

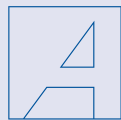
**DIGITAL TERRESTRIAL
TELEVISION MIGRATION
IN ZIMBABWE**

**CHALLENGES &
OPPORTUNITIES**

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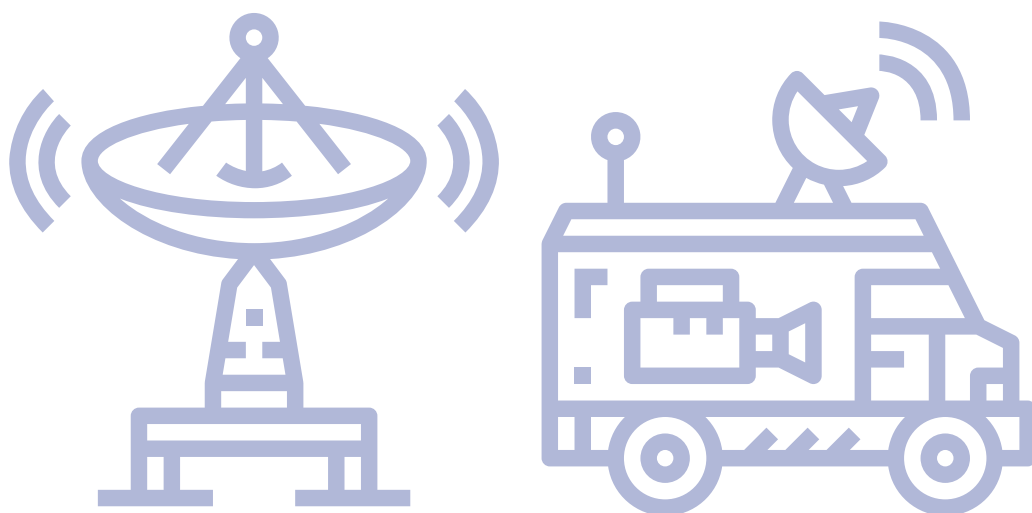


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Introduction



The international telecommunications union (ITU) set 17 June 2015 as the deadline to switch off analogue TV broadcasting in the UHF band. This was set by ITU member states at the Regional Radio Communications Conference in 2006 known as the GE06 regional agreement. SADC countries gave themselves deadline of June 2013 to migrate to digital transmission to allow each member state to sort out any challenges that might arise from the digital migration process before the June 2015 ITU deadline. The plan was to have dual illumination ie simultaneous transmission of both analogue and digital signals between June 2013 and complete analogue switch off (ASO) date of June 2015. Unfortunately SADC countries spent a lot of time failing to reach consensus on which terrestrial transmission standard to adopt only to agree on DVB-T2

standard in 2012 more than six years after the GE06 agreement.

SADC still could not reach consensus since Botswana went out of line with the rest of the SADC member states and adopted the Japanese standard, the integrated services digital broadcasting - ISDB -T standard.

June 2015 came and passed and very few countries in Africa had migrated to digital terrestrial transmission (DTT). In SADC only Mauritius, Namibia and Tanzania managed to complete the DTT migration and ASO by June 2015. ITU extended the ASO deadline to June 2020 for developing countries. The following is an analysis of progress of DTT migration of Zimbabwe and SADC countries.

DTT migration status in Zimbabwe

The Zimbabwe DTT migration is overseen by the Broadcasting Authority of Zimbabwe and Huawei Technologies as the technical partner. The DTT project started in 2015 and digital TV transmission has not yet commenced even as we approach the second ITU ASO date of June 2020. Funding has been the major drawback to the project completion. Most countries in the region and beyond employed a phased approach to DTT migration with great success.

Most countries started deploying DTT in the major cities and major populated settlement areas. Zimbabwe has so far spent USD 40 million on the project yet the whole country is still on analogue transmission. There is no clarity from the project managers on when dual illumination will commence. Emphasis is being put on infrastructure establishment as if the success of DTT migration depends on it when in reality success of DTT migration hinges on the following consumer issues:

- Set top box (STB) availability and affordability.
- Exciting content
- Consumer awareness and buy in.

Analogue switch off (ASO) should not occur before a sufficient number of consumers have acquired set top boxes.

Those countries that have successfully implemented DDT migration have kept the above at the centre of the DTT migration project. The DTT migration project is supposed to be a standalone project but in Zimbabwe it is intertwined with the revamping of the FM transmission network .

The following table shows progress made so far in implementing DTT migration .

