Digital Dilemmas for South African TV

Chris Armstrong & Richard Collins

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Abstract

There is a global push towards digital transmission of TV signals – for reasons of efficient spectrum usage, lower transmission cost and better service offerings for users. But throughout the world, this "migration" from traditional analogue transmission of TV to newer digital transmission systems is proving to be a highly complex proposition. Even in wealthy nations with a mass of well-off consumers able to pay for new services and equipment, getting the "digital business case" right – particularly the economics of the "switchover" period – has been fraught with difficulty. Two countries, the UK and Spain, have already seen the collapse of digital terrestrial television (DTT) services, and while in the UK DTT has been revived and is operational again, the process has not been an easy one.

Most of South Africa's approximately 7 million TV households consume "free-to-air" television -- SABC 1, 2 and 3, and eTV – via analogue transmissions received through traditional fixed antennas attached to their sets. Only about 670,000 subscribers consume digital TV transmissions, via the DStv direct-to-home (DTH) satellite service. Most industry-watchers are convinced that the migration to digital-only TV transmission in South Africa and the rest of the world is inevitable -- meaning that the 6 million South African households currently receiving analogue TV will eventually make use of digital signals. But there is less agreement about how quickly South Africa can or should arrive in this digital TV future.

The advantages of digital TV transmission are clear: lower transmission costs for the broadcasters and signal distributors, more efficient use of broadcast frequency spectrum, higher-quality images, and greater consumer choice/interactivity. But the migration period to digital is expensive. The broadcasters have to pay to put their programming on both analogue and digital platforms, so as to draw viewers over to digital while not stripping "late adopters" still on analogue services. And the switch to digital puts added costs on the consumer, who has to purchase either a set-top box (STB) converter or a new, digitally-enabled TV set, and often a new aerial. In South Africa, where many households cannot afford a television set, any extra reception cost threatens to undermine the important objective of universal access. Meanwhile, revenue streams for broadcasters are not as straightforward in the digital TV environment. Digital TV bouquets tend to fragment audiences between niche services, and "broadcasting" starts to become more like "narrowcasting" – something that not all advertisers find attractive. And to make full use of the digital environment, broadcasters increasingly have to link up with other types of services, such as home shopping and Internet-based platforms.

In this paper, the authors outline the main complexities of the digital television issue in South Africa and other markets, particularly the UK. The authors also sketch the views of the various South African stakeholders, and explain the difficult position the South African Ministry and Department of Communications find themselves in. The government needs to simultaneously create an enabling environment for migration to digital TV while at the same time ensuring continued access to television programming for low-income South Africans. The authors show that, as with many other contemporary social delivery issues in South Africa, there is the difficulty of simultaneously serving both of the country's "two economies" - one the formal economy and the other of those marginalised from the first. There is every reason to believe that members of South Africa's "first economy" will be willing and able to buy into new digital TV platforms once the services are rolled out and digital receiving equipment gets cheaper. But the scenario is not nearly as simple for delivery of TV services to the large number of poorer South African households. Some difficult questions emerge: To what extent is government willing and able to subsidise access to digital TV for poor South Africans? Or, to what extent will subsidisation be necessary in a few years' time, when the prices of digitally-enabled TV reception equipment may have dropped significantly?

Another key issue explored by the authors is the difference in priorities between the country's main TV signal distributor (Sentech) and the country's largest free-to-air TV broadcaster (the SABC). Sentech, which is 100 percent state-owned, wants a clear digital migration path – and government support for this path -- so that it can start investing in digital terrestrial television (DTT) transmission infrastructure. But the SABC, Sentech's biggest client, is currently taking a more cautious approach. Meanwhile, ICASA, the country's broadcast regulator, is feeling its own pressures, compelled as it is by the International Telecommunication Union (ITU) to work with the South African government and local industry players to finalise a digital terrestrial broadcast frequency plan for South Africa – with input from other SADC countries – by the end of February 2005.

The authors conclude by arguing for a two-phase approach: an initial opening up of the broadcast sector in the short-term to allow for commercial licencing of digital terrestrial TV (DTT) services, followed in the medium- to long-term by a full digital migration for all TV services (including public-service channels) which can take advantage of the anticipated global reduction in the cost of digital TV equipment – and which can avoid the pitfalls currently being experienced in the pioneering digital TV markets of Europe.

1. Introduction - The 'Digital Age'

The solution to every modern communications problem, it seems, is to "go digital." We are told we live in a "digital age," and that whatever "digital divide" exists can only be overcome through "digital inclusion." There is a great deal of hype around digital technologies. For people living in poverty without electricity, the hype often doesn't amount to much. But for those on the well-off side of the divide, digitisation – of everything from voice to pictures to music to video – is indeed proving to be a remarkable enabler. Once information is digitised, it can easily be stored, easily manipulated, easily copied -- and used over and over again without loss of quality. Digital content can also be easily, quickly and cheaply sent all around the world – via satellite or computer networks, over telephone or Internet platforms – again without loss of quality. Moreover, digital transmission generally is more economical than analogue – less radio frequency spectrum and less of the capacity of wired networks are required for digital signals, and, in some cases (e.g., TV) lower power is required to send digital signals through the air than analogue ones.

What exactly is digitisation? Most radio and television broadcasting has traditionally been in "analogue" format. In analogue, sound and video inputs (what the camera "sees" and the microphone "hears") are encoded so that the electrical signals created by the cameras and microphones vary analogously with the inputs. For example, an increase in volume of sound causes an increase in the fluctuation of the electrical current. Digital signals do not vary in this way. Digital systems encode (and decode) signals in a manner whereby inputs, whether sound or video, are converted into (and from) a single stream of zeros (0) and ones (1), or "ons" and "offs," in the electrical current. Digital systems are preferred over analogue because they can, all other things being equal, provide higher fidelity recordings and reproductions than analogue. And, as suggested above, they are more easily edited, take up less bandwidth (so more signals can be carried over a given infrastructure with efficiency gains), and sometimes require less power to transmit.

But not much is said, amidst all the "digital age" discourse, about analogue systems' countervailing advantages. Analogue broadcast systems, though more prone to "noise" and signal degradation than digital signals, have the advantage of "failing soft." In marginal conditions, an analogue system can often provide intelligible (and, to the consumer, often quite acceptable) signals in circumstances where digital systems will fail completely. Conversely, a digital system, like the coding it is made up of, is either on or off. When it fails, it fails completely; it fails "hard."

Another more prosaic plus on the side of analogue broadcasting is that most of the world's existing radio and television sets, video cassette recorders (VCRs) and the like are analogue machines. A transition to digital means viewers and listeners have to replace or augment their equipment. True, consumers are able to buy digital converters that make analogue receivers digital-capable – as South Africa's DStv customers do with their dishes and set-top boxes (STBs) – but it is still an added cost. In South Africa, a DStv digital satellite dish/decoder/smart card package, with installation, costs around R1500. In the UK, where they have digital terrestrial television (DTT), a basic DTT converter sells for the equivalent of around R600,[1] but UK consumers often have to improve and/or re-position their receiving aerials/antennas to get DTT, adding another cost.

So, the days of analogue TV are not completely over. But the march towards digital TV transmission is, in the medium- to long-term, seemingly unstoppable. Once enough countries have moved completely over to digital TV transmission – and there are many nations currently on this path – it will not make economic sense for a country to go against the trend: the price of digital TV transmission and reception equipment will get cheaper and cheaper internationally, and analogue infrastructure will get more and more difficult to source and replace.

