmissions of the games, but would need a TV set capable of displaying these to get the benefit. Southern Africa through the SADC has agreed to the DVB standard for digital TV. But, as indicated, in May 2010, the South African government said it wanted to review this and look at the Japanese standard (which is also used by Brazil). Industry interests complained that enormous resources and planning had gone into DVB preparations, and some said that if anything South Africa should upgrade to DVB-T+ which was a third more efficient than DVB-T.

The decision as to whether there should be a "Multiplex" operator, or operators, distributing the digital signals separate from the broadcasters, is another important policy decision. Besides the broadcaster/s, this necessary part of digital broadcasting (fusing various channels onto a single digital signal) can be operated by a signal distributor, a third party company, a broadcaster or a coalition of broadcasters. This matter impacts on who is licensed to use the frequency – the operator who can play the role of gatekeeper, or the broadcasters. For example, in Kenya, the state-owned Kenya Broadcasting Corporation will operate as that country's Multiplex operator, and has reportedly set up a separate firm called Signet for this purpose. In such cases, conflicts of interest issues arise, and there is also the matter of monopoly around a Multiplex operator and the costs that will be charged. The matter of a licensee being allowed to sub-lease unused parts of a frequency is also a policy concern that needs spelling out. Policy in these areas has implications for the models of digital broadcasters – for example, producer-publishers versus compiler-publishers.

Policy can also set usage conditions for digital migration. These can be rather controversial. For instance, the South African regulator ICASA proposed in 2009 that broadcasters licensed for digital television via DVB-T technology would not be allowed to run pure audio (i.e. "radio") on their Multiplexes. This may have been intended to reserve use of the signal for its best use (digital TV). But in an environment where a broadcaster like the SABC may struggle to fill all the newly available channels it is being offered, it seemed artificial to block this broadcaster from transmitting its radio services through the system. From an audience point of view, many SABC radio stations remain restricted to given regions, when they could instead be disseminated nationally in the unused space of the corporation's Multiplex channels. (The regulator lifted this limit after complaints). In radio, a similar controversial decision was taken by British regulator Ofcom which allows only 30% of a DAB radio Multiplex to be used for non-audio services. In 2009, Zambia took a highly restrictive stance by banning satellite broadcaster My TV from re-broadcasting Lusaka's Muvi TV to parts of the country outside of the capital. Such attempts at restriction contrast with digital satellite TV in South Africa, where broadcaster DStv is permitted to re-distribute on a national basis both regional radio channels and regional community TV station Soweto TV. However, in these ways, regulatory policies are not only far from being technology-neutral, they can also stifle the optimum use of digital potential in broadcasting.

Policy choices also become important as to specifications of the set-top box, and the issue of what devices will be permitted for import or operation. The specifications for set-top boxes cover issues like "Conditional Access" (including user and broadcaster filter powers – more detail is given later in this booklet), Subscriber Management Systems (SMS) and Electronic Programme Guides (EPGs), which raise a lot of questions around control of broadcasting, including pay TV, encryption and piracy. There is also the question of reception software in the box – in South Africa's case, specified to MHEG 5.1 standards (not to be confused with MPEG). Known as "middleware", this software is able to handle not only reception, but interactive weather information, e-government

information lists, and games. Digital migration does not end entirely with viewers having a set-top box (or digital-receiver TV set). It is likely that the boxes (or sets) themselves will need to be switched for more advanced ones at least within a decade of their dissemination, and backward compliance issues come into the picture. (More detail on the technical issues is provided in the next section).

Further policy questions affect the extent of accessible digital content. In South Africa, government policy has been decided that the SABC should have two more TV channels in indigenous languages. Micro-policy proposals by the regulator ICASA have also suggested local content quotas for certain digital channels. In countries with large state-owned broadcasters, the policy question also arises as to whether these institutions will lead or lag digital transition, or whether momentum is more likely in non-state broadcasters. State-owned broadcasters, which are supposed to act as “Public Service Broadcasters”, have a huge stake in digital migration, because it is a development that could easily leave them behind in relation to private players. As a custodian institution for broadcasting as public service (rather than primarily profit), PSBs are called on to ensure “must carry” obligations for subscription broadcasters to carry their services (although there is always a debate about who pays for this). These state-owned broadcasters can also be expected to promote public awareness and literacy about digital broadcasting more broadly, and also further expected to pioneer services that may not be immediately profitable – like digital broadcasting to cellphones. Whether government deals with these roles for the public and private broadcasters within a digital migration policy is an important matter.

Policy needs to acknowledge that many African broadcasters are partly donor-dependent, and competition for donor funds for digital transformation will be high. In this way, some state-owned broadcasters may be able to link two transitions: (a) reform away from being government broadcasters and becoming instead public service broadcasters, and (b) the change from being an analogue-only player to being a fully-fledged multiplatform

broadcaster and media house.

Because digital migration will eventually mean many more television channels on air, and therefore more audience choice, the state-owned broadcasters will face an uphill battle to be able to call on public funding for their output. There could be public and competitor resistance to taxpayer funds going into state-owned enterprises which have lost significant audience share. What becomes a big policy issue here then is the role of government. It is complex if the state is both a player (as owner of a broadcast institution) and a referee. A better arrangement is to have independent regulators to adjudicate some of these issues and rule on, for example, unfair competition with the private sector. There is also the issue about whether governments are prepared to allow tightly-controlled state-owned broadcasters the freedom to reform into public service institutions, if that becomes a condition for donor support for digital migration. All this raises yet more issues of politics and policy.

Although community TV is far less evolved in African countries than community radio, digital migration policy should also make provision for this character of television broadcasting alongside public and private. Thus, government policy regarding community TV broadcasting (including its funding) should also be part of digital migration. In South Africa, three community stations have been licensed on an analogue basis, and are only expected to migrate after SABC and commercial TV have completed their transition and switched off their analogue signals. One existing community TV station in Cape Town actually found its analogue frequency under threat of removal and re-allocation to new mobile digital broadcasters, as a result of poor policy by the regulator.

Within broadcast organisations themselves, a wide-range of policy decisions must be made, even if the wider parameters are sometimes set by other parties. Amongst these decisions, the individual broadcasters need to decide whether to spend time and money on digitising archives, or whether to just convert analogue content to digital when needed for transmission purposes. There is also a need to decide how to respond to digital possibilities other than broadcasting, such as the internet (whether

accessed by wires or wireless means). In this, the issue that should be addressed is how to develop a new mindset that goes beyond broadcasting as a one-to-many information flow. This means a transition where broadcasters begin to embrace two-way interactive communications with their audience, including carrying what is called “user generated content”, as is the case with, for example, with certain video clips on the BBC, CNN and the Belgian public broadcaster.

Successful politics around digital migration policy result in compromises with wide benefits, and legitimated priorities. To elaborate further on this point, key to this outcome is public participation in policy-making, even inasmuch as elected governments are entitled to have the final say. The extent to which the authorities treat participation as genuine consultation or as political theatre (a charade), has a bearing on the quality of policy that results. One thing is certain, however: digital migration is too complex an issue, with too many stakeholders, to be left solely in the hands of government. This is at least recognised by many governments, even those without any inclination towards embracing stakeholder participation. If participation proves itself in regard to improving policy-making on digital migration, this could perhaps help engender a pattern in the longer term for the way that governments develop policies on other communications issues – for instance, on broadband internet. In many developed countries, Internet is growing faster in many respects (access, usage, advertising) than traditional broadcasting, and African countries need to take into account the whole picture of communications, rather than consider broadcasting policy in isolation. An example of a comprehensive policy worth considering is the UK’s White Paper called “Digital Britain”, which not only set out targets for digitising not only broadcasting, but also sought to achieve a universal level of basic broadband access in the UK by 2012. African countries could do well to develop local equivalents that describe the targets and roles for digital developments across the board of broadcasting, telecoms and internet.

2.6 The technological environment

Digital migration entails digitisation of technology at the production, transmission, and reception stages of the value-chain of broadcasting. As indicated, the primary component is the transmission, which has the effect of freeing up the airwaves for additional broadcast (or other) channels.

Transmission in this sense is generally understood to apply to terrestrial transmission systems (particularly TV), as distinct from satellite. But not all countries are going the route of Digital Terrestrial TV (DTT); countries like India put emphasis on satellite for delivery of digital broadcast content. While both are costly, there are advantages to DTT in that existing signal distribution towers can be re-purposed and ultimately also utilised for wireless broadband internet, meaning a return-path for the audiences to interact with digital broadcast content. On the other hand, satellite – although it can be obscured in some localities – is very good for reaching remote areas. In many instances in Africa, a combination of the two digital systems will be in operation. For example, satellite is thus used to get signals to remote base stations which in turn may re-transmit the signal on a terrestrial basis.

Transmission is a complicated matter, relating to the preparation of signals in a particular digital format for broadcast – and there are several different standards in operation around the world. In Africa, digital television transmission is mainly based on the DVB family of standards, which have specific configurations for satellite, terrestrial, and for handheld devices like cellphones (DVB-S, DVB-T, DVB-H). Digital audio-only channels can be, and are, transmitted on the DVB signals. However, there are also specially designed systems for digital audio broadcasting – two of which are DAB and DRM (which refers to Digital Radio Mondiale, and is not to be confused with “Digital Rights Management”). Slightly confusingly, DAB and DRM can also broadcast non-audio data – in other words, images and text. In this way, there is a convergence possible whereby digital TV can also deliver digital radio, and digital radio can also blur into simulated TV. More detail on the technology of digital broadcasting is given in sections 3 and 4 below.

Within digital TV, there is a distinction between High Definition (HD) and Standard Definition (SD) transmission, based on the amount of data being transmitted. HD produces a much richer image because it embodies more data. Its resolution is approximately five times better than SD. However, by the same token, HD also takes up more bandwidth and a single digital signal can accommodate far fewer channels if they are in this format, as compared to if they are in SD. This bears on policy decisions as to what kinds of services to licence. It also bears on reception. As discussed above, most TV sets are still analogue in display, and all digital signals have to be down-converted for viewing. Whether transmission is in HD or SD, the viewing quality on the set is the same as for analogue. Even a TV set that can display digital signals directly is not necessarily one that can show HD (which also operates at a different horizontal-vertical size ratio to SD – 16:9 vs 4:3). By the same token, an HD set cannot directly receive digital signals unless it has a digital receiver built into it.

Aside from the format issues, digital transmission also raises a number of other matters. One of these is the transmission apparatus. In the case of terrestrial-based signal distribution, the old analogue transmission towers have to be upgraded to be able to send digital signals. This is a costly operation. Where signals are not strong enough, consumers may have to acquire and install new antennas, especially where their existing equipment is designed for VHF rather than UHF where digital transmissions are located.

There is also a tricky requirement in the nature of digital, which requires that there are no noticeably delays between a broadcast tower receiving a signal and relaying it onwards to the public or to neighbouring towers. If digital signals are not synchronised on Geographical Positioning System co-ordinates, they may interrupt each other and affect reception. Further, if satellite is used to service rural towers, there is often a delay due to the immense distance involved of sending the signals, and the result can also be disruption. A further complication is that, because a digital TV signal can accommodate around ten (SD) TV channels on it, a special agency may be required to fuse separate channel

signals (even from different broadcast companies) into the single combined signal. This operation is known as “Multiplexing”, and as mentioned earlier there are variations in who does it: a 3rd party operator independent of the broadcasters and the signal distributor; a broadcaster or a consortium of broadcasters; or a specialist signal distributor.

Receiving a digital signal is dependent on the public having the technology to do so. Most people with televisions worldwide do not have digital-receivers in their sets, even if other components are digital (eg. digital recording and storage of programmes). This means that an intermediary device, namely the set-top box, is usually needed to receive the DTT signal and convert it for analogue display. As discussed earlier, there are major policy questions as to how to ensure that audiences acquire this equipment, so that they are not left bereft of TV at the point when the analogue signal is switched off. Also, as discussed above, there are major issues related to Electronic Programme Guides (EPGs) and “Conditional Access” built-into the box. The first of these requires the participation of all broadcasters on a Multiplex, and a system for fair display of competing programmes. The second issue (“Conditional Access”) impacts on whether certain channels can be blocked (eg. those unsuitable for children) at certain times of day. Conditional Access is also related to whether a box can be switched off by the broadcaster for non-payment of subscription TV and/or licence fees, or if it is stolen.