> **There are three main types of digital TV: satellite DTH, wired/cable and terrestrial DTT.**

There are three main methods of digital TV transmission being used in the world today. The oldest is direct-to-home (DTH), via satellite. There are also wired systems, which send digital TV content to users via phone lines, via broadband Internet connections, or via the cables initially used to deliver analogue TV. A more recent evolution is digital terrestrial television (DTT), which sends the digital signals wirelessly via terrestrial (Earth-based) transmitter towers. DTT is currently being tried in many markets, including several European nations, and is particularly popular in nations that do not have extensive cable-TV infrastructure in place.

2. The Digital TV 'Switchover'

Until recently, much of the transformation of television from analogue to digital was at the level of production. Digital video cameras, computer-based digital editing suites, on-location digital satellite feeds back to the newsroom – all these things, and many others, brought the digital revolution to the production, storage and relaying of video/TV content. But at the level of transmission – getting the TV content into the homes of consumers/viewers -- most countries, South Africa included, still rely to a great degree on analogue platforms. The majority of South Africans view television via TV sets equipped with a set-top antenna or outdoor/external antenna that picks up analogue television signals transmitted from towers all around the country. Through this system, South Africans are able to consume the four South African "free-to-air" channels – SABC 1, 2, and 3 and eTV. A few users (about 360,000) also consume the M-NET pay-TV service via analogue signals that are decoded via a set-top box (STB) (ICASA, 2004). Only a relatively small number of South African households -- about 670,000 of the 7 million TV homes in the country -- receive digital TV transmissions, via MultiChoice's DStv direct-to-home (DTH) satellite service (ICASA, 2004: 25; OMD, 2004).

This plural analogue/digital regime exists in many other countries. But, increasingly, national governments, principally in the richer nations, are committing to a digital "switchover," whereby analogue signals are to be gradually phased out, and all television signals -- at some time in the future -- are to be digital. For example, the United States began digital television services in 1998 and has set a target date of 2006 for analogue switch-off, subject to 85 percent of US TV homes having access to digital services and possessing digital receivers. Canada started its transition to digital in 2003 but, as of yet, has no target switch-off date. The UK started digital services in 1998 and has set a target date of between 2006 and 2010 for switchover – subject to 95 percent of TV homes having access to digital services and possessing digital receivers. The Netherlands started its transition to digital in 2003, with a target date for analogue switch-off of between 2008 and 2015, while Japan also started its digital services in 2003, with a switch-off target of 2011. Australia began its transition in 2001, aiming for switch-off by 2012.[2]

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[1] *Using a Rand: UK pound rate of 12:1.*

[2] *Because of high cable penetration in countries such as Canada and the Netherlands (for example, only around 1 percent of Dutch homes are dependent on terrestrial analogue transmissions), digital switchover in these countries is likely to be straightforward in comparison to other countries, such as the UK and South Africa, where cable penetration is low and wireless, free-to-air transmission has been the norm.*

What lessons might the experiences in other countries offer to South Africa? The UK is a representative case. Though the frontrunner in the great digital switchover race may change -- sometimes from day to day, it seems -- it is generally accepted that the UK is among the countries farthest advanced in the digitisation of its television services: the French consultancy, BIPE, for example, claimed that "Britain is the leading European country in terms of digital television penetration" (BIPE, 2002: 139). Switchover in the UK is designed both to increase efficiency by releasing potentially valuable radio frequency spectrum for other purposes (see Cave, 2002), and to accelerate achievement of the government's "On-line Britain" project (whereby everyone in the UK will have access to interactive connectivity).

Getting the UK on-line is a headline goal for the Blair government. An on-line UK promises to contribute to the modernisation of public services, to reduce the dead weight of inefficiency carried by the UK economy, and to clothe the government that succeeds in getting the UK on-line with an attractive "halo" of modernity. All UK public-sector bodies are required, by a target date of 2005, to initiate electronic service delivery and to promote public access to services electronically (e-Envoy, 2002a). The guidelines for electronic access to services, drawn up by the UK's "e-Envoy" (the official charged by the Prime Minister with getting the country on-line), give digital TV a prominent place in the service delivery strategy, because of its availability to "all groups in society" (e-Envoy, 2002a: 7).

> Migration to digital TV is central to the "On-line Britain" project.

However, the e-Envoy's own analysis suggests that few Britons use digital television to get on-line: only 7 percent of adults have ever used digital television to access the Internet, whereas 98 percent of UK Internet users get on-line via a PC (e-Envoy, 2002b: 1)[3] . A recent digital television survey, undertaken by MORI, found that only 1 percent of respondents identified e-mail and Internet access as possible reasons to switch to digital television in the next two years (DCMS, 2002: 14). Thus, one of the two major rationales given for digitisation of UK television – provision of interactive services -- seems to be flawed.

What then of the UK's other primary rationale for TV digitisation: spectrum efficiency? Leading UK academic economist in media and communication issues, Martin Cave, was charged by the UK government to review the country's radio spectrum management and recommend changes (Cave, 2002). Cave found that "Broadcasting in general, and

terrestrial TV in particular, is a major user of radio spectrum. Terrestrial TV transmissions occupy 40 percent of the spectrum below 1 GHz" (Cave, 2002: 161). Cave concluded that "The chief means of improving spectrum efficiency in the broadcasting sector will be to move from analogue transmission to digital. Digital transmission allows more information to be squeezed into any given amount of spectrum, e.g., six or more digital TV services can be housed in the spectrum used by one of its analogue equivalents" (Cave, 2002:162).

Though Cave clearly found that efficiency gains would accrue from digitisation of television broadcasting in the UK, the balance of advantage, between maintaining the analogue status quo and switching to digital, is actually much less certain. Not only are there other potential routes to efficient use of spectrum (e.g., spectrum-trading or spectrum re-allocation), but also the cost of switchover is unclear. Estimates of potential cost savings are strongly conditioned by initial assumptions. For example, is the cost of switchover to be determined by considering only the first set in each television household or all sets and VCRs in the household? David Elstein[4] has argued cogently that the UK government's "ambitions have come at a heavy price: one that UK taxpayers and licence fee payers will continue to bear for many years" (Elstein, 2002: 1). Elstein concluded that it is dubious whether, even if achievable, the benefits of digital switchover will exceed costs.

There is, then, in the UK, some uncertainty about whether the benefits of digital switchover will exceed the costs. Nonetheless, the UK government remains firmly committed to digital switchover. The UK's first digital terrestrial television (DTT) service, a pay-TV offering provided by ITV from 1998 to 2002, collapsed after a myriad of difficulties, including technical problems, ineffective regulation, and hard-nosed tactics by the rival digital operator -- Rupert Murdoch's BSkyB satellite direct-to-home (DTH) platform (BBC, 2002). A new UK DTT service, this time free-to-air and launched in late 2002 by the BBC in partnership with BSkyB, is having better success, but there are still problems getting the signal to cover the entire country -- and many UK "refuseniks" are still not keen to go digital. Spain also saw its first DTT service, called Quiero, collapse in 2002, after just two years of operation. There have also been difficulties and

> Two DTT services have already collapsed, in the UK and Spain.

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controversies around DTT in several other European markets. For instance, German cable-TV operators are angered by government subsidisation of a DTT service currently being rolled out (Advanced-television.com, 2004).

These experiences in the UK and other European markets reveal the difficulties of the migration to digital TV transmission. The collapse of the ITV service in the UK illustrates the difficulties of strategies that rely primarily on the market to drive migration, while the German scenario shows the difficulties governments can find themselves in when they try to subsidise the switchover. The South African market, while different than most European markets – e.g., much lower Internet penetration than the UK, and no cable TV infrastructure – is no less complex.

In South Africa, with its dual economy, it seems unavoidable that, should an aggressive switchover be pursued anytime soon, the state would have to play a role in subsidising digital TV access for poor South Africans. But it is not clear what the best method of subsidy would be, or where that state money would come from, at a time when the newly re-elected (in April 2004) government has laid out an ambitious set of targets for delivery in health, education, housing and basic services. The push for universal access to digital and interactive information services (the push seen in the UK) is overshadowed in a country such as South Africa by even more fundamental access issues – e.g., water, electricity and housing.

As with all issues of technological "progress," South Africa must achieve a balancing act. It must not get left behind by technological advance, while at the same time it must not advance in a manner that further marginalises already-marginalised groups. The South African digital TV switchover scenario is further complicated by the fact that spectrum scarcity appears to be a less-urgent problem in South Africa -- and thus less of a justification for urgent digital migration -- than in other markets aggressively pursuing digital TV. There is some crowding of TV broadcast spectrum in Gauteng, Cape Town and Durban – and to a lesser extent in Bloemfontein and Port Elizabeth -- but with only five terrestrial TV services (the three SABC channels, eTV and M-NET), there is still some room to maneuver. (The spectrum situation will become tighter if and when the two SABC regional TV services (a northern service and a southern service) go ahead, but there is currently no clear funding commitment for these channels, making their arrival in the frequency spectrum unlikely within the short term.)

3. The Digital TV Stakeholders in South Africa

Most South Africans only encounter digitally-transmitted television signals when they go to a bar or a hotel that offers "satellite TV." It is invariably a digital signal that carries the images of the soccer match or the latest terror bombing down from the satellite to the receiver dish on the roof of the establishment and then into the cabling and set-top box (STB) linked to the TV screen. As stated earlier, it is only a small minority -- the roughly 600,000 South African households that have bought a receiver dish and STB and pay a monthly subscription fee – who receive digital satellite TV directly into the home, via MultiChoice Africa's DStv service (headquartered in Johannesburg) (ICASA, 2004: 25).

South Africa's situation is unlike the scenario in countries that have an existing cable-TV infrastructure – e.g., the Netherlands and Canada – where consumers access digital TV transmissions via cable – the cable originally laid to carry analogue TV signals. South Africa also has not yet seen a wave of "broadband TV," a popular trend in some European markets where TV is sent over DSL-enabled telephone lines using Internet Protocol (IP). In Italy, for example, a telephone company called e.Biscom has an estimated 300,000 subscribers receiving digital TV via telephone lines through a service it calls FastWeb. This FastWeb package bundles together TV, phone and Internet services, all coming through the same broadband line. Similar services are starting to be rolled out in France, by France Telecom and rival operator Neuf (Fortune, 2004), and in the UK by Homechoice in London.

In countries such as South Africa that don't have a strong history of cable TV, digital terrestrial television (DTT) transmission is currently in vogue. Being tried aggressively in several countries, DTT sends the signal wirelessly from transmission towers, usually co-located with the same towers used to broadcast traditional analogue radio and TV services. Both of South Africa's licensed broadcast signal distributors – Sentech and Orbicom – have been doing DTT tests for several years. Both firms say they are keen to partner with broadcasters to begin trying commercial DTT operations in a major metropolitan area (e.g., Gauteng, Cape Town, Durban), where they feel population density and high incomes could give terrestrial digital TV services a chance of success – in the same way that DTH digital satellite TV (MultiChoice's DStv) targets the higher-income market.

Sentech and Orbicom are developing different DTT models. Sentech has been focusing on a "high site" model for DTT network coverage, where DTT signals are transmitted at high power (though lower power than

required by analogue) from aerials co-located with its established analogue terrestrial television transmission network. Meanwhile, Orbicom has been testing two types of DTT transmission. As well as investigating high-site transmission, Orbicom has been testing a lower-powered, "cell-based" system co-located with the send/receive base stations used by MTN, one of South Africa's cellular (mobile) telephone companies. According to Orbicom, MTN's base stations currently cover about 95 percent of the South African population, while Sentech's widest terrestrial TV "footprint," which it provides to the SABC 2 channel, covers around 90 percent of the population (SABC, 2003c: 37). Orbicom says its cell-based approach to DTT has the potential to be the most cost-effective way to roll-out DTT, with the broadcaster only paying for the small amount of transmitter power needed to target small "niche" markets, i.e., high-income areas in metropolitan centres. Orbicom also predicts eventual DTT synergies with cellular phone services, with customers being able to interact with the DTT content – and perhaps even view it -- via their handsets. (Video/TV viewing via cellular handset is an emerging trend in Asia (e.g., Japan, Korea) and parts of Europe with the roll-out of Third Generation (3G) mobile telephony.)

> **Signal providers Sentech and Orbicom both predict a mix of satellite DTH and terrestrial DTT for South Africa.**

Both Sentech and Orbicom also run digital satellite direct-to-home (DTH) TV broadcast platforms. Orbicom's main business is providing the satellite DTH platform for MultiChoice's DStv pay-TV service (which also includes audio channels). Meanwhile, Sentech transmits the country's free-to-air TV (SABC, eTV), the SABC radio services, and corporate audio/video services via satellite on a digital DTH service called Vivid. Sentech uses this Vivid platform to provide service to remote-location customers who are unable to receive terrestrial free-to-air signals and can afford a satellite dish and Vivid decoder. Vivid, a ku-band satellite platform, is also a back-up for Sentech's C-band satellite relays. (Sentech uses C-band satellite transmissions to digitally "hop" some of its terrestrial TV and radio signals out to remote analogue transmitter sites.)

While Sentech's and Orbicom's digital DTH satellite systems have the advantage of covering all areas of the country without roll-out of transmission towers, both firms point out that DTH is not as flexible or potentially interactive as digital terrestrial (DTT) systems. Both firms see the long-term future of TV in South Africa, and on the African continent, lying in a mix of digital satellite DTH and digital terrestrial DTT systems -- satellite DTH to reach remote, sparsely-populated areas where digital terrestrial DTT transmission infrastructure roll-out is not cost-effective,

with DTT used for more populous areas. (Digital cable and other wired digital TV systems – like the ones popular in North America and parts of Europe – are not seen as central to the digital TV migration scenario in South Africa, because South Africa does not have any existing cable TV infrastructure and has relatively low levels of fixed-line telephone roll-out.)

Both Sentech and Orbicom also have DTT ambitions outside South Africa's borders. Sentech has already installed a DTT system in Taiwan, while Orbicom says it will be installing a single-transmitter DTT system in an African city starting in September 2004.[5]

Sentech, South Africa's corporatised state-owned signal carrier – which has a "common carrier" licence obliging it to provide all reasonable requests for signal distribution services in South Africa -- is perhaps the biggest backer of a full, large-scale DTT migration in South Africa. Sentech doesn't want to continue to re-capitalise its analogue transmission infrastructure, given that analogue TV transmission appears to be a technology entering its dying days. Sentech argues that analogue-compatible transmission equipment is going to be increasingly hard to find and expensive in the years ahead, and it wants to start installing some digital-only infrastructure. (All new Sentech transmitters are currently dual-mode, requiring a new front-end if they are to be used for DTT.) Sentech wants to entice its key broadcast clients -- SABC, eTV and M-NET terrestrial -- over to digital with the argument that digital transmission, because it can multiplex as many as six channels into one frequency and uses lower power than analogue, will be a lot cheaper for broadcasters to use. The SABC and eTV – as free-to-air services targeting viewers of all income groups -- are not necessarily in a hurry to move to a digital transmission platform that will force added costs onto their audiences. The M-NET pay-TV service, however, which uses Sentech for its terrestrial analogue coverage and Orbicom for its DTH digital satellite distribution, says it is keen to try a DTT service. M-NET's viewers tend to be in the higher-income brackets, and they already own set-top boxes and are accustomed to paying monthly subscription fees. As well, M-NET has more than a dozen channels of content to work with. M-NET has been privy to the results of Orbicom's DTT tests (Oribcom and M-NET are part of the same corporate family), and M-NET management says the company is merely waiting for the necessary regulatory environment to be put in place before trying DTT distribution.