Policy may well seek to promote a common basic standard for a set-top box, so that consumers do not have to buy different boxes to access services from different broadcasters. The issue is what is included in the basic standard. Boxes can have a built-in return path, for example, an internet connection via a SIM card for instance. In South Africa, it was decided, however, that this option would make the basic box too expensive, and therefore only a USB port would be included, which would depend on a consumer buying an extra plug-in device for internet connectivity. The first prototype of the box, however, neglected to have a power supply to the aerial, meaning that the USB port then had to be turned over to this particular purpose. Whether basic set-top

boxes should have built-in recording capacity and hard-drive storage is another issue. The extent to which software in a box can be upgraded directly by broadcast signals is another matter. What is clear, however, is that, like the Google TV promise, a set-top box can in theory be a home computer, and with the TV monitor as screen, all that is needed is a connected keyboard. This scenario raises exciting possibilities for mass enlistment into digital communications.

For radio, the case of reception of digital signals is much more complicated. The diversity of radio sets in the market means that it is not feasible to envisage a “set-top” device that would enable a radio set to receive digital signals and convert them to back analogue for listening to. In any event, the cost of such a device would probably exceed that of many radio sets. In consequence, the concept of digital migration when applied to radio means introducing new and separate sets into the market place. However, radio is different to TV in another regard. In TV, there is a “stick” that ultimately compels viewers to upgrade: the analogue transmissions will be switched off in favour of digital signals. But analogue radio is not likely to be switched off anytime soon, because the radio waves it uses are generally not suitable to digital radio. Digital radio broadcasting in most of its versions is an add-on, not a replacement, for analogue radio. This is because, as noted earlier, it needs to use different frequencies to analogue radio broadcasting (and in particular TV frequencies). Therefore, the motive for consumers to buy digital radios is not generally about any fear of being cut off from radio reception. Instead, it has to be related to consumers receiving better quality audio and additional services being available on digital radio platforms. The lack of urgency of vacating analogue radio signals, and the need to resort to a “carrot” rather than “stick” approach means that it will be many, many years before digital audio migration is completed.

Digital production has its own technology issues. Many African broadcasters are already advanced in terms of digitisation in production and in particular in computer-based editing, although actual newsgathering in the field lags behind somewhat. The

activity of converting analogue archives to digital is the orphan of the process. What this unevenness means is that the full advantage of digital content management is yet to be realised. Software known as “Content Management Systems” (CMSs) is the key application here, and it refers to the use of databases for managing digital content. Content that is gathered in digital form, or which is analogue but then digitised, is stored in a database through CMS software. It can then be drawn out into a workflow process that allows varying permissions to different users, and version controls. In this way, it can be edited in preparation for output as an edited broadcast-ready product. A CMS can also convert formats for varying resolutions – for example, from High Definition to Low Definition digital TV, or between different audio formats for radio. Digitising archives and adding them to the database is a way of preserving content where physical tape, film or records are deteriorating, as well as making this content available for varying kinds of re-use.

Central to all this, however, is the indexing of digital content. Key words and reference information (“metadata”) are needed so that content, especially images and audio, can be easily located in the database. While CMS products such as Dalet are commercial installations aimed at large-scale broadcasters, there are also open-source and freeware systems available such as Campcaster and BroadcastCMS.com.

The report of the Kenyan taskforce on digital migration (2007) stated that “Content development is recognized by the Taskforce to have even more importance in the era of digital broadcasting”. Indeed, the technological environment means that the availability of many more opportunities for TV as a result of digital migration, calls upon Africans to rise to the challenge of content production, rather than rely on imports or be unable to take up channels. Such content naturally needs to have a business model, which in the digital universe may be even more difficult than it is in the African analogue TV world. Recognising the need for promoting indigenous digital content and avoiding reliance on poor-quality imports to fill the new channels, the South African government in 2009 produced a Local and Digital Content Production Strategy

document, which it also elaborated upon in more detail in a Draft Public Service Broadcasting Bill later that year.

More detail on the significance of technology issues for DTT and digital radio is provided in later sections of this booklet.

2.7 The economic issues

Economics is partly about the balance between costs and benefits, and about which groups are affected in regard to the equation. As indicated above, the key driver for digital migration in developed countries is economic. The interests involved can be categorised into business, consumer and government interests.

Business interests want to get greater usage of especially TV airwaves spectrum – be these TV broadcasters, cellphone companies, wireless internet service providers, banks or others. Where analogue radio frequencies are used up, and no more FM licences can be issued, then those who want to enter or expand the radio market would also like to see digital services becoming available. Meanwhile, manufacturers of consumer electronics devices are always on the look-out for encouraging new demand – even in the realm of radio listeners whose analogue audio consumption does not occupy spectrum that could be used for other purposes.

To an extent, consumer interests also are an economic driver, in that more efficient use of the airwaves via digital is likely to mean there are more services available to the public in the broadcast marketplace. In some variations, digital can also mean better technical quality, although that is not automatic – it depends on the degree of compression, and also whether digital broadcasts are directly consumed in digital form or converted into analogue.

Consumers, generally speaking, are expected to pay something towards the transition, and not only via their taxes. Especially in the case of TV, they are required to make some investment in a set-top box, even in cases of partial government subsidy. Here, the cost of the boxes is an economic issue of relevance, and this depends on issues of import duties and local industrial manufacturing policy. Kenya, for example, has said it will consider

tax relief on importing boxes so as to ensure they are affordable.

Even without the costs variable, the question that still generally arises is why should consumers fork out any money for a box unless absolutely necessary? While the threat of turning off the analogue TV signal constitutes a serious “stick” (as noted earlier), a transitional period cannot rely on a rush at the last minute to buy the boxes. The logistics of disseminating boxes and phasing in the transition require that there are also “carrots” for the audience. In general, this requires that digital TV should offer highly desirable benefits that go far beyond what is obtainable through the existing analogue services. In short, for consumers to spend money on receiving devices, someone has to spend money on the sourcing and delivery of content that is extra (or enriched - eg. by subtitles) to the existing mix. The same applies especially to the issue of consumers buying digital radio receivers.

This raises the role of government as a driver of digital migration. On the one hand, there is a direct incentive in that a state can reduce some of the costs of governing by promoting digitisation broadly, including of broadcasting. The sale of freed-up frequency can also add to state coffers.

However, while all these stakeholders seek the benefits, the question arises as to who will pay the costs. For African countries, where business and consumer interests in digital migration are not actors to the same extent as in developed countries, the question of costs becomes even more pressing. Why would African broadcasters and consumers contribute scarce funds towards digital migration, especially when the envisaged benefits of new markets and more choices are a long way off in the conditions of the continent?

As is often said, everyone wants to go to heaven, yet no one wants to die. Accordingly, the stakeholders noted above would all like to be in digital nirvana, but nobody wishes to pay the price. The costs are substantial, and how they are paid can also impact on the length of the transition. Public funds can shorten the period, but there are also many other causes calling out for state resources, particularly in African countries.

One of the most contentious costs is that of “dual illumination” –

the transition period of overlap where both analogue and digital signals are transmitted. Broadcasters do not want to pay for the extra digital transmission service before the uptake of digital receivers is high enough to make it worth their while. Whether this means “worthwhile” in terms of advertising or subscription revenues, however, the difficulty is that the transition is likely – at best – to shift the same revenues from the analogue platform onto the digital, and not necessarily gaining extra revenues from duplicate distribution of broadcasting. Subscribers to analogue services are not going to pay for that service as well as a digital one; advertisers who previously spent a certain volume of advertising are not likely to increase it – rather, they would want to pay less for a declining analogue audience, and switch proportionately towards where the audience now is – going digital. The same challenges apply even more to digital radio, which has the prospect of a much longer period of dual illumination, given that analogue radio services, unlike television, will persist well into the future.

In point of fact, it is also likely that broadcasters in a pure digital-broadcast environment may find themselves with more channels but less advertising, precisely due to the increased number of opportunities for advertisers to spread their budgets. According to Marcel Golding, CEO of private South African broadcaster eTV,

“...the introduction of new channels will fragment audiences ... drive down advertising rates. It is unlikely ... that advertising spend ... will increase – it is more likely that the available spend will have to be shared across more channels. As more channels mean higher costs for broadcasters, this will have an adverse affect on incumbent broadcasters.”

Advertising inventory can cater to niche interests with a proliferation of digital channels, with more prime-time possibilities on sale. The result is that advertising rates are likely to decline.

To the extent that digital migration leads to new TV channels, the fragmentation of audiences into specialist channels signals the end of an era of selling mass audiences to mass market

commodity vendors. The impact of this on broadcasting transition is very significant. What it means is that the “incentive” of providing additional digital channels to analogue broadcasters could turn out to be a double-edged sword. This is why many broadcasters want not just the compensatory channels, but also seek relief in the form of governments subsidising the period of “dual illumination” from the general fiscus.

The “incentive” thus is also not quite as straightforward as might first seem to be the case. The broadcasters have to find content for the new DTT channels, and a business model that will sustain the acquisition and transmission of this content. For some, this will be a stream of dirt-cheap (or free, but agenda-driven) imported content that they hope will be sufficient to generate an audience of some interest to advertisers. This model, however, does little for a country's independent production sector or for its cultural valorisation.

In other cases, such as South Africa's SABC which is subject to local content quotas, as has been noted, it would be desirable for radio channel content to be re-distributed on the DTT platform. However, it is also possible that SABC could fill at least some of its new digital TV space using video content that it already has. One example is that a lot of imported content that it rebroadcasts on its existing channels actually comes bundled with secondary material – known in the trade as unavoidably acquiring “fleas” when one buys the “dog” in the form of programmes sold only in packages and portfolios rather than singly. A second source of video content is re-runs, although the right to do so may often need to be renegotiated depending on how the content was acquired. A third is news and sports footage generated on a daily basis by SABC staffers, only a portion of which finds a space on the analogue national news bulletins. These resources could for example, contribute towards running dedicated channels for movies, news and sport. In other words, in this model of filling airtime on DTT channels, the costs of content are not substantially increased, although there are still transmission costs. SABC itself believes that a third of the total content of these new channels will still, however, have to be newly generated if the consumer

proposition is to be attractive. To meet these costs, SABC is likely to depend on a mix of public subsidy and advertising. Without public funds, it might just fill the airtime with cheap or free imports.

Another economic issue in digital migration concerns how subsidies – where they exist – can be implemented. In South Africa's case, the multi-stakeholder committee, the Digital Dzonga, before its dissolution in 2010, had been debating how the agreed-upon government subsidy of set-top boxes for poor people would be delivered. Retail interests in that country have said they do not want to take on the administrative work of assessing who is eligible; nor do they want to wait for government to reimburse them for vouchers cashed-in by those receiving the subsidy. But if the subsidy goes directly to the manufacturers and vendors, that does not concentrate it on the specific low-income sector of society which is earmarked for the subsidy, but instead spreads it more thinly across everybody buying a box.

For African countries, the economic drivers of digital migration are not as directly driven by economic stakeholders as in developed countries. But given the subordinate place of Africa in the global economy, there are nevertheless economic factors at work. As noted earlier, these include the concern of going into the future dependent on obsolete analogue technology, and the challenge (where applicable) of donor-driven status. In South Africa's particular case, the migration driver has been setting in place the production and transmission infrastructure for the 2010 World Cup, so that HD TV broadcasts can be sent around the globe and also SD TV for DVB-H enabled cellphones. Ironically, most South Africans will not benefit from either of these services, because of delays around set-top box manufacture, distribution and subsidy agreement, and the scarcity of advanced cellphone handsets capable of receiving HDTV. Digital TV services for cellphones were supposed to be a benefit to the South Africa public by the time of the World Cup, but regulatory delays prevented the realisation of this scenario.

2.8 Pluralism and diversity issues

In this section, the concept of “pluralism” refers to the extent of “players” in broadcasting, and “diversity” refers to the range of broadcast content on offer. There can be a connection, in that a greater number of broadcast outlets (especially if separately owned) can often mean that a greater diversity of content is carried on these outlets. However, this latter outcome does not automatically follow from the former. For example, similar or identical music can be played across several radio stations competing for a given demographic; many news bulletins can all be homogenised by dependence on a single national news agency. The degree of pluralism in numbers and ownership, and of diversity in content, is greatly influenced by policy.

The evolution of broadcasting in much of Africa in the past 15 years has seen a policy of liberalisation unfolding, in which state-monopolisation of the airwaves has been pushed back, and independently-owned stations have been licensed. In several countries, some state-owned stations have also been privatised. Some of these new players have a relatively free hand as commercial enterprises, while others have public service licence conditions imposed. In some countries, a distinction is made between private commercial broadcasters on the one hand, and community broadcasters on the other (whose motive force is supposed to be community participation and service, rather than private profit-making). These regulatory distinctions between types of broadcasters and around public-service conditions are central to whether a pluralism of broadcasters translates into a wide diversity of content. Without these conditions, broadcasters often gravitate to similar kinds of genres and content (including for example, imported music). This is sometimes said to be the case with highly de-regulated broadcast markets, such as the USA, where corporate and chain ownership has led to a homogenising of content across many stations.

The contemporary state of play in most African states is that the widespread pluralism of ownership models that currently exists does – at this stage of its development – seem to translate into

an increase in content diversity. This is despite the fact that in most countries on the continent, state-owned broadcasters still dominate the national airwaves, often with a mix of programming that may meet some public interest criteria (such as language and cultural promotion, educational services), although not others (which deliver government propaganda rather than ethical news). At least in most African urban areas, there are now choices for listeners in the form of alternative stations run by non-state actors. It is the case that sometimes such stations are licensed to government figures or their friends, or to people with primarily political rather than business or community interests. Based on the extent that digital migration opens up more broadcast opportunities that can be actually taken up, there is the possibility of greater pluralism at least in terms of numbers of outlets.

Digital Terrestrial TV (DTT) roll-out requires ultimately that analogue TV is switched off, because this technology needs to use the same frequencies as its predecessor. There is thus a difficult balancing act to squeeze in digital transmissions without displacing analogue ones over the transitional period before analogue is switched off. This is, as mentioned earlier, not only a technological issue, but has a bearing on policy as to whether new TV outlets will be licensed over the transitional period. It could be that the transition period will therefore see a three to five year freeze in new entrants into the TV market – especially if the digital channels are allocated to the existing incumbents as incentives to compensate them for dual illumination. For that sector of the public that has access to DTT, there could be more choice, but from the same providers as previously. At the same, the argument is sometimes made that the market leaders know how to develop the market, and that it can backfire if there is an artificial attempt to bring in new and inexperienced players. The question this raises is whether regulation should operate less at the ownership level, and more at the level of what the owners need to do from the point of view of the public interest.

In Kenya, it has been reported that the number of applicants awaiting allocation for TV frequencies increased from 143 in 2007 to 192 in 2008. While many of these would be unlikely

to succeed, allowing them to try would be possible by making available digital licences. In December 2009, the Kenyan President Mwai Kibaki announced that there were applications for 60 TV licenses and more than 150 for FM radio. By July 2009, however, only one digital TV licence had been issued in Kenya. Significantly, in the same country, frequencies in actual use dropped from 368 in 2007 to 268 in 2008.

In the bigger picture, policy conditions will impact on the issue of pluralism of ownership of new digital stations, and whether there are licence conditions that relate to diversity. In the South African case, public broadcaster SABC has only three analogue channels to provide news services in prime time for the 11 official languages of the country. Policy and regulation could ensure that this broadcaster utilises extra digital channels to expand the primetime news offerings to cater for additional languages at any given moment, or to increase subtitling at the very least. Without such regulated parameters, the broadcaster would likely opt for cheaper options such as imports or re-runs, which do little for local diversity of programming.

Across the continent, the most common de facto policy on resourcing for broadcasting has meant that most African broadcasters (including even state-owned ones) depend on advertising as the key component of their business model. This in turn has introduced at least an aspect of accountability to the market-place, which in this way has somewhat diluted the extent to which non-commercial controls (like politics) can exclusively determine content. In a situation of pluralism, any broadcaster who relies on advertising cannot afford to alienate an audience by producing programming that serves other interests (eg. government) at excessive expense of the audience's own needs and interests. Outside of commercially-funded broadcasters, there are also religious-owned and religious-sponsored broadcasters in many countries, as well as an amount of donor-funded programming across all broadcast sectors. What all these business dimensions mean is a net effect of diversity of content on the airwaves – certainly, much more than was the case in the era when broadcasting was a state-funded monopoly. If digital

migration for TV and radio can succeed against the odds and find models for economic sustainability, then, with appropriate regulation, this could help consolidate and even expand pluralism in broadcasters and diversity in their broadcast content. As discussed previously, however, there are major challenges in the economics of digital migration and in its destination: i.e., a digital world that underpins fragmentation of audiences and advertising.

Another dimension of African broadcast development relevant to pluralism and diversity that is worth noting is the effect of cellphones. This technology has fuelled a degree of broadcast responsiveness to citizens, in the sense that stations no longer have to be primarily unidirectional institutions. Interactive communication is now possible between a broadcaster and its audience, although with the costs of participation born by those who are wealthy enough to take it up. What was formerly seen as the preserve of community stations, i.e. local participation in programming, has become a partial feature of other kinds of broadcasting – private-commercial and even state-owned. Talk-radio is the most explicit form of this, but so too are SMS comments and polls. In its classic model, community radio goes further than this kind of audience involvement by extending to governance of the station and participation in its overall programming mix. However, the rise of degrees of audience participation across the broadcast sector as a whole has also contributed a lot to an increase in the diversity of content available on the airwaves. In some cases, such as Kenya post-elections in 2007, or Uganda riots in 2009, there have been government actions to limit audience expressions that are seen as threatening violence in tense situations. These cases, however, seem to be exceptions (whether justifiable or not), to the contribution of “user-generated content” to the African airwaves. Digital migration on its own will not necessarily increase this kind of content, but it could well do so if it is paralleled by, and articulated to, cheaper cellphone costs and to internet growth. Increasing audience interaction, when linked to digital migration, may provide new sources of revenue and may also enhance audience loyalty. Most of all, it introduces more voices into broadcasting.

Much of broadcast development in Africa in the past 20 years was driven by pro-active stakeholder groups in civil society, and it has been particularly been a fruit of the democratisation movement across the continent since the 1990s. Valuable standards have been advanced in the 2001 Charter for African Broadcasting and the 2006 Declaration of Principles of Freedom of Expression in Africa. These influential declarations have gone a long way towards guiding broadcast legislative reform, and laying the basis for pluralism and diversity. At the same time, it must be said that many of the new players in the African broadcast landscape, even before digital migration, are fragile entities in terms of economics. In turn, this leads to inadequate technology, vulnerability to untoward political or commercial pressures, and a propensity to under-resourced journalism, cheap programming and piracy. Even state-owned broadcast entities suffer the same afflictions. Into this environment, digital migration comes as an additional pressure. The matter is not only the hard costs of conversion, but the time that is required to understand, organise and participate in how the transition unfolds.

As indicated earlier, the obstacle to increasing pluralism and diversity in broadcasting around Africa is not, generally, congestion in analogue transmission. Many countries still have analogue space available for many more broadcasters, TV and radio. For example, in July 2009, the Kenyan authorities started to cancel two-thirds of the licences issued for 258 frequencies, which had been awarded but not taken up. Rather, the obstacle to more broadcasters in the game is related mainly to non-technical factors. One of these is the continuing attempts by governments to monopolise national broadcasts, such as in the case of Zambia mentioned above, where the authorities banned the retransmission by satellite of urban independent radio services to that country's rural areas. This was not an issue of frequency shortage. Another obstacle to increased pluralism and diversity is the sheer economics of running a sustainable station even on the current analogue frequencies. This is especially the case for the costly business of television, but it also applies to radio – and not least to community radio which often depends of the unstable

commitments of volunteers and unpredictable support by foreign donors.

On the other hand, as discussed earlier, most African governments seem to feel obliged to fall in line with global trends on digital migration. This is notwithstanding that most existing limits on pluralism and diversity are not problems that will be solved by digital migration. It is also notwithstanding the questionable relevance (as discussed earlier) to Africa of the ITU's deadline for ceasing to "protect" analogue TV broadcasting after 2015 (or 2020 for 30 of Africa's countries). It is the case that in developed countries, digital migration may be expected to enable an increase in pluralism and diversity. However, this is by no means guaranteed in African conditions. This is because, as argued, it is political and economic factors, rather than the technical availability of frequency, which constitute the constraints. In other words, digital migration in the medium term is not a panacea that will automatically generate many more broadcasters in Africa, and nor is it guaranteed that new digital stations will necessarily translate into more content diversity.

2.9 Global and access issues

A key global issue in digital migration is the question of content regulation in broadcasting. In the analogue age, public claims on private broadcasters could be legitimised as being in the general interest, thanks to the fact that frequencies were scarce, and hence obligations could be placed on the few who succeeded in winning licences to use them. A limited public resource, it was argued, could only be put to private use if some public purposes were fulfilled by it. This rationale informed the imposition of licence conditions (eg. programme mix, language mix, local content quota) on private broadcasters. It also reinforced the idea that state-owned broadcasters especially should impartially serve society's general interests. Local content requirements are generally stronger in the case of state-owned broadcasters rather than private ones. However, private commercial broadcasters are often still required to support local music to a certain degree, even

if the costs of acquiring this are more expensive than equivalent imported from abroad (where larger markets are the main profit hub, and sales to developing countries incur very marginal costs to the rights holder).

In the digital era, there are differences. Where the airwaves can be used by many more players (and for many purposes), it is sometimes argued that the scarcity factor falls away, and with it, the rationale for imposing public service obligations. For this reason, while analogue broadcasters have often operated under particular parameters (which often cost them money), they are amongst the first to argue that such conditionalities should fall away when they broadcast on digital. This argument is certainly accepted by the South African regulator, ICASA, although critics believe that the scarcity rationale does not lose all its power simply because there are more channels in the digital system (many of which are being given as incentives to incumbent players anyway). The critics argue that it is still public property that is being leased by the broadcasters.

On the other hand, it is the case that, in theory at least, more technical availability of channels on digital does mean more access potentially for smaller and greenfields players within the broadcast sector. This development also, as mentioned earlier, makes it easier for states to offer channels like parliamentary TV – although by the same token, there are also more opportunities for government propaganda to be purveyed. Access in this case is not necessarily a matter of public service.

Access on the part of audiences to digital transmissions has already been extensively discussed in terms of set-top box availability, costs and specifications. What can additionally be underlined, however, is that if the basic box does not have a return path built into it, this will serve to limit access to participation. Instead, only a minority with access to a plug-in device, or to a separate internet connection, will be in a position to directly interact with broadcasting. However, in the case of digital broadcasting received on a cellphone (a phenomenon that is still minute in Africa), this does provide greater access to participating by way of wireless internet or sms. In the current period, cellphones

enabled to receive digital broadcasting are still scarce and highly pricey in African conditions. What does seem likely therefore is that the linking of digital broadcasting to that other digital issue – internet access – will be an elite phenomenon in Africa. In this way, there will be a clear class difference between those with access to information and communication, and those with only basic (digital) broadcast access. For the first group, their ability to not only receive, but to store, react, remix and re-disseminate, will be vastly improved; the latter will be confined to be passive reception of digital broadcasts. The digital divide will be a public participation divide.