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[5] *For reasons of business confidentiality, Orbicom was not able to confirm the location of this DTT roll-out at the time of publication of this paper.*

South Africa's broadcast and telecommunications regulator, the Independent Communications Authority of South Africa (ICASA), has started making provision for the migration to digital broadcasting. ICASA stated in its August 2003 Regional Television Discussion Paper, and in its April 2004 Subscription Broadcasting Discussion Paper, that South Africa will have to follow the global trend towards digital broadcasting, in order "to remain competitive in a global market and to avoid analogue technological obsolescence" (ICASA, 2003a, 2004). In its November 2003 Terrestrial Broadcast Frequency Plan, ICASA set aside two frequencies for DTT in every part of the country (ICASA, 2003b). ICASA's international counterpart, the International Telecommunication Union (ITU) is currently working with governments, regulators and industry on guidelines for frequency-planning for VHF/UHF digital terrestrial broadcasting in Region 1 (Africa, Europe and the Middle East). May 2004 saw the holding of an ITU Regional Radiocommunication Conference (RRC-04) in Geneva, with 87 countries including South Africa represented, to consolidate the digital frequency-planning guidelines. This ITU process, which will culminate in a six-week, high-level frequency-planning session in May 2006, is the first of its kind in 15 years, made necessary by the international push towards digital broadcasting. South Africa's delegation to the May 2004 ITU meeting, made up representatives from government, ICASA and industry, has to submit its proposed DTT and digital audio broadcasting (DAB) frequency allocations to the ITU at the end of February 2005.

> **The regulator ICASA has started to set aside terrestrial DTT frequencies in its Terrestrial Broadcast Frequency Plan.**

The South African government officially backs the idea of migration to digital TV, though it has not yet announced a clear switchover strategy, policy or timeframe. The Minister of Communications established a Digital Broadcasting Advisory Body (DBAB) in 2001 "to advise the government on issues relevant to the introduction of digital broadcasting" (Ministry of Communications, 2001), and the DBAB handed over its final report to government in late 2002. The Minister is expected to release the government's digital broadcasting blueprint sometime in the near future, and the Department of Communications is said to be working on the draft. ICASA said in its April 2004 Subscription Broadcasting Discussion Paper that "the Department of Communications is preparing a national strategy that will provide guidance on government's approach to digital migration in South Africa" (ICASA, 2004).

A South African industry stakeholder grouping, the Southern African Digital Broadcasting Association (SADIBA), wants government to initiate policy that will allow ICASA to start licencing commercial DTT -- so that the market can start to develop. So far, Sentech and Orbicom – both key members of SADIBA -- have only been able to secure licences for testing of DTT transmissions, not for roll-out of services commercially available to users.

As mentioned above, South Africa's two free-to-air TV broadcasters, SABC and eTV, are much more cautious in their approach to digital switchover. These two broadcasters are reluctant to fragment their viewers between those who can access digital services and those who are still on analogue. Also, to encourage viewer migration to digital, the broadcasters will have to make some of their content available only on the digital platform, or generate new content for a digital channel. This will almost certainly increase production costs, and will anger some viewers who are unwilling – or unable -- to afford to upgrade to digital reception. It will also present advertisers with a fragmented free-to-air audience (some advertisers like niche audiences, but others don't). eTV, the country's only commercial free-to-air service, has only just recently announced positive financial returns, having gradually clawed its way to business viability since its launch in 1998 (This Day, 2004). With its slogan "Be Free With e," eTV is unlikely to relish the prospect of its customers having to buy new digital equipment to receive its signal. Meanwhile, the SABC, as the public broadcaster, is concerned that its large number of low-income viewers will not be able to afford the new apparatus required for digital. The SABC is bound by legislation and its 1999 Charter "to make its services available throughout the Republic" and its new Editorial Policies include a section on "Universal Service and Access" (SABC, 1999; SABC, 2003). In its recent application to ICASA for regional TV licences, the SABC wrote that: "End user cost is…a critical factor for the successful delivery of information to [low-income] communities, and hence analogue, as the cheapest and most established platform, is best suited to achieving these policy aims" (SABC, 2003c: 39).

> **The free-to-air broadcasters, SABC and eTV, are cautious about digital switchover.**

4. Policy Balancing Act

The South African Ministry and Department of Communications (DoC) find themselves in a difficult position, faced with competing policy imperatives. The signal providers, Orbicom and Sentech, want to see an enabling licence regime and digital migration plan as soon as possible, in order to incentivise broadcasters, consumers and equipment-makers to gradually move to DTT. The country's key pay-TV content producer, M-NET, is keen to try the DTT platform. The regulator ICASA, spurred by international regulatory and technological momentum, has already set aside DTT frequencies nationwide. But the country's dominant TV broadcaster, the SABC, is calling for a go-slow approach to digital switchover.

For its part, the DoC has several urgent broadcasting matters to attend to -- not the least of which is the Broadcasting Amendment Act of 2002, which requires the SABC to roll-out new regional TV services carrying more regional programming and under-served languages. The SABC has estimated that two new regional services – one for the south and one for the north -- will cost R442 million to set up and run for the first year (SABC, 2003c: 18). The 2002 Act, and ICASA's 2003 Regional TV Position Paper, call on the government to provide the bulk of the funding for these new regional TV services (which ICASA says shouldn't carry advertising[6]), but so far the Treasury has not agreed to DoC's requests for regional TV money. One can presume that any requests by the DoC to Treasury for funding of migration to digital TV (e.g., via subsidies for new Sentech transmission infrastructure and/or set-top boxes for low-income viewers) would meet with similar difficulties.

How then can the Ministry and DoC balance the digital TV interests of the signal providers and pay-TV content providers with those of the free-to-air broadcasters and low-income consumers – and in a manner that does not require money from Treasury? The industry body SADIBA has come up with a sensible proposal: a two-phase migration. First, create an enabling licencing environment that allows firms to test the market for commercial DTT services (for high-income households, presumably on a pay-TV basis). Then, in the second phase -- only once the dynamics of the South African market have been assessed through high-end offerings, and only once global economies of scale have taken hold in the

digital TV market -- tackle the issue of full digital migration, including migration of free-to-air commercial and public-service TV broadcasting services.

SADIBA's call for a phased approach rests on the assumption that there are "significant differences in drivers and considerations that apply to commercial, public, community, niche and multimedia service providers respectively" (SADIBA, 2002: 3). SADIBA – whose membership includes broadcasters (including SABC), signal providers (Orbicom and Sentech) and equipment manufacturers – wants an approach that will allow South Africa to respond to whatever economies of scale may develop both internationally and domestically. SADIBA argues that "it may be difficult if not impossible to predict world economic trends and developments in the local market," and that the only way to test the viability of DTT and other digital broadcasting applications is to liberalise the environment and allow for experimentation. SADIBA correctly points out that "the social prerogatives and benefits of the introduction of digital may only be defined and realised once services can be offered in a commercially viable manner" (SADIBA, 2002: 4). SADIBA's approach is a reasonable one: let the high end of the market (the people who are already subscribers to pay-TV services) determine which DTT content services and reception systems are most viable.