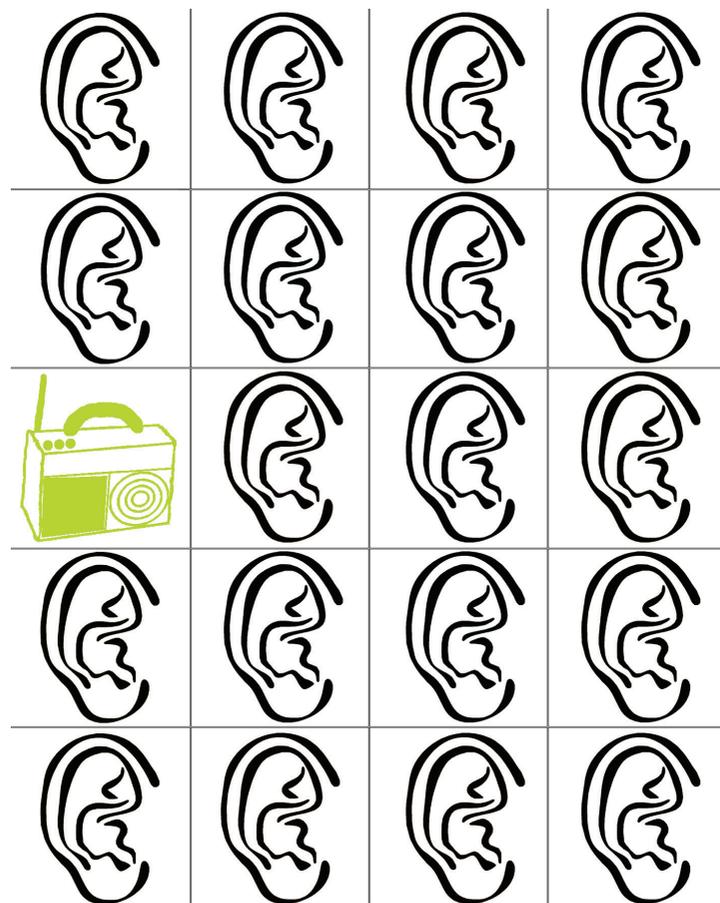
Access for audiences also relates to universal access issues. Partly this is a question of policy and regulation as discussed earlier. Whether a public broadcaster wishes to use the technology to switch off the TV set-top boxes of citizens who have not paid their licence fees is a major policy decision. Faced with this new possibility, in a country where most people do not pay licence fees, the South African government proposed instead in 2009 that it would drop this system in favour of an income tax.

Technology can affect access to digital TV, in that, whereas an analogue signal can still be seen on the margins of its dissemination, albeit in snowy pictures, this is not the case with digital. Accordingly, it may be that some viewers will even lose their TV access with the switch to digital, unless there is provision for those in these localities to receive by satellite or unless the digital signal catchment area is beefed up.

Another access issue is related to discussions at the World Intellectual Property Organisation (WIPO). This refers to a global debate around piracy of broadcast signals and their “fixation”. Broadcasters, mainly in developed countries, are concerned that digital broadcasting (by terrestrial, satellite or internet) entails a signal that is more easily co-opted for purposes they do not intend. This includes even encrypted digital signals. The interest of these broadcasters, for example, is in exploiting the rights to transmit major sports matches, without third party pirates capturing and/or retransmitting this content for own gain on separate digital signals (whether internet, terrestrial or satellite).

One complication here is the extent to which the broadcasters own all the rights to the content in their transmission, and have a right to protect from further use even that content which might be user-generated or public content. Another complication about control of digital broadcasting is that there are accepted practices in international copyright law which legitimise re-uses such as for news or research, or for disabled people. Finally, developing countries have an explicit WIPO dispensation (albeit qualified) to use copyrighted content for transformative purposes, such as translating it into local languages. Attempts to limit access to digital broadcasting by protecting signals against simultaneous or later retransmission and use, is therefore not a straightforward matter.

A final issue related to global matters and access is the matter of technology. Given the international character of much broadcast content, a big question is the common technical currency for content transfers. It will ultimately limit access to transactions between developed and developing countries, if the latter are using obsolete technology. An example might be trying to sell content on a cassette tape to developed countries. Another example is a broadcaster in a developing country receiving content in a Sony Blu-ray format DVD for which it does not have a player. In this way, digitisation can impact negatively on access – increasing a digital divide on an international scale. Like it or not, global technological innovation can “disenfranchise” communities and countries tied to archaic formats. On the other hand, this does not call for a continuous rush to keep up. It requires only a sensitivity as to the point at which a country should make the leap to the latest technology standards.



Radio

This section goes into depth about the digital migration for radio stations, with special reference to access to public information, technical challenges and alternatives.

Analogue radio exists in three different wavelength formats: FM, AM-LW, and shortwave. In digital, DRM (Digital Radio Mondiale) technology is generally seen as the suitable replacement for the last two categories. France has chosen DRM for low frequency radio stations. This technology can co-exist with analogue transmissions on longwave, and in theory produce FM sound quality – although the audio quality is sometimes criticised. DRM+ is a successor technology that is said to overcome the problems. However, it needs to operate on FM frequencies, although it can yield CD quality there. There is much debate, however, about what should take the place of FM, if anything, because other than DRM+, the other (more established) standards for digital radio require the use of TV frequencies, and do not replace FM transmissions. Examples are DAB, DAB+, and DMB. In other words, through these standards, much digital radio can co-exist with FM precisely because it operates elsewhere on the airwaves. In DTT, digital TV can only grow at the expense ultimately of switching off analogue TV, because the same frequencies are at stake. That's not the case for digital radio (excepting DRM+ in relation to FM).

In more detail, instead of being suited to FM frequencies, DAB, DAB+ and DMB (all related to Eureka 147 standards) are tailored mainly to the (to-be-vacated) higher frequencies in the VHF band that have hitherto largely been used for TV. (TV, in turn, is moving on, in digital form, to the UHF bands). This makes, to an extent, the migration to digital radio partially dependent on the success of TV migration and the associated freeing up of VHF spectrum. While FM usually operates in 87–108MHz (VHF Band II), DAB usually operates in VHF Band III (174–240 MHz) and L band (1452–1492 MHz). Broadcast analogue TV is usually located in Band III, often between 200 MHz and 1 GHz. The UK locates DAB in Band III, while Canada and several European countries use the L Band for digital radio.

One implication of this is that while there are arguments as to

why all analogue radio should eventually be shifted to digital, there is no technical pressure to do so because FM airwaves are not being sought after for alternative uses in most cases. Australia's regulator, however, is nevertheless said to have declared that analogue radio transmissions will be switched off in 2015. Digital radio is only really needed where analogue frequencies are full, and no more FM stations can be licensed – something that applies in cases like the topography of Cape Town. In these cases, any new stations can only be transmitted in digital form, although their success depends then on whether listeners have digital radio sets enabled to the particular technical standards being used. The switchover therefore is a matter of carrots, rather than sticks, as regards listeners acquiring digital radio sets. But the advantages of digital radio are not clear-cut. Radio services delivered via higher frequencies in the VHF band can be even better quality than FM (which generally operates at lower frequencies in VHF), but most listeners are generally quite satisfied with FM anyway.

Some digital radio standards do allow for enriched services (data streams accompanying the audio). These include "PAD" (Program Associated Data like scrolling text with programme details) and "SLS" (being "Slide Shows" that deliver images like a web cam photo of a DJ, an album cover, or a logo for an advertiser, etc). However, part of the appeal of radio is precisely that an audience does not need to be watching a screen while consuming the medium, so it is questionable as to whether the enhanced experience is a significant driver of uptake by listeners.

Around the world, the UK is a leading promoter of DAB – a standard that is somewhat archaic because its roots are in the 1980s. Denmark is another country said to have gone the DAB route. DAB is especially criticised for using the inefficient MP2 codec, meaning that its compression ratios are poor compared to what is possible today with DAB+. The UK started DAB broadcasts in 2002, and in 2009 was said to be using this technology to transmit 250 commercial stations and 34 BBC stations. However, there has been a lot of criticism of quality. This is because in order to fit this number of stations on the Multiplexes involved (9 stations rather than the recommended 8 per signal), the audio

quality has been degraded to below that of FM. In addition, DAB radios are said to consume much more battery power than their FM counterparts. These may be some of reasons for the fact that listener uptake of DAB has not been high. The statistics are confusing, but some interpretations are that there are more people in the UK listening to digital radio through their TV sets (transmitted on DVB-T on the Freeview ensemble), than via DAB radio sets. Although a reported 10 million DAB sets have been sold in the UK, sales of FM radios are still higher, and there are some 150 FM radios in listeners' homes anyway. In addition, it is estimated that 20% of the British population is still not in range of DAB signals, and that it would take 100 million UK sterling to expand the networks to overcome this. In order to encourage the public to buy DAB radio sets, most of these have also had to build analogue FM receivers into the device as well.

To try and kickstart greater DAB uptake, however, British investors in the technology have formed an organisation called Digital Radio UK. Some of its members – broadcasters, manufacturers and retailers – want to see firm government action to turn off analogue radio in the UK, which then would force reluctant consumers to scrap their old sets and buy new devices, and release the pressure on those radio stations who are currently having to pay for double transmission (FM and digital). However, although the UK government in June 2009 proposed that 2015 would be the date to commence migration, i.e. most FM radio stations would then need to commence digital transmissions, legislation in November 2009 deliberately refrained from specifying this deadline. Also absent from legislation was any mention of 2013 as the deadline for all car radios to be DAB capable, which had also been part of the June proposal. (In contrast, the UK has been definitive that digital migration for TV, which began in 2008, should culminate in 2012 at which point analogue TV will be terminated). The reasons for British government reluctance to force the pace reflect the complexity of its radio transition. In Germany, the government decided in 2008 to stop funding DAB, saying the technology was no longer cost-effective.

Digital audio via DAB+ is said to be twice as efficient for compressing data streams than DAB is, and one third the cost in terms of transmission. The significance of this is that it offers the possibility of a higher number of radio channels and at higher quality, than its predecessor. However, it is not backwards compatible. This means that most of the estimated ten million DAB radio sets in the UK would not be able to receive DAB+ signals although the expectation is that there will be DAB+ transmissions in that country from 2010 onwards. While DAB+ radio receivers can be used to listen to DAB broadcasts, DAB receivers cannot pick up DAB+. This means that a country like the UK can end up with many radio sets in the market that will be valueless if there is a switch to transmitting in DAB+ in the coming years. Meanwhile, countries said to be leapfrogging straight to DAB+ are Australia, Italy (which has largely switched away from DAB), Singapore, Czech Republic, China, Malta, Australia, Israel, Kuwait, Malaysia, Switzerland, Hungary and Germany (which is switching off DAB). Australia is beginning to roll out digital radio on DAB+ in major cities, and hopes by 2013 to reach the next 50 largest areas. These experiences suggest that being a front-runner in terms of digital radio may not be the best position to occupy; those who come later can reap the benefits of better standards and of not being tied to investment in out-moded technologies. There is a lesson in this for Africans who fear for being "left behind" in digital migration.

A third standard is DMB (Digital Multimedia Broadcasting), which has been adopted in France, and is also supported in Norway, Singapore and South Korea. DMB is four times as efficient as DAB. The French radio broadcasters say that DMB allows them to broadcast pictures or low-bit rate video alongside audio streams, which will make digital radio more appealing to consumers. However, this technological standard is criticised because it is a third less efficient than DAB+, i.e. as meaning that comparatively fewer stations can be carried on a Multiplex. DMB radio has to transmit a video element (however basic), which takes up extra space in the signal. (DAB+ can do video without synchronised audio). DMB, it appears, was originally designed for mobile TV,

which is why it is over-specified for primarily radio usage. (In Africa, a DMB mobile TV launch took place in Ghana in 2008 with FonTV, under operation by Black Star TV). Technically, the same Multiplex can be used for both DMB and DAB+ transmissions, and digital receivers can be built to accommodate both (in much the same way as many analogue radio sets can receive both FM and AM).

These three standards – DRM, DAB and DMB – are not the only options for distributing audio via digital signals. There is also some questioning whether even providing universal DAB+ signal coverage in the UK (a very expensive conversion) would be obsolete by the time it is done, due to other technologies maturing by then. This is because digital radio is also already being delivered on other such platforms – satellite or DTT for example. Sweden's government, for instance, argues that instead of DAB or DAB+, it makes more sense to use the digital television standard DVB-T+, to deliver digital audio to devices. Similarly, along these lines, digital radio is also likely to become a functional feature of mobile broadcasting to cellphones (eg. by DVB-H) at some point in the future. And already, some phones are being made that are capable of receiving DVB-T (although the standard is supposedly destined for fixed point TV sets). Finland has opted for, inter alia, digital radio via DVB-H.

Internet radio is also being listened to on computer, or through portable Internet Radio sets that use Wi-fi connections to the web. In November 2009, the BBC announced a new web-based radio-player in partnership with several private radio station companies. The device allows users to search for stations, songs, genres and particular programmes, and has interfaces with social networking sites like Facebook. In comparison to internet-distributed sound, however, both analogue and digital broadcast technologies are effective because their transmission costs are fixed whether one or one million people are tuning into broadcast signals. They are also accessible on some mobile receivers (mainly on FM at this stage). Both these characteristics are not at present a major part of the Internet landscape which requires more bandwidth and signal dissemination, the more that people access it, and where

most receiving devices are still fixed line computers. Experts estimate that while the most popular drive time show in the UK (BBC radio 2) has an audience of 8.5 million, the bandwidth of entire UK internet infrastructure would be needed to serve just four million if the service was to be offered through internet.

However, the cost of computer equipment, especially routers and servers, which enable traffic flow around the internet, continues to fall. In addition, the internet is being re-engineered to provide for what is called "multi-casting". This is an alternative to the current "unicasting", which is one-to-one transmission, and does not scale well for broadcast type uses. Instead, the new "IP Multicast" is a point-to-multipoint (one-to-many) protocol for sending to multiple receivers at the same time, using multiple IP addresses. Content packets only have to be sent out once, and copies are made when the links to the multiple destinations split. This is thanks to nodes in the network ensuring replication such that the packets then reach all those multiple receivers seeking the particular content. The load on the original server is not increased. However, Microsoft has warned that multicasting on the Internet is still generally not practical because only small sections of the Internet are multicast-enabled. However, this technology can be complemented by a "content delivery network" which would cache information at the telephone exchanges (i.e. at the start of the last "mile" between user and Internet). These scenarios would avoid calling down a huge number of content streams in parallel from the original server. Instead, each broadcaster would transmit only a single stream per station from its web-server. Thereafter, caches combined with peer-to-peer systems will reduce the load on the Internet backbone. If multicasting on the internet works as expected, content could potentially reach an unlimited number of listeners without having to use more bandwidth to do so.

All this portends increasing use, especially in developed countries, of Internet Radio (and also IPTV) – whether on wires, or (more likely) on wireless broadband (or a mix of the two). In this scenario, listening to Internet Radio (on whatever device) offers enormous advantages to listeners. First, its quality could be better than the way DAB is currently delivering radio in the

UK. Second, it is suited to choices between live streaming, on-demand listening or download. Third, it provides choices to the listener of thousands of online radio channels from around the world. Fourth, it facilitates customisation and personalisation for the user. Fifth, and especially for younger listeners, Internet Radio has immediate interactive possibilities – something that "digital natives" come to expect of their media consumption. Already in the UK, it is the case that 15-24 year olds listen to radio via the Internet more than they do on any other platform (including FM and DAB). One potential therefore is that where the internet can deliver digital radio, this may lead to increased consumer take-up of broadband services. It is also expected that hybrid radio receiver devices will become increasingly available – offering reception of radio from analogue, DAB, DRM, internet and other sources.

All that is in the future, however. For now, even in developed economies, such as that of the UK, the bulk of radio receivers still being sold are analogue, and will probably have a life of at least a decade. Meanwhile, radio-capable cellphones on sale in the UK pick up analogue, not digital, radio. It was reported this year that 13.5% of British listeners used their phones for receiving radio, and broken down in terms of social sectors, the figure was almost a third of people aged 15-24. In developed countries, unlike much of Africa, a good deal of radio listening is also in cars – but even there, digital terrestrial radio sets account for a fraction of commuter listening. The result is a call from the proponents of digital radio for exemptions on duty when importing digital radio sets. The idea of the public buying dedicated radio devices, as they did in the analogue radio world, is one that is rapidly passing.

In the meantime, many radio stations in developed countries are burdened with carrying dual transmission costs with no end in sight, due to the uptake of digital terrestrial radio being snail-paced. In the face of this, at least one industry figure in the UK has called for the "stick" approach – that analogue be switched off in 2017, thereby forcing listeners to buy a digital radio set.

A less coercive approach has been proposed by the British Government's "Digital Radio Working Group" (set up by the

Department of Culture, Media and Sport) which proposed that transition towards analogue radio switch-off should last some three years, but that it should also only commence when certain conditions are met:

* national Multiplexes should offer coverage equivalent to what FM currently does in the UK;

* local Multiplexes should cover 90% of the population including all major roads;

* A least half of "total radio listening must occur on digital platforms".

This last item indirectly indicates how fraught it is to migrate away from analogue radio, because it disingenuously refers to listening on all digital platforms – not only to digital radio on terrestrial airwaves. In other words, the proposal is that, if half the population have alternatives to analogue terrestrial radio (whether these alternatives are by internet, or satellite, for example), then the UK government would give notice to switch off analogue radio signals. There are severe problems with this perspective, because it ignores the fact that internet or satellite radio are not necessarily alternatives to listening to analogue radio, but complimentary delivery platforms. For example, a person may listen to internet radio at home, digital terrestrial radio in shops and analogue radio while commuting to work. Meanwhile, in 2009, only a fifth of total radio audience in the UK was on any digital platform, while the rest were on AM and FM. Of those digital listeners, just over half were using DAB – and significantly, this figure is under half the number of British households owning a DAB-capable radio set (most of which sets also provide an FM option). The head of BBC Radio, Tim Davie, said in 2009 that at the current rate of purchase of digital radio sets, there would not be radio switchover "in our lifetime".

During 2007, the head of British regulator Ofcom said that no new FM licences would be awarded, but added that a swift "forced march" to analogue switch-off was not on the cards. Observers think the earliest that FM could be switched off in the UK is around 2020. Even the advocates of DAB promotion in that

country envisage an indeterminate time in which FM use at local level should continue. Meanwhile, as noted above, digital radio in the UK is also listened to via DVB-T (on the Freeview platform), with TV sets being utilised as household radio devices.

What may trump the acquisition of DRM, DAB, DAB+ or other-enabled radio sets by the public is the development of cellphones with digital sound reception capacities. Especially in Africa, many people would prefer to buy a phone than a radio set, and if a phone comes with radio capacity built-in, that represents a saving of scarce resources. What is critical then is what kind of reception technology is included, and what the business models may be. While most Africans cannot currently afford a subscription to radio/TV or a subscription to internet access, it looks like DVB-H (or its successor, DVB-H2) would be the most accessible method to reach African audiences with video and audio via cellphone devices. DVB-H is said to be six times more efficient than DAB. If there is an alternative to analogue radio in Africa, it is likely to be this cellphone-delivered audio. Although as mentioned earlier, phones are being made that can receive DVB-T, DVB-H has the advantage of using less battery power. But as devices become less power-hungry, so DVB-T as a delivery technology for audio to cellphones is also a viable option.

A sensible approach for African countries was taken by the Tanzania Communications Regulatory Authority in its 2005 consultation document on digital migration. It argued: "Most consumers are not aware of digital radio and find analogue radio is good value for money." In addition, "the added value from digital radio ... does not yet seem sufficient to justify the additional cost for the average consumer, although prices are falling." It noted further that subsidisation of receivers is difficult in Tanzania and the scope for pay radio did not exist. In consequence, the regulator said it would consider inviting license applications for terrestrial digital radio when the market potential materialised, the price of receivers became affordable, and worldwide penetration picked up momentum. In the meantime, the incumbent sound broadcasters would be allowed under their respective licence conditions, i.e. to continue to make use of the AM/FM frequencies

for analogue sound broadcasting.

Even if digital terrestrial broadcasts for radio do take root in African countries, eventually it is likely that audio will actually travel via a patchwork of technologies, such as satellite for remote areas, and cellphones for outdoor listening, while indoors would be via internet or even digital TV. For example, in the USA, much digital radio is listened to by satellite, but for indoors listening there is terrestrial transmission, cable or internet-delivered service. Each option comes with different costs, and different parties to bear these.

What all this means for public information is that, for many years still, analogue radio will continue to be the primary platform for dissemination of information, and in the case of community radio, for public participation in mass media. Newer platforms are likely to be explored by the more established mainstream media players, rather than smaller and rural stations. This will help increase the volume of information in circulation, which could then spread through various steps to the less empowered enterprises. However, all radio outlets can at least begin to see themselves as more than just traditional broadcasters, and initiate (or increase) experiments with interactive communications with their audiences using new technologies to hand, whether SMS or email or partnerships with digital TV providers.



Television

This section adds more information about the digital migration for TV stations, with special reference to access to public information, and supplementary information to that already provided above about technical challenges and alternatives.

The bulk of the TV viewing public is not likely to get DTT initially, due to signal range limitations or due to the extent of availability and cost of set-top boxes. For this constituency, the information divide will be greater because it will remain with the existing analogue TV services, while the better-off community begins to experience more channels. If analogue is switched off prematurely, those without set-top boxes or digital-receivers in their TV sets will be disenfranchised in terms of receiving news and other information in video format. That scenario would of course deepen the divide even further between the info-rich and the info-poor.

As with radio, the alternative may increasingly lie with cellphones. On the technology side, DVB-T is the standard that most African countries appear to be adopting for DTT. This software allows for MPEG-4 compression standards. There are sister standards – DVB-S for satellite, and DVB-H for broadcasting to cellphones.

There is an expectation that the DVB-H (or in a few cases – the DMB standard, which like DAB is based on the Eureka family of standards) will become the mobile TV standard. There is already a successor technology called DVB-H2 in development, as well as its terrestrial counterpart DVB-T+ (also known as DVB-T2). This caters for High Definition TV transmission as well. These could all also be used for digital radio. In South Africa, regulations envisage two mobile TV Multiplexes in the transition period. However, only one company in May 2010 met the application requirements.

It is likely that mobile TV will be watched during the daytime, and fixed TV at nights. This means that daytime mobile consumers may well prefer on-demand TV content, rather than a stream that simply duplicates the normal daytime programming, which tends to target house-wives and children.

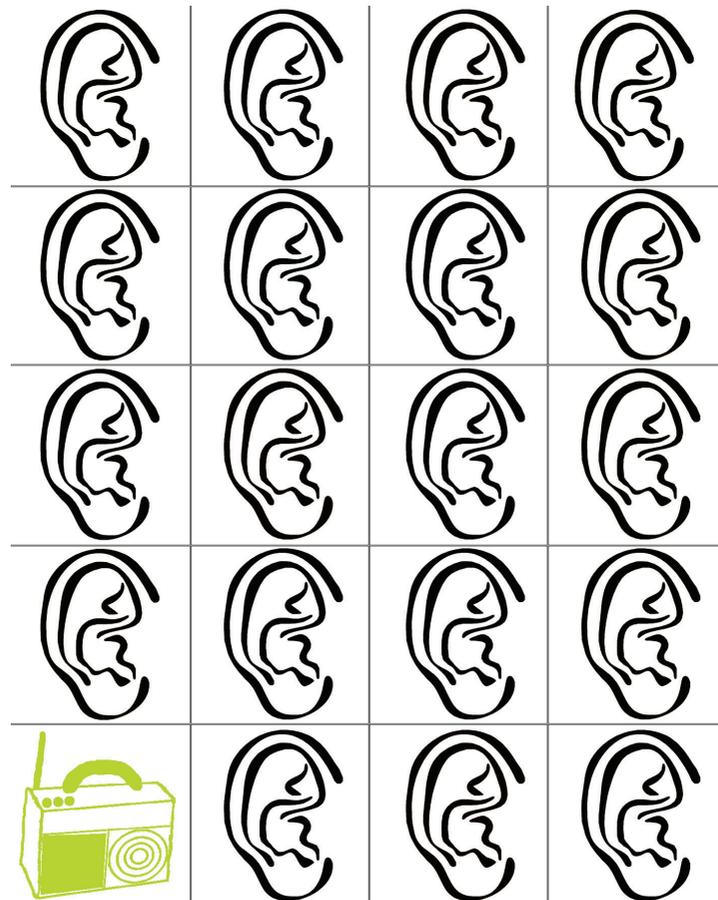
Distinct from DVB-H, cellphone companies offering 3G are already providing video services to many phones with suitable screens. The 3G broadcast standard is called MBMS (Multimedia

Broadcast Multicast Service), and is currently in use by several African countries. It operates through on-demand access, although speed and quality of delivery depend on how busy the network is. Uptake, however, has not been extensive. There is an expectation, however, that 3.9G cellphone technologies like Long Term Evolution (LTE) and 4G will greatly stimulate mobile TV viewing, due to it then becoming possible to transmit more broadcast channels and more cheaply than is currently the case. In the UK, mobile TV is available on the iPhone using the BBC iPlayer TV stream.