However, opening the South African broadcasting market up to various digital broadcasting/multimedia services is easier said than done, and requires clarity on a regulatory regime for what the Broadcasting Act of 1999 calls "multi-channel distribution services" -- the operators who, in the digital broadcasting universe, sit between the content providers and network/infrastructure operators. (Multi-channel operators, also known as "multiplex operators" perform the technical operations necessary to deliver several different types of digital content in a single "multiplexed" frequency.) ICASA has said it will conduct its inquiry into the regulation of multi-channel operators (an inquiry required by section 33 (1) of the 1999 Broadcasting Act) in late 2004 (RSA, 1999; ICASA, 2004: 31). South Africa's broadcast licencing categories may also eventually be affected by the outcomes of South Africa's Convergence Bill process, launched with a draft bill in late 2003, but the timetable for this process is uncertain at present. (We return to licencing later in "The Way Forward.")

> A new category of operator emerges in the digital broadcasting environment: the multi-channel or "multiplex" operator.

Before suggesting a "Way Forward," it is necessary to provide more detail on the main complexities of the digital TV migration issue in South

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[6] In any case, the SABC estimates that advertising revenues could cover no more than 5 percent of the costs of these services.

Africa – particularly the complexities of migrating free-to-air TV. We now look at the following elements of the issue:

- Spectrum Efficiency
- Interactivity
- Transmission Costs
- Licence Fee Collection
- Citizen Access

5. Spectrum Efficiency

A key selling point for digital television transmission -- whether it be direct-to-home (DTH) by satellite or transmitted terrestrially via DTT – is that it frees up valuable electromagnetic spectrum. With the massive expansion in information and communications technologies (ICTs) over the past decade, the frequency spectrum has become increasingly crowded, particularly in urban areas where the different frequency bands – for cell-phones, broadcasters, remote-control gates, two-way systems used by police and taxis, satellites, astronomy etc. – are being gradually filled up. Digital TV transmission enhances spectrum efficiency in the broadcasting frequency bands because it takes up less space than analogue: as many as six TV channels can be transmitted in a multiplex channel using the same amount of bandwidth used by just one of the current analogue channels, thus releasing extra bandwidth for other services.

But spectrum scarcity is a tricky issue. To accurately predict the future of spectrum requirements one must guess at the future directions technological development will take. As technologies develop, different frequency bands come to be used. New services tend both to pose additional demands on spectrum, but also to open up use of areas of spectrum that have, hitherto, been under-used or unused. For instance, South Africa's two original cell phone operators, Vodacom and MTN, occupied the 900 Megaherz (MHz) band. Spectrum scarcity and changing handset capabilities later forced a policy and legislative change that will give Vodacom, MTN and new entrant Cell-C access to the 1800 MHz band. The newest handset incarnations – the Third Generation (3G) phones – will use even higher frequencies. South Africa now has somewhere between 15 and 20 million cellular phone accounts, yet back in the mid-1990s when cellular telephony was introduced to the country, it was estimated that the South African market would yield only about 2 or 3 million users. Clearly, demand for spectrum is not always easy to predict. It should also be noted that migration is not the only way to free up spectrum. Other options include substituting wired for wireless

systems, establishing a market in spectrum (see, inter alia, Cave 2000), and utilising hitherto unallocated or unused frequencies. For instance, an unused frequency set aside for commercial or community TV services can be re-allocated to public service.

Turning to the contemporary situation in South Africa, broadcast signal providers Sentech and Orbicom and other stakeholders point out that TV broadcast frequencies are already becoming scarce in Gauteng and Cape Town, and will soon be in short supply in the Durban area. Sentech argues that the roll-out of two new SABC regional television (RTV) services in analogue – if and when they happen -- will further exacerbate the situation. But there are other observers who claim that broadcast spectrum "scarcity," even in South Africa's major cities, is being exaggerated by the digital migration proponents. For instance, it can be argued that if ICASA were to set aside just one frequency for future DTT use in each area of the country -- instead of the current two DTT allocations per area -- and if, as it now seems, the roll-out of new SABC regional TV services is at least 2-3 years away, then analogue TV frequency spectrum scarcity becomes more of a medium-term problem, not an urgent crisis.

6. Interactivity

For its enthusiasts, one of the most compelling aspects of digital TV is its interactivity. The viewer/consumer can increasingly control and interact with TV when it arrives in her or his home in digital form on a digital platform. There is "video-on-demand" (VOD), a digital TV application that allows the consumer to download programming from a digital archive. And there is "T-commerce" (television commerce), or, to be more precise, home shopping – applications that enhance customer interaction with info-mercials (for things like muscle improvement, hair acquisition and vegetable-dicing). Rather than calling the toll-free number to order the product, digital TV transmission systems offer the possibility of making selections via the TV remote. Digital TV is also seen as an eventual provider of "T-government." Why stand in a long queue for your child maintenance grant, or to vote in an election, when you could do it through your TV? And then there is "T-health," and "T-education." South Africa's Mindset Network, a distance education project that both Sentech and Orbicom/MultiChoice participate in, uses digital satellite (DTH) television signals to send programming directly into classrooms. Eventually the plan is for students and teachers to be able to interact with the content via a "return-channel," probably via Internet (Sunday Times, 2003).

The key to interactive digital TV is this "return-channel" or "return-path," which in European, North American and Asian markets is often provided via a wired (cable or Internet) connection. There are moves towards creating wireless return-paths, via cell-phone, via Internet WiFi platforms and even via a return-channel built right into the functions of a digital terrestrial TV (DTT) set-top box.

> **The key to interactivity is the "return path" - wired or wireless.**

South Africans have so far proven to be "rapid adopters" of new technologies, and there is no doubt that many South Africans have a taste for interacting with television programming. The Big Brother and Pop Stars reality TV shows have revealed a keenness on the part of South African viewers to determine the fate of their fellow human beings via interactive means (Internet and cellular short message service (SMS)). With cell-phone accounts outnumbering home Internet connections by at least three to one in South Africa, SMS interactivity with TV programming is an important trend to monitor. South Africans are rumoured to be the world's highest per-capita senders of SMSs, and already one can see the TV broadcast environment adapting to this phenomenon. Increasingly, one sees "ticker tape" rolling displays at the bottom of South African current affairs programmes, displaying viewers' SMS inputs and comments, and there are now frequent TV adverts for lottery-like contests where, for instance, simply SMS-ing the word "house" to a particular cellular number earns the TV viewer a chance (for the price of a premium-rate call) of winning a new home.

But the fact is, many elements of TV interactivity do not require digital TV transmission into the home. Many interactive features – like the ones described above (e.g., Big Brother, Pop Stars, SMS interactivity) -- already exist in the analogue TV environment, because the return-path is via a telephony platform. Even high-end services like video-on-demand (VOD) don't need an end-to-end digital TV transmission environment. The Homechoice system used in the UK, for example, works effectively with analogue receivers and requires only an ADSL modem (using a phone line) and a set-top box (STB) for the return-path of communication between the viewer and the databank of programming. Another popular digital TV application, the personal video recorder (PVR) – which allows the viewer to pause and skip adverts in live programming – is not always contingent on an actual digital transmission coming into the home. Some basic models of PVR work with analogue feeds. And as UK research is showing, consumers are not necessarily attracted to the prospect of doing "everything" through their TVs. In the UK, consumers still prefer PC-based and telephony platforms for their return-path when they want to interact with information received on TV.