Another option for cellphones, different from both 3G and DVB-H, is IPTV via wireless internet. This option relies on broadband wireless connectivity being available widely and cheaply. That in turn depends on, inter alia, the availability of spectrum for this purpose. If the airwaves are prioritised for broadcast use, as distinct from wireless broadband, this ultimately could harm the ability of audiences to receive “TV” via wireless internet. IPTV is generally a dedicated subscription channel, and often a ‘walled garden’ on the internet, unlike Web TV which refers to sites like YouTube. The difference is that access to internet provides a gigantic variety of choice of content from across the globe, coming from many different kinds of suppliers, as distinct from the limited number of broadcasters (even with digital offerings) in a given country.

For both digital radio and TV broadcast to cellphones, whatever the technology that is used, the significant factor is whether the receiver device has a direct return-path built into it. This “game changer” means that broadcasting changes from being a primarily transmission platform, and allows for interactive communication activities to supplement the informational ones. Whether by SMS or IP, receivers can become commentators, curators and onward communicators in their own right. In such an environment, issues of regulation, intellectual property, local content and quality of information in circulation become very important.

The downside of TV on cellphones (unlike audio) is screen-size. However, it may be that a market will develop for connecting cellphones to analogue TV screens, perhaps via a set-top box, or for advanced phones to even include a built-in miniature data-projector that can display images on a bigger surface.



Awareness and preparation
in Africa

This section deals with awareness, preparation and perspectives in Africa in general. Southern Africa is mainly cited by way of examples. It has been difficult to track information about many other regions. For example, for West Africa information could only be sourced about aspects of digital migration in Ghana, Nigeria, Senegal and Benin.

South Africa is a frontrunner in terms of policy and practice for digital migration. This has been framed in highly political terms. Deputy Minister of Communications Dina Pule said in September 2009 that digital migration needed to be “people-driven, and people-centred” in terms of which “our people are the determinant and the beneficiaries of this venture both socially and economically”. She went on to say that the digital dividend should allow for additional TV and radio stations “particularly those that are community-based”. Further, the “imminent multi-channel digital television services must be biased towards local content production and programming and growing the local content production industry”.

Another political approach to digital migration was expressed in December 2009, by Kenyan President Mwai Kibaki, who spoke as follows:

“The Government is committed to giving the private sector the space to exploit the power of digital technology. The Government will however ensure that the public interest is secured. We will continue to make certain that valuable public broadcasting frequencies are put to good use by broadcasters. Indeed, the expansion of the broadcasting arena must also be matched by responsible action by all players. We must use the expanded broadcasting space to build on our national unity and expound on the development agenda.”

The South African approach has been taken further in the decision by that country’s government to subsidise 70% of the cost of a set-top box for an estimated five million households (of a total of nine million viewing households), who will not be

able to afford the device (estimated retail cost \$60 - \$100 for a basic box). As noted earlier, there is still debate over how the subsidy will be administered. Retailers are reluctant to take this on board, but if the support went directly to manufacturers, it would mean spreading the subsidy to all citizens rather than the poor, by reducing the wholesale price of boxes in general. A similar dispute exists with manufacturers who do not want to take the risk of manufacturing boxes that the market may not necessarily buy. They want government to place major orders to kick-start the process. What also arises in all this is the matter of installation, support and repair costs for set-top boxes – how these services will be covered still needs to be determined. The Digital Dzonga stakeholder group has estimated that between 300 000 and 1.2 million boxes could be adopted in the first year after “market launch” if basic conditions are met (including new digital channels being licensed and actually being broadcast). What all this indicates is that even with a policy framework in place, and an institution to drive the process, digital migration is still a very complex and lengthy phenomenon – and that is not even talking about migration of radio.

At the same time as digital migration is framed in pro-poor terms by government, South Africa is one of the few African countries where there is some similarity to developed country environments in terms of rationales for undertaking the process. Experts say that in the province of Gauteng, which includes Johannesburg, it is currently necessary to use 60 frequencies to provide six analogue terrestrial television services. All these could, in principle, fit onto a single digital frequency, freeing up the equivalent bandwidth of 59 frequencies. Botswana also says that it is finding it problematic to get more frequencies for analogue TV broadcasting. To these extents, there is a case for digital migration – although the costs are still a matter in terms of which the benefits need to be weighed.

If South Africa’s Digital Dzonga stakeholder group was one of the early moves in Africa to help shape digital migration, a number of other countries have also been active in taking similar steps. In Ghana, the Ministry of Communications said it would start setting up an inclusive national migration committee in late 2008, and

pilot steps towards digital broadcasting have been taken by the players in that country’s TV industry. Steps towards stakeholder committees have also been taken in Kenya, Uganda, Sudan and Rwanda. The latter-named has set 2012 as its deadline for migration. Chinese-owned Star Media was reported to be broadcasting via DVB-T to 5000 subscribers in Rwanda by the end of 2008, and to have plans to expand to Uganda and Burundi. Trials for digital broadcast in Rwanda started in 2005, carrying CNN, TV5 and Rwanda Television. In Uganda, a DTT pilot of seven channels was commenced in November 2009, involving a company called Next Generation Broadcasting in partnership with the Uganda Broadcasting Corporation (UBC). The country’s self-imposed deadline is to complete television migration by December 2012.

In Botswana, a Digital Migration Task Force was announced in May 2009 as a body that includes industry, government and civil society advocacy group the Media Institute of Southern Africa (Botswana chapter). The target date for switch-off is January 2014. The country has already converted six of 38 transmitters to be digitally-capable. It envisages a Production Fund being set up to promote local content in digital broadcasting, as well as a “Content Standards Board”. Lesotho’s TV transmitters were purchased three years ago, and are digitally ready, but the country’s officials say they are concerned about how content for additional digital channels could be paid for. Zambia’s government has set up a National Task Force on Digital Migration as a multi-stakeholders’ body to develop a roadmap and oversee the migration. Servicing the Task Force is a committee comprised of the Ministry of Information and Broadcasting, the Communications Authority and the Zambia National Broadcasting Corporation. The Communications Authority has been convening public discussions on the process, explaining issues like digital TV sets and counterfeit set-top box devices. Tanzania began consultations with stakeholders in 2005 already, based on a consultation document by the Tanzania Communication Regulatory Authority about the migration in general, and followed up in 2006 with another consultation document specifically on Multiplexing.

Consultative practice is a subject of some dispute in Nigeria. The government there reportedly came under criticism in 2009 for allegedly allocating exclusive management of digital transition to the Nigerian Broadcasting Commission. Ben Egbuna, veteran broadcast manager and former director general of the Federal Radio Corporation of Nigeria (FRCN), has called on the Broadcasting Organisation of Nigeria (BON), the umbrella industry association of public and private broadcasters, to become involved. However, a Digital Broadcasting Migration Working Group has been established by government, and a stakeholder meeting was held in Abuja in June 3, 2008. This gathering referred to the need to embrace the new technology so as not to become a dumping ground for obsolete analogue equipment (although, as argued earlier, a case can be made for African countries to profit by buying up redundant equipment and provide a longer life for analogue until there really is good reason to commence migration). Attending the stakeholder event were various government ministries plus private broadcasting stations, policy makers, law makers, non-governmental organisations and members of the general public.

According to the National Broadcasting Commission, the Abuja meeting urged government to drive the process by providing infrastructure, funding and setting up an implementation task force. The regulator's role, according to the Commission's own website, was defined as being to educate stakeholders "on the implications of the switchover including the social benefits and the timetable". (No mention was made, however, of the costs in relation to the assumed benefits). The regulator would further execute a migration strategy, including setting standards for set-top boxes, enforcing dates, and "insisting on systems synergy to permit consumer mobility between providers".

Following this meeting, in October 2008 the Nigerian government set up the "Presidential Advisory Committee on Transition from Analogue to Digital Broadcasting", which includes various state and private sector members, as well as the Consumer Protection Council and even a newspaper company. This body is tasked with producing a report that the government will use to produce

a White Paper and subsequent legislation. Its terms of reference are to:

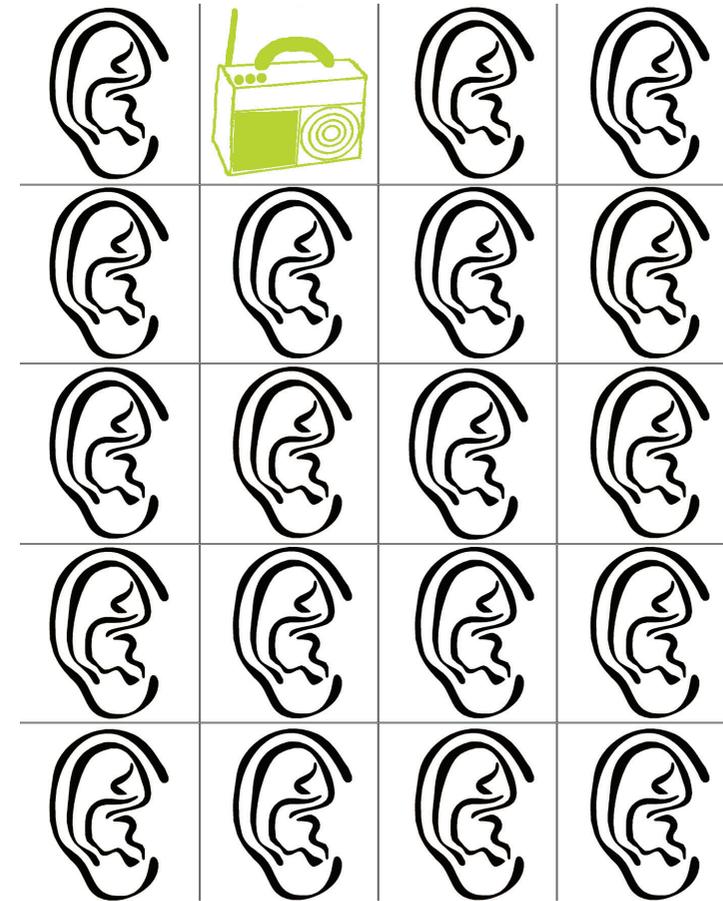
- Recommend a policy on digital terrestrial broadcast transition using global best practices.
- Recommend appropriate regulatory framework.
- Recommend a National Broadcasting Model.
- Assess impact of digitization on the consumers and recommend possible government intervention.
- Determine the quantum of expected digital dividend.
- Assess environmental impact of digitization, if any, and recommend steps to be taken.
- Advise government on any action relevant to smooth the transition in Nigeria.

Nigeria has set June 17, 2012 as its analogue switch-off date. Meanwhile, 2009 saw the launch of HITV, a DTT operator, in Nigeria, providing 24 channels, including English Premier League soccer and other European football footage. Also in the mix is Hi-nolly (Nigerian videos) and Nigezie (a music channel which claims a 90% local content).

Kenya's Ministry of Information and Communication is reported to have developed a "Digital Kenya" project with a Digital Kenya Secretariat based in its regulatory body, the Communications Commission of Kenya. An "Analogue to Digital Broadcasting Migration" task force reported in October 2007, having involved stakeholders from government, the Media Owners Association, the Kenya Broadcasting Corporation, the Media Council of Kenya and the Association of Practitioners in Advertising (APA). This report in turn led to the creation in early 2008 of an 11-member committee consisting of experts from private and public sectors. Kenya's Permanent Secretary in the Ministry of Information and Communication is reported to have said in September 2009: "... (D)igital television will not only improve on our quality of TV signals, but will also create room for more broadcasters...". Already in October 2007, the country's regulatory body, the Communications Commission of Kenya, had received the final report of the National Task Force on Digital Migration, which body

had been launched in March by the Kenyan government. There was substantial public consultation in the process, including on the draft recommendations and culminating in a stakeholders' forum before the report was finalised. In February 2009, it was announced that signal distributors would start being licensed for the migration, with switch-off envisaged in 2012.

What these developments show is that several African governments have commenced preparations at an institutional level, but also that a number have set a very tight deadline for completion. This envisages a short transition, long before the 2015 or 2020 deadline of the ITU, but it is probably very unrealistic in most cases.



Strategies in operation

This section covers strategies put in place in relatively “advanced” African countries, such as Kenya and South Africa, and at the international level, for facing digital migration.

Mauritius has led African countries in DTT migration, and its experience includes positive and negative lessons for the others. One negative has been adopting an approach that allowed an open-market for importing and selling set-top boxes. The effect has been a variety of boxes in the country, many of which do not provide quality services. This has meant a poor experience of digital TV for the populace, and some 40% cannot yet afford boxes. In addition, the whole Mauritian experience has been extremely costly, to the extent of the digital migration being unsustainable, according to the national broadcaster. Twelve additional digital channels were introduced, but it turned out that only enough suitable content could be obtained to fill six. The anticipated switch-off date of 2011 in the country is thus in jeopardy, with 2013 now being considered. Meanwhile, there is major competition from satellite digital TV.

In August 2009, Malawi was reported to have said that government would assist broadcasters to buy equipment for digital broadcasting, although exactly how was not very clear. It appeared that one plan was to start licensing would-be vendors of broadcast equipment with the requirement that they supply “better” prices. In July 2009, the country’s regulator, Malawi Communications Regulatory Authority [MACRA], said that a steering committee had been set up, headed by the Ministry of Information and Civic Education.

Tanzania has moved decisively on digital migration policy for its estimated four million viewers of 300 000 TV sets. A 2006 consultation document by the Tanzania Communication Regulatory Authority included a policy position that the content providers (i.e. broadcasters) other than the national broadcaster should not be allowed to own and operate digital transmission facilities, and in particular that they would have to use a separate Multiplexing company for DTT (whose cost structure would need with approval from the regulator). (This system contrasts with South Africa which, after court action by the private sector,

now allows a dispensation wherein broadcasters can get a licence to “self-provide” their signals). The Tanzanian consultation envisaged licensing three Multiplex operators, including the one for the national broadcaster. The three Multiplex operators will be licensed as network service licences, while a content licence will be issued to broadcasters. Local content requirements are 60%. The country is not planning a subsidy for digital migration, but the regulator has said it hoped to get import duties on equipment dropped. The regulator has recommended a “managed market take-up strategy” in which government would ensure a forced migration so as to reach analogue switch off in 2015, and would also subsidise the migration of the national broadcaster.

Regulating for digital migration is where much of the ‘rubber hits the road’, and some detail from South African experience has wider significance. After receiving regulatory permission to test out digital signals, South African stakeholders eventually commenced a pilot DVB-T migration in November 2008 but with only 3000 test set-top boxes in the market and initially just three extra channels that are not available on digital. Government’s original deadline for switch off of analogue TV transmissions was November 2011. However, the regulator ICASA predicts that dual illumination would probably need continue into 2013, recognising that an earlier analogue switch off would cut off many viewers from TV altogether. Implicit in all this is that switch-off itself is likely to be phased in, perhaps even over several years, based on specific geographical regions, thereby reducing the geographical extent to which dual illumination is required.

ICASA’s issuing of draft regulations for the digital transition during 2009 attracted legal challenge and therefore substantial delays in finalisation. The objecting parties demanded a finalised frequency plan as a prior step to regulating digital migration. There was also criticism by commercial station eTV that the regulations seemed to tie them to using state-owned signal distributor, Sentech, in the absence of any regulation on the company’s tariffs. The company also objected to the draft regulations requirements that all digital channels would have to provide simultaneous translation in three languages. (This proposal was dropped from the second version

of the regulations).

Some groups also criticised the proposed allocation of digital channels, which they said would consolidate the dominance of the existing broadcasters at the expense of later entrants into the market. ICASA had proposed three Multiplexes for existing broadcasters (one largely for SABC – expanding its three station licenses by another five), one for free-to-air commercial channels, and one for pay-TV channels). It envisaged eight standard definition TV channels per Multiplex, and it banned the use of DTT bandwidth for High Definition channels until after the migration was completed. ICASA further proposed (in the first version of its draft regulations) that a “public value” test be applied to SABC before it would be allowed to launch new stations in its expanded digital channel allocation. On this basis, ICASA would specify the extent of language, local content and other obligations that the new services should meet. The regulations were silent, however, on whether commercial digital channels would attract the same level of public service obligations as would the broadcasters’ analogue channels. The second version of the regulations proposed a “market-impact analysis” to ensure that new SABC channels added to diversity and, it appears, would not damage the business models of commercial broadcasters.

The ICASA draft regulations also initially included a policy decision that the Multiplexes have to be used for video services (with a ceiling on 15% data). This ban (later dropped) on broadcasters transmitting their radio stations (where these exist) on the Multiplexes goes against the regulator’s supposed commitment to “technology-neutral” licensing. However, ICASA’s position has been that specialised spectrum should be found for digital audio – probably after the analogue television switch-off serves to free up some VHF frequencies which are needed for technologies like DAB and DAB+.

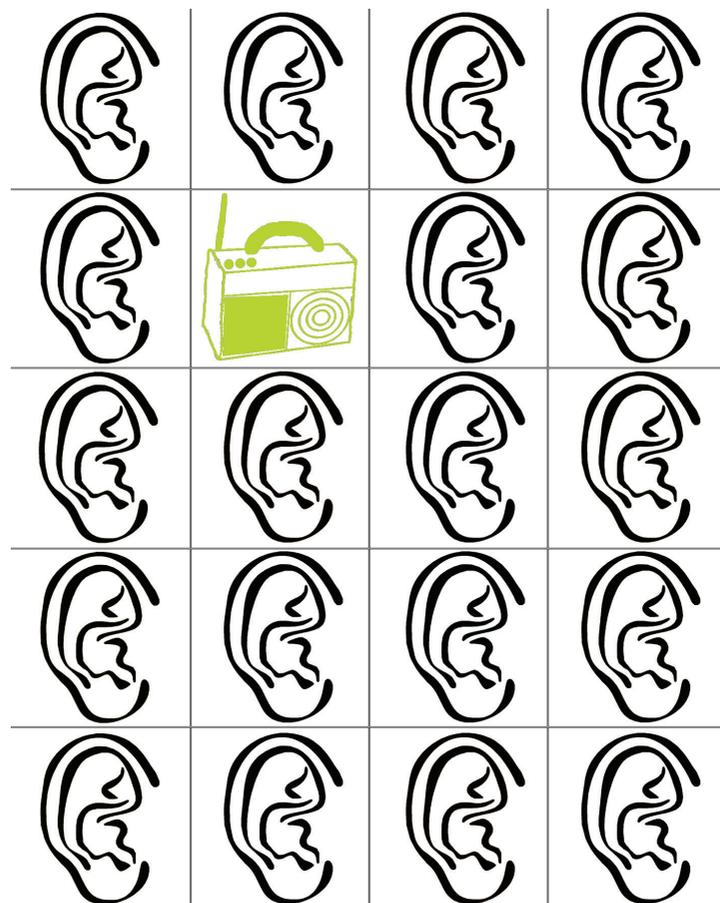
Lagging behind in ICASA’s regulation has been DVB-H, aimed at cellphones enabled to receive digital TV. The standard has been tested by broadcasters and cellphone companies within South Africa since 2005, but no licenses had been given out by end May 2010. However, the pressure of a commitment made to FIFA for

the World Cup to have DVB-H in place by June 2010, saw some movement near the end of 2009. Here, an analogue community TV station in Cape Town protested that it had been instructed to vacate its UHF frequency, which would be turned over for broadcasting to cellphones. This would likely require the station to move to VHF. Temporary licences were possibly expected to be granted in South Africa for the duration of the World Cup.

However, countries like Kenya, Namibia, Nigeria and Ghana are reported to already have such TV to handheld services provided by DSTV mobile (through a subsidiary known as Digital Mobile TV, DMTV) in collaboration with cellphone companies. These players are Nokia and MTN in Nigeria’s case (which was reportedly the first in Africa to get commercial digital TV for cellphones), and the channels on offer there initially were a bouquet including: CNN, Africa Magic, NTA International, Magic Plus, Supersports 9, Supersports Blitz, Channel O, Cartoon Network and TBN. While these were initially free-to-air, there was a plan to start charging from April 2010. Because DVB-H needs to cater to mobile viewers, it is seen by some observers as best suited to UHF frequencies. The higher the frequency, the smaller the cells reached by signal, whereas lower frequencies require more power but reach across wider areas.

Multi-Choice and MTN announced in 2009 that they hoped to have DVB-H services, with up to 16 channels, including SuperSport3, SuperSport5 and supporting soccer channels, in Nigeria, Ghana and South Africa in time for the June 2010 World Cup. The cost was estimated at \$15 a month, and Sony Ericsson DVB-H enabled handsets at \$300.

What emerges from this brief review of strategies is that there are developments in the TV arena. Policy that informs these strategies is not always well-elaborated, however, and there are often problems that arise from resource constraints in implementation (whether these constraints are the funding of new channels or the regulator having the capacity to produce regulations timeously).



Recommendations to stakeholders

This section is about specific recommendations to the various stakeholders (broadcasters, content producers, policy-makers, media-support organisations, public interest groups, African Union, ECOWAS and other relevant African regional governmental organisations and donors). It assesses their roles in regard to the digital migration process. The recommendations are:

7.1. Don't rush onto the bandwagon

The first point to make is that there is no need to panic, or to feel that African countries will be forever left far behind the rest of the world if there is no scramble to embark on digital migration. The mentality of “we must catch-up” is a manifestation of an inferiority complex, when instead African countries should take as their starting point their real conditions, achievements, potentials and priorities. As argued in this booklet, the drivers of digital migration are specific to forces within developed countries who seek more use of the airwaves and to sell new consumer gadgets to access broadcasting. North-South and South-North dynamics, however, should be put in perspective by taking proper cognisance of the differences between the two zones. In the developing world, the analogue airwaves have not reached choking point, there is not generally a scarcity of frequency, and the public is also not generally a mass market for the latest devices.

Even the ITU ‘deadline’ of 2015 (in fact 2020 for two thirds of Africa) should not be of too much concern to Africans. Moreover, throwing volumes of energy and resources at digital migration is not guaranteed to make 2015 anyway, given the complexity and immensity of the process. That being the case, African broadcasting (and especially radio) can wait (and indeed keep growing via analogue systems) until such time as there really is congestion on analogue frequencies, and until the point when there are extremely cheap consumer devices on the market for audiences to acquire. Over time, hybrid devices, able to receive digital and analogue signals, will reduce in price and begin to permeate African societies – leading to “a tipping point” moment

when it makes sense for broadcasters to transmit in digital in earnest. In the meantime, investment can and will (and should) continue in digital production technologies, even if transmission and reception remain analogue. In addition, any African content that could find markets outside the continent can easily be converted into digital format if it is to be broadcast in places that have digital channels.