Some argue that South Africa, with much lower fixed-line telephone and Internet penetration levels than the UK and other richer nations, and with no cable-TV infrastructure, would be a good market for a wireless DTT return-path. This may be so, but it also seems likely that some of the key return-paths for interactive TV in South Africa will have to be platforms (packet-based or Internet Protocol (IP)-based) that are accessible through cellular handsets – platforms that will work in both analogue and digital TV environments.

7. Transmission Costs

A huge operating cost for the terrestrial broadcasters --SABC, eTV and M-NET terrestrial -- is the monthly bill they pay Sentech to transmit their signals around the country in analogue. Transmitting digital terrestrial TV (DTT) signals requires less power than transmission of analogue, meaning that the SABC, eTV and M-NET could reduce their transmission costs with DTT. This cost-efficiency is one of the key arguments put forward by Sentech in favour of terrestrial broadcasters going digital. However, it must be acknowledged that digital satellite DTH transmission is even cheaper than DTT transmission in terms of its ratio of cost for coverage area, providing automatic 100-percent coverage of the country (something a DTT system is not able to cost-effectively achieve because rolling out transmitters is not financially viable in remote, low-population areas). However, DTT transmission is still favoured over DTH satellite for coverage of most areas because of its greater interactive potential and because of the "sovereignty" concern posed by carrying TV signals (particularly public-service broadcast signals) via foreign-controlled satellites (an issue we consider later).

While there is no doubt that lower power usage and multiplexing make digital TV transmission (DTH or DTT) cheaper than analogue transmission, the difficulty with migration from analogue to digital is the high short-term transmission costs, because of what is known in the industry as the "double illumination" period. "Double illumination" refers to the years during which the broadcasters, in order to avoid losing viewers, have to transmit programming on both analogue and digital platforms. This period is required to allow viewers to gradually acquire and install the digital receiving equipment needed to migrate from analogue to digital. During this double illumination window, the SABC, eTV and M-NET will have to pay Sentech an even higher monthly transmission charge than the present one – to cover both analogue and digital. (Estimating this rise in cost is difficult because it depends on how many digital channels are multiplexed together, but presumably all five existing South African terrestrial channels (SABC 1, 2 and 3, eTV, and

M-NET) and even an SABC regional TV channel -- could be multiplexed together in one frequency, thus spreading the cost of digital transmission across five or six balance sheets. The other key cost variable is the length of the double-illumination period, which, based on the experience in other countries, is typically 10 years or longer.)

Thus, the "transmission cost savings" argument in favour of digital TV is a case of "short-term pain for long-term gain." For a pay-TV service such as M-NET, the pain (the double-illumination period) could perhaps be relatively short, because M-NET's largely high-income viewers could be expected to migrate over from analogue terrestrial to DTT relatively quickly. But migration of free-to-air SABC and eTV viewers can be expected, in the absence of a subsidy scheme, to take a full 10 to 15 years, given that many of these viewers will not be able to afford new equipment. The question then arises: where is the money going to come from to cover the cost of free-to-air broadcaster double illumination over a 10- to 15-year period? Neither the signal providers nor the free-to-air broadcasters are likely to have much spare cash during migration: the signal providers will have to invest in new DTT infrastructure, and the broadcasters will need to invest in new and unique content to offer as "digital-only" in order to lure viewers over to digital channels. That would leave the South African Treasury as the likely source of double illumination funding, i.e., through grants to Sentech (the corporatised state-owned signal carrier). As argued above, it is difficult to conceive of Treasury doling out funds for digital TV migration when it already appears to be hesitant to fund regional public television. Digital broadcasting would however offer a range of other applications, such as e-government, that might motivate the case for state support. That leaves the consumer as the likely subsidiser of double illumination, with the extra costs being built into the cost of digital pay-TV packages for those who switch over to digital – suggesting that it will be pay-TV players such as M-NET, and the spending power of well-off South Africans living in the country's "first economy," who will likely determine the pace and character of digital TV migration in South Africa. There does not, at present, appear to be any clear revenue stream to fund migration of free-to-air services.

> It is difficult to see where the funding will come from for analogue/digital "double illumination."

8. Licence Fee Collection

Currently, it is estimated that about 69 percent of South Africa's TV-viewing households possess an SABC TV licence, which is a legal requirement for TV use in the country (SABC, 2003d: 29) This is a significant improvement on the estimated 48 percent payment rate in 1998, but it still represents a serious financial constraint for the SABC, which currently gets little in the way of state support and has to rely on advertising and sponsorship to cover over 70 percent of its costs. Getting the licence-fee payment rate closer to 100 percent would probably increase the SABC's overall revenues by a useful 5 percent (data derived from SABC, 2003d: 29). Promoters of migration to digital TV often point to the advantage that digital conditional access (CA) systems offer for collection of user fees. CA systems, programmed into set-top boxes (STBs) or built into TVs, are used by pay-TV companies to restrict viewing to households whose STBs or sets are enabled (e.g., via "smart cards") to decode (or "decrypt") transmissions. If a customer's subscription lapses, the conditional access can be cut off, with each customer having a unique identifier in the CA system. Such a system allows for precise tracking of payment and non-payment -- a perfect method, say digital TV advocates, through which the SABC could ensure that each of its viewing households pays the licence fee.

The flaw in this argument is that CA systems do not need a digital TV transmission platform to function. South Africa's M-NET pay-TV service, started in the mid-1980s as one of the world's first encrypted conditional-access services, uses an analogue (not digital) terrestrial transmission platform. Thus, the SABC does not have to go digital in order to institute a conditional access (CA) regime and generate more licence fees. The real barriers preventing the SABC from going for CA are the possibility of driving viewers away – to eTV, for instance – and, more importantly, the contradiction such a system would pose to the "Universal Service and Access" provision in the SABC Editorial Policies (SABC, 2003a). Would it be justifiable for low-income people to lose access to free-to-air public-service broadcasting services because of their inability to pay? If such a situation were to arise, the SABC would likely find itself in the same situation as the likes of Johannesburg Water or the national electricity parastatal Eskom, at loggerheads with low-income residents over a pay-as-you-go system for an "essential service."

9. Citizen Access

Citizen access is perhaps the thorniest issue in the digital TV debate in South Africa. It is this access dimension that provides some of the most powerful reasons for a cautious, phased approach to migration of free-to-air TV over to digital platforms.

Notions of universal service and access, or "universality," are typically brought to bear on sectors such as health care, education and essential services including water, electricity and phone service. In the field of telecommunications, the universality concept was initially used to apply to the provision of fixed-line voice telephony, or "basic voice." Today, we see the universal access paradigm applied to a wide array of communications and information services, with the definition of basic access varying from country to country. In countries such as South Korea, for instance, there is a push for "universal broadband." In the UK, as outlined above, there is the push for an "On-line Britain," in which all citizens can make use of interactive services. In South Africa, communications universality was until recently seen in terms of access to fixed-line voice services. But the massive growth in cellular-phone usage in South Africa, coupled with a stagnant fixed-line sector, has muddied the issue in the telecommunications sphere.