7.2. Get the big picture – of which digital migration is just one part

The second recommendation is that Africa should not continue business-as-usual. All stakeholders need to educate themselves about the issues. There is a huge misunderstanding amongst politicians and broadcasters, and the media community has often compounded this with confused reporting. As mentioned earlier, African countries could do well to develop national versions of “Digital Britain”, which sets out targets and roles for digital developments across the board over the next decade. Digital communications can help to build media and information pluralism. They can provide access to public information issues, even for disadvantaged communities. But this requires a clear policy and strategic framework to be developed, which locates digital migration within a wider horizon, and which allocates limited resources appropriate to the bigger digital picture of building an African Information Society.

Specific leadership is called for in these regards from players like the SADC and the Economic Community of West African States (ECOWAS). The latter already has a commitment to common standards for communications policies, laws and regulations, and has demonstrated initiative in forming the West African Telecommunications Regulatory Association (WATRA) in 2002.

7.3. A call for co-operation

A third recommendation flows from the evidence that no single player can ensure the success of the transition to DTT, let alone the

longer-term issue of digital radio. In developing policy therefore, governments should be sure to involve all stakeholder groups in meaningful ways. These should not ignore groups like retail distributors whose input should be taken on board early on – not least so that they begin programmes to educate their salespeople about what is coming down the pipeline. Implementation that follows will require co-ordination of these parties, and there also need to be clear regulations laid down – preferably by an independent regulator. No one will move unless others move, and potential deadlocks need to be broken. Thus, broadcasters need to know that it is worth doing digital output because there are set-top boxes being made and supplied; the manufacturers and retailers need to know that there is this broadcast output so that there will be a market for their devices. What these groups need to grasp is that digital migration is not a technical issue, but ultimately a behavioural-change process amongst themselves and amongst the public, and a process that needs education and communication at its heart.

7.4. Look at alternatives to DTT

Fourth, as regards radio in particular, a case can be made that developing this medium in Africa should concentrate on overcoming the economic and political obstacles that limit the effective use of FM analogue frequencies. And then, rather than look to digital terrestrial radio, the focus should be on other digital platforms, like satellite, DTT (via DVB-T+, also known as DVB-T2) and mobile broadcasting (DVB-H). Internet radio is hostage to the development of cheap and ubiquitous broadband, probably by wireless means, in Africa. SABC, however, expects that IPTV will have a 30% share of the South African market by 2013. The figure for radio may be similar or greater. For other countries, a diaspora market may be prepared to pay for podcasts, even if live-streaming of audio is not likely to be economical for most radio stations.

7.5 Digitising community radio

As a fifth recommendation, community radio stations can take cognisance of the rise of social networking by Internet or cellphone technologies. This phenomenon is close to the heart of community media, and digital technologies allow community radio stations to link into it for more impact. In other words, although digital migration is not a prospect for community radio in Africa for at least ten years, there is still a lot of benefit from other digital developments.

To this end, community radios should go further than SMS interactions, and consider text-based social networking around their content (on a model similar to the Mxit.co.za application popular amongst South African youth). They should also set up mobile websites that are easily accessible by cellphones. If many members of the public are willing to download ringtones, there is no reason why community stations cannot distribute some of their content in a similar way. Finally, digital technology enables networking amongst community radio stations in very powerful ways. In this way, content can be exchanged, and ideas and experience can be shared. Scale can be created through convergent digital communications so as to leverage extra advertising, sponsorship or donor-funding across several stations.

7.6. African broadcasting as a pro-active force

Lastly, all broadcasters can assert themselves as part of a community of interest in all things digital, and help ensure that digital migration is not something imposed on them and their audiences, but evolved in relation to real needs and capacities. Those broadcasters (whether state-owned, community-owned or company-owned), who are committed to public interest programming, can particularly play a role in shaping digital communications towards providing pluralism, diversity and the widest public access.

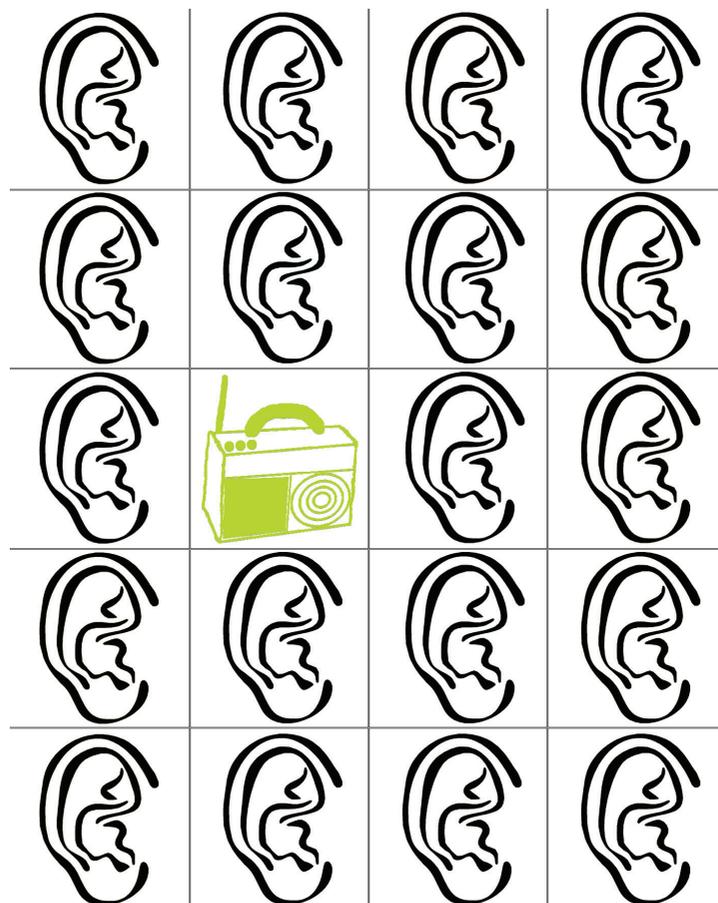
In conclusion, if there is one thing this booklet shows about digital migration for radio is that the technical standards are diverse and

indeed in flux. To get stuck in an outdated standard, such as in the UK, is not a healthy place to be. The moral of the story is that Africa can afford to bide its time – both in terms of digital terrestrial television, and especially in terms of migration to digital audio.

At the same time, it is imperative to acknowledge that radio people should not think they have no worries just because digital migration for years will still focus on TV spectrum. On the contrary: there are still implications for analogue radio. The point is that analogue radio needs to see itself as a current in a widening sea where digital is gaining momentum. This highlights the need to develop connections to many other digital currents, including (but not only) that of DTT which (regulations permitting) can deliver pure audio. The field for traditional radio to engage with is all platforms that deliver (digital) sound broadcasts: satellite, DTT, Internet (wired, wireless), cellular technologies and – although they are still far distant in African conditions – even digital sound technologies (DRM, DAB, DMB, etc) via dedicated audio broadcast Multiplexes.

If radio people do not take cognisance of the changes around them, they will find themselves the Cinderellas of digital migration – languishing at home, instead of showing off at the ball. They need to develop partnerships and to play on these different platforms, for instance, supplying audio-only channels for digital TV, where the viewing set (and in future, the cellphone) will serve as a radio receiver and, to an extent, supplant conventional radio sets. They need to contribute to the design of TV set-top boxes, enabling viewers and listeners to respond to audio content coming through digital TV transmissions. In short, they need to play across the entire network of information and communications technologies. And although their game remains primarily audio, they also need to engage through extra-audio features, such as SMS and online options or (in time) digital images.

Above all, the digital age is engendering new behaviours and radio stakeholders need to remember that consumers are showing that they want to do more than be confined to the status of passive consumers, which is the intrinsic character of unilinear traditional radio broadcasts.



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PANOS INSTITUTE WEST AFRICA TERMS OF REFERENCE FOR THIS STUDY

A - Digital migration for media information: concept and overview of general issues

- a) What is digital migration, its various understandings, notably taking into account the broadcasting value chain? What are its causes?
- b) What are key consequences for the various types of media (radios, including community radios, and TV)?
- c) What urgency for digital migration according for TV and radios? What are the international recommendations on this matter?
- d) What is the general status of debate and awareness on these issues in Africa, in the media sector and at the policy decision-making level?
- e) What general technological changes and challenges for national media infrastructure?

B – Digital migration for radios – access to public information, alternatives, technical issues

- a) What does migration to digital means for radios, notably taking into account the whole radio broadcasting value chain? What are its advantages?
- b) What are the access issues to public information issues for digital radios, in particular for citizens?
- c) Will we be facing a new 'Balkanisation' of productions and of African's voice in the world?
- d) Does it exist alternatives for migration to digital radios (access to radio via digital TV, cell phone, internet, satellite? Etc.) – What relevance of these alternatives for access to public information in West Africa, including in rural areas? How can they be effectively deployed?
- e) What are technical challenges for the various stakeholders, namely: broadcasters, producers, listeners (in particular regarding equipment and capacity building?)
- f) What are regulatory issues for Africa?
- g) What broadcasting norm(s) for digital radios and what are (the) best choice(s) for Africa?
- h) What are (best) practices and strategies put in place Africa, especially in Anglophone countries and at the international level to face digital migration? (action plans – role, functions and strategies of think thanks/ Committees, etc.)
- i) Recommendations to various stakeholders in West Africa for facing digital migration (policy-makers, radio broadcasters, media support organizations, regional governmental organisations, donors).

C – Digital migration for TV – access to public information and TV pluralism issues

- a) What does migration to digital means for TV, notably taking into account the whole TV broadcasting value chain? What are its advantages?
- b) Will we be facing a new 'Balkanisation' of productions and of African's voice in the world?
- c) What are the access to public information issues for digital TV, in

particular for citizens?

- d) What are economic issues for the African TV industry?
- e) What broadcasting norm(s) for digital TV and what are (the) best choice(s) for Africa?
- f) What are technical challenges for the various stakeholders TV (re/ broadcasters, consumers, producers, etc?), in particular regarding equipment and capacity building?
- g) Does it exist alternatives to migration to digital TV? What option before full migration to digital TV? What is the relevance of these alternatives regarding access to public information in Africa, including in rural areas? How can they be effectively deployed?
- h) What strategies for policy-makers for migration to digital TV?
- i) What are (best) practices and strategies put in place Africa, especially in Anglophone countries and at the international level to face digital migration? (action plans –role, functions and strategies of think thanks/ Committees, etc.)
- j) Recommendations to various stakeholders in West Africa for facing digital TV migration (policy-makers, re/broadcasters, producers, media support organizations, regional governmental organisations, donors)

LIST OF RELEVANT ACRONYMS

CMS – Content Management System
DAB – Digital Audio Broadcasting standard
DRM – Digital Radio Mondiale
DMB – Digital Multimedia Broadcasting
DVB – Digital Video Broadcasting
DVB-H – Digital Video Broadcasting for Handhelds
DVB-S – Digital Video Broadcasting for Satellite
DVB-T – Digital Video Broadcasting for Terrestrial
DTT – Digital Terrestrial Television
DTTV – Digital Terrestrial Television
EPG – Electronic Programme Guide
IPTV – Internet Protocol TV (streamed video services on the Internet)
LTE - Long Term Evolution (4G cellphone standard)
MBMS – Multimedia Broadcast Multicast Service, MBMS (a system used by cellphone operators to deliver broadcast TV on 3G or LTE transmission technologies).
MHEG – Multimedia and Hypermedia Experts Group (A group of experts who have defined a set of international standards relating to the presentation of multimedia information, especially for interactive TV middleware on a Set-top Box).
MPEG – Motion Picture Experts Group (A group of experts who defined of standards for the compression of audio-visual data) MPEG-1, MPEG-2 and MPEG-4 (for use with DVB for example) are the most used formats they have defined.
ICASA – Independent Communications Authority of South Africa
ICT – Information and communication technology
ISP – Internet service provider
ITU – International Telecommunications Union
SADC – Southern African Development Community
STB – Set-top Box



Professor Guy Berger is head of the School of Journalism and Media Studies at Rhodes University, Grahamstown, South Africa. He is author of "Beyond broadcasting: the future of state-owned broadcasters in southern Africa" (2009) he also writes a fortnightly media column at www.mg.co.za/converse. His full CV and research are online at <http://guyberger.ru.ac.za>.