In South African broadcasting policy, the notion of universality has been present for many years, and it was concretised in 2003 when the SABC was compelled, in terms of the Broadcasting Amendment Act of 2002, to develop a set of Editorial Policies. At the time of public input into the Editorial Policies, not much was said about the Universal Service and Access Policy. But the SABC's Universal Service and Access Policy, adopted in 2003, makes for interesting reading. In tandem with the SABC's Language Policy adopted in the same year, the Universal Service and Access Policy obliges the public broadcaster to promote universality in a multifaceted way. The two policies make it clear that universality in broadcasting is about more than just the SABC "making its services available throughout South Africa." The services must also be affordable and, the policy points out, must satisfy the 1998 Broadcasting White Paper's call for services that "recognise the special character of language broadcasting." The Language Policy specifically says that programming "must strive to reflect the needs of each language community" (SABC, 2003a: 35-38, 26).

> **The SABC is bound by its Universal Service and Access Policy to ensure affordable reception.**

Based on these SABC Editorial Policies (Universal Service/Access and Language), it is possible to extrapolate a kind of "citizen access test" for free-to-air broadcasting, with three central components: signal coverage, affordability and home-language provision. At present, it is fair to say that South African free-to-air TV fails this "access test" on all three grounds:

- **Signal Coverage**: about 9 or 10 percent of the adult population does not have access to a free-to-air terrestrial TV signal, because the terrestrial signals do not reach the places where they live

- **Affordability**: about 40 percent of households do not own a TV set

- **Home-Language Provision**: home-language speakers of languages other than English are poorly served by TV programming, particularly speakers of Xitsonga, Tshivenda, siSwati and isiNdebele.

The question then emerges: What are the likely impacts of migration to digital terrestrial television (DTT) on these three elements of access to free-to-air broadcasting?

9.1 Signal Coverage

The two free-to-air TV channels with the widest terrestrial analogue coverage in South Africa -- SABC 2 and eTV -- are available to about 90 percent of South Africans. Households living in these coverage areas are able to consume these channels with even the most basic analogue television (including old black-and-white sets) equipped with a traditional reception antenna sitting on top of the TV set or on the roof of the house.

Extending terrestrial TV signal coverage to the territory inhabited by the remaining 10 percent of South Africans (about 2.9 million adults, based on an adult population estimate of 29 million), is extremely difficult using analogue transmission because of economies of scale: these un-served people typically live in low-population-density areas with low per-capita incomes and low levels of electrification and TV ownership, making it uneconomical for the signal provider (Sentech) to roll out transmission infrastructure to these areas, and uneconomical for the broadcasters to pay for transmission into these zones. The ratio of increased expenditure to increased viewing households is not favourable. As the SABC puts it in its Universal Service and Access Editorial Policy, "a huge investment in infrastructure results in reaching only a very few people, or provides a social but not a financial return" (SABC, 2003a: 38). Digital terrestrial (DTT) transmission, while cheaper to transmit, poses the same problems as analogue terrestrial in terms of transmission infrastructure roll-out. Capital expenditure on DTT will not be significantly more economical – in terms of the ratio of increased viewership to expenditure on new

transmitters – than the existing analogue transmission network. In fact, in the short-term, DTT would, in the absence of government subsidy, be even more expensive for each household to consume. Each user would have to acquire a set-top box or digitally-enabled TV, and probably a new aerial too.

By far the cheapeast way to reach these outlying areas and achieve 100-percent coverage – from the point of view of the signal provider and broadcaster – is digital satellite (DTH). As outlined earlier, there is already a free-to-air DTH platform -- Sentech's Vivid system -- covering the entire country. All four free-to-air channels are available via Vivid, provided the consumer has a set-top box and a satellite receiver dish. So, universal coverage of free-to-air TV signals already exists, via a combination of analogue and DTH. The reality is: the real barriers to TV signal access are the dynamics of rural development (e.g., electrification levels) and affordability. Many households don't have the money needed to buy TV sets, let alone dishes and decoders, and even if they did find the money for these items, they often wouldn't have access to a reliable electricity supply needed to power these devices – a situation symptomatic of life in the "second economy," the underdeveloped tier that challenges all of South Africa's social development efforts. (We take up the issue of "affordability" more in the next section.)

Assuming people in marginalised areas had the electrification and resources necessary to make use of the existing Sentech Vivid free-to-air DTH satellite platform, there is, however, another concern often cited about using DTH systems to universalise signal coverage – the issue of "sovereignty." Sentech and Orbicom lease their satellite capacity from foreignowned (US and European) satellite firms. Some say South African broadcast signals, particularly the SABC's public broadcasting service (PBS) channels, should not be reliant on foreign-controlled satellite transponders for distribution. However, this argument is not particularly strong, because, as the SABC recently pointed out in its application to ICASA for regional TV licences (SABC, 2003c), even Sentech's so-called "terrestrial" analogue transmission systems make use of satellites to "hop" the signal between transmitter sites. Thus, it can be argued that South Africa's sovereignty is already compromised by the makeup of Sentech's mixed terrestrial/satellite network. To be fair, however, it is probably true that South Africa can better control information flows inside its borders by maintaining a significant terrestrial signal distribution infrastructure – analogue or DTT or both -- rather than increasing its reliance on satellite to get broadcast signals to the end-user. For

> Lack of rural electrification presents a barrier for both analogue and digital.

instance, there have recently been two "pirate" TV broadcasters – "Don't Panic TV" and "Otherchoice" – found illegally distributing services in South Africa via DTH satellite (ICASA, 2004).

9.2 Affordability

As mentioned above, a key South African TV access dilemma – along with rural electrification shortfalls -- is affordability. The SABC Editorial Policy on Universal Service and Access says programming must be "delivered via the most appropriate technical means available at an affordable price to broadcasters and audiences alike" (SABC, 2003a: 38). Thus, technological choices must balance the affordability for both broadcasters and viewers. In terms of affordability to broadcasters, DTH is currently the cheapest transmission technology, followed by DTT (once the analogue/digital double illumination period is over). Though given the "sovereignty" argument mentioned above with regard to DTH reliance, perhaps DTT is favourable in the long-term for free-to-air, particularly public-service free-to-air.

However, in terms of the other half of the affordability test – affordability to audiences/viewers – both digital platforms (DTH and DTT) are problematic in the short-term. As the SABC puts it, "the key question is whether these advances in technology will help us to deliver affordable public broadcasting services, or merely add to the inequality in provision of services and widen the digital divide" (SABC, 2003a: 36). The SABC correctly points out that in the short-term, digital TV platforms do not pass the affordability test – because both DTH and DTT require the consumer to purchase new or additional reception equipment.

It must be said that this situation is likely to change in the years ahead. If DTT is indeed a "killer application," as it is being hyped in Europe, then the cost of digitally-enabled TVs and DTT set-top boxes will continue to drop significantly. Since 2002, the cost of the most basic DTT set-top box in the UK has dropped by half (from R1200 to R600), driven down by customer take-up of the new Freeview DTT (BBC/Sky) service. The safest course of action for South Africa will be to wait until sufficient economies of scale are reached in the European and global digital TV markets before positioning digital TV as an affordable free-to-air access tool for all South Africans. In the meantime, where government funding or other subsidy is available for TV access projects – e.g., at Multi-Purpose Community Centres (MPCCs), telecentres and schools – DTH satellite can be used, with free dishes and decoders provided. (The Mindset distance education project is an example of just such a DTH initiative.)

9.3 Home-Language Provision

The third part of the "access test" proposed above is home-language provision. At present, only about 50 percent of SABC 2's programming is either bilingual (through subtitling), or in Afrikaans, or in a Sotho dialect, with the other 50 percent in English. SABC 1's non-English percentage is even lower, sitting at about 30 percent (in Nguni dialects). Meanwhile, SABC 3, the public broadcaster's "public commercial" service, is 100-percent English (SABC, 2003d: 66). The private-commercial free-to-air service, eTV, is almost entirely in English.

Though the SABC's non-English provision on SABC 1 and 2 has improved over the past year and a half – with TV news bulletins now available in all 11 official languages – there is a recognition that more has to be done to provide South Africans with TV programming in the languages of their choice. According to the 2001 Census, only 8.2 percent of South Africans identified English as their home language, with 23.8 percent speaking isiZulu at home, 17.6 percent speaking isiXhosa, 13.3 percent Afrikaans, and so on (OMD, 2004). One explicit purpose of the 2002 Broadcasting Amendment Act's call for new SABC regional television (RTV) services was to increase the provision of TV programming in the 10 official languages other than English.

But to ensure increased non-English home-language TV consumption, the SABC has to take into account the existing correlation between home language and income. South Africa's main audience segmentation system, the Living Standards Measure (LSM) developed by the South African Audience Research Foundation (SAARF), reveals that low-income South Africans (in LSMs 1-5 on a scale of 10) are more likely to speak a language other than English as a home language. In other words, English home-language speakers are on average wealthier than non-English home-language speakers. SABC's audience figures correspond with this finding. The SABC's non-English radio services have lower-LSM audience ratings than its English channels. In TV, the two SABC services that have non-English content, SABC 1 and 2, draw larger lower-LSM audiences than the all-English SABC 3 and the predominantly-English eTV (SAARF, 2003).

An SABC language study in 2001 found that most South Africans are willing to consume international entertainment programming in a non-home language (i.e., English), but people want to consume news, local sport, local drama and religious programming in their mother tongues (SABC, 2003c: 31).

Based on this language study and on the LSM statistics, the SABC argued in its December 2003 regional television licence application that analogue TV transmission would be the most effective way to achieve the language mandate of regional public television. The SABC wrote that "One must consider the policy driver for public regional television services is access to information, both of a national and regional form, to communities currently under-serviced, in particular with respect to language....End user cost is therefore a critical factor for the successful delivery of information to these communities, and hence analogue, as the cheapest and most established platform, is best suited to achieving these policy aims" (SABC, 2003c: 39). The SABC essentially argues that any platform that increases the cost of reception to the viewer (i.e., requiring the purchase of a digital aerial/dish and STB) will disproportionately affect non-English-home-language speakers.

Sentech disagrees with the SABC on the issue of DTT usage for regional television, arguing that DTT can increase multilingual access by allowing for the bundling of translated versions of programming into the digital multiplex, thus allowing for more voice-dubbing and subtitling options at no extra transmission cost.

The regional TV debate has exposed the divergence of views between the SABC and Sentech on digital TV. Sentech sees the launch of new regional SABC TV services as the perfect opportunity to begin DTT migration, while the SABC is hesitant.

10. The Way Forward

We support the industry lobby SADIBA's call for a phased approach to migration – an approach that first gives the high-end subscription DTT market a chance to develop in metropolitan areas, followed in the second phase by attempts at full national migration of free-to-air TV services, including public-service broadcasting.

We agree with SADIBA's suggestions that certain initial steps need to be taken by the government and the regulator ICASA to enable commercial entry into the DTT market.

One such step would be the adoption of a technology standard for DTT in South Africa – a standard to be used by operators wanting to roll out commercial services. The obvious choice is the Digital Video Broadcasting (DVB) standard for DTT, known as the "DVB-T" platform. This standard is compatible with the digital satellite (DTH) platform used in South Africa by Orbicom and Sentech, which is "DVB-S." As well, these two DVB standards have been widely adopted in Europe, which falls in the same ITU frequency-planning region (Region 1) as South Africa. At the ITU RRC-04 meeting in Geneva in May 2004, DVB-T was approved as the Region 1 standard.

In terms of operators, international experience suggests there will be three main types of players in South Africa's digital TV sector:

- *Network/infrastructure operators* – a category that would include the existing broadcast signal distributors (e.g., Sentech, Orbicom) and also other possible deliverers of audio visual signals, including, for instance, telecommunications firms (e.g., Telkom, the Second National Operator, the cellular companies);

- *Multi-channel/multiplex operators* -- a new type of entity lying between the network operator and the content providers; and

- *Content providers* – a broader category of operator than the traditional "uni-directional" broadcast firm, these content providers "aggregate" various content services, including two-way content applications such video-on-demand and other interactive services.

There seems to be consensus that the network/infrastructure operators and content providers need to be individually licenced in the digital TV environment, but there is debate as to what kind of licencing, if any, the multi-channel/multiplex service providers need to be subjected to.

Creating this kind of "horizontal" licensing regime – a key element of a converged communications environment – is potentially made difficult in South Africa by the "Multimedia" and "Carrier of Carriers" licences awarded to Sentech in 2002. These telecommunications licences, which have been the source of much confusion and interpretation, potentially give Sentech many of the rights of a content provider and multi-channel/multiplex operator (on top of its traditional role as a network/infrastructure operator), thus giving Sentech a high degree of potentially anti-competitive "vertical integration" in the digital broadcasting environment. Also impacting the evolution of South Africa's digital TV regulatory regime will be the outcome of ICASA's Inquiry Into Subscription Broadcasting (started April 2004), and ICASA's Review of Signal Distribution (scheduled to begin in late 2004). As well, there is the DoC's Convergence Bill process, begun with a draft bill in late 2003, which can also be expected to influence digital TV regulation. (But these regulatory complexities are not the focus this paper.)

We support ICASA's decision in late 2003 to begin setting aside DTT multiplex frequencies in its Terrestrial Broadcast Frequency Plan, provided that ICASA works effectively with the DoC and industry players to refine South Africa's DTT allocations for submission to the ITU in February 2005. It may be necessary for ICASA to review its decision to set aside two DTT frequencies throughout the country. In some metropolitan areas, it may be necessary to reserve only one DTT multiplex (capable of carrying six channels) in the short-term, thus enhancing analogue frequency availability during the beginnings of the "double illumination" period.

We also agree with the industry grouping SADIBA and other stakeholders that government should not designate a rigid analogue "switch-off" date, but rather a gradual migration strategy. Evidence in European markets has shown that "absolute" switch-off dates inevitably have to be revised and end up becoming overly politicised -- and consequently embarrassing to governments and politicians. As SADIBA puts it: "Merely setting an analogue switch-off date without ensuring that the consumer benefits through better, cheaper, more compelling services, is likely to lead to resistance, which could jeopardise the entire process" (SADIBA, 2002: 92).

Whatever the measures are that government and ICASA decide to take, the measures must be based on cognisance of the fact that, in the short- to medium-term, it is likely that the precise direction of digital TV in South Africa – and the mix of technological solutions to be employed – will be guided by many factors beyond South Africa's control. For example, a

key factor will be the cost of DTT transmission and receiver infrastructure, which will largely be determined by the success of DTT take-up in overseas markets. In another three or four years, South Africa may potentially be able to "leap-frog" into a digital TV era made affordable (to broadcasters and consumers) by European economies of scale. The degree to which these economies of scale will be satellite-based or terrestrial, wired or wireless, DTT or cable, remains to be seen. And the degree to which the cellular handset may become the dominant TV return-path for interactivity is also difficult to predict. For the next few years, South Africa needs to continue to let richer overseas markets serve as the "test cases" for "analogue switch-offs," national DTT roll-outs and other aggressive digital broadcasting migration strategies, while South Africa focuses on improving delivery of other more basic services -- such as electricity, without which TV services of any sort will always have only a limited reach.

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