Table 01

DTT project status in Zimbabwe March 2019

TV coverage area	Project status
1. Harare	Complete DTT equipment has been installed, ready for transmission. Test running of equipment is on going
2. Head end	The equipment to multiplex TV signals from content service providers was installed at Pockets Hill Harare. Ready to provide the subscriber management system and any encryption where required.
3. Signal distribution equipment	The satellite uplink facility was also installed at Pockets Hill in 2015. Satellite transponder space was secured from Eutelsat at a fee of USD 1.2 million per annum. This equipment is critical. It distributes the TV services from content providers to the transmitter sites for transmission and reception by the end users. Most of the transmitter sites are not yet linked to the fibre network and satellite distribution remains the most reliable practical means for signal distribution. Equipment already in use in distributing FM signals to all FM transmitting sites

4. Pockets Hill Studios	The studios have been modernised to meet DTT requirements
5. Kotwa	New transmission tower has been constructed. DTT equipment has been installed and site ready for transmission.
6. Mudzi	Fully equipped and ready for DTT transmission. FM transmitters have also been installed
7. Karoi	Tower was refurbished and full deployment of DTT equipment has been completed
8. Chivhu	Tower was refurbished and the site has full set of equipment to offer DTT services
9. Mutorashanga	Ready to offer DTT services
10. Mutare	Full complement of equipment has been installed. Site ready for DTT. Test running equipment
11. Nyanga	Full complement of DTT equipment installed and ready. FM transmitters also installed
12. Chimanimani	Installation of DTT equipment completed site ready to offer services
13. Honde valley	New tower has been constructed. Equipment is yet to be installed
14. Buhera	Tower still in early stages of construction
15. Gweru	Full set of DTT equipment in place ready for transmission
16. Kadoma	DTT Equipment in place. Site ready.
17. Gokwe	Equipment in place ready for DTT
18. Siyabuwa –Chitekete site	New tower has been put up. No DTT or FM equipment has been installed
19. Zvishavane	New tower has been erected. No DTT equipment has been installed. Only FM services are currently on offer
20. Bulawayo	Site fully equipped with DTT hardware and ready . Test running the equipment
21. Montrose studios	The modernisation of the studio is not yet complete.
22. Lupane	The site at kenmaur has been equipped with DTT equipment ,
23. Kamativi	DTT ready

24. Gwanda	DTT ready
25. Binga	New tower has been constructed. No DTT equipment installed as yet but FM transmitters have been installed and radio services are available in and around the area
26. Hwange	New tower has been constructed. No equipment has been installed as yet at the site.
27. Thsolotsho	New tower still under construction
28. Chiredzi	Site equipped with DTT equipment and ready .
29. Chikombedzi	Transmission tower has been constructed and has not been equipped with DTT equipment yet. Only FM services have been introduced

Zimbabwean transmission network plan has 48 transmitter sites to cover the whole country, 24 backbone sites and 24 gap fillers. Seventeen backbone sites have already been equipped with DTT equipment and are ready to transmit digital signals. New towers have been constructed and completed at eight gap filler sites. At this stage, dual illumination should have been introduced in some of the TV coverage areas so as to stimulate TV viewers to acquire STBs. A portion of the USD40 million spent on the project to date should have been ploughed into STB acquisitions because STBs are central to DTT migration success. A further USD 103 million is required to complete the DTT migration for outstanding work in the following areas:

- Studios
- Transmission equipment
- Tower construction at gap filler sites
- Tower reconstruction of some old towers
- STBs
- Content generation support
- Public awareness

02

STB requirements and distribution in Zimbabwe

The DTT project coordinators requested 400 000 STBs to be procured for the project at a cost of USD 18 million in 2015 and no funds have been availed this far. There is no policy yet on the STB distribution yet it central to the DTT migration success. There must be positions or policies on the following issues.

Technical specifications of the STBs and integrated digital TV sets (IDTVs) cost of the STB and antenna set

- Who will do the distribution of the STBs
- Who will do the STB installations and servicing
- What will be the nature and scope of subsidy if any
- At what point of DTT penetration in the coverage areas do you switch off the analogue services

The 400 000 STBs requested is far less than the projected requirement given the number of TV households in the country. Zimbabwe has a population of about 14 million and about million households. According to the ICT 2014 survey 40% of the households have TV sets translating to more than 1.24 million TV sets in the country.

Table 02

Distribution of TV households by province ICT household survey 2014

Province	Number of TV Households
1. Bulawayo	160 758
2. Manicaland	124 610
3. Mashonaland Central	78 549
4. Mashonaland East	97 409
5. Mashonaland West	134 924
6. Matebeleland North	31 697
7. Matebeleland South	44 005
8. Midlands	121 650
9. Masvingo	81 694
10. Harare	420 952
TOTAL	1 296 248

Table 03

Distribution of TV households by land use ICT household Survey 2014

Land use Description	Number of TV households
1. Communal	232 344
2. Small scale commercial farming	5 496
3. Large scale commercial farming	33 602
4. Urban council areas	875 789
5. Administrative Centres	1 648
6. Growth points and mining areas	14 296
7. Small scale commercial farming areas (RS)	1 277
8. Large scale commercial farming areas (RS)	19 414
9. A1 farms	60 744
10. A2 farms	30 237
11. Old resettlements	21 400
TOTAL	1 296248

The tables 02 and 03 above should inform policy on STB distribution and access. There may be more TVs than recorded in urban areas where you find more than one family sharing the same house and each family having its TV set. STB distribution must be done quickly so that most of the viewers have the gadgets in the shortest possible time before the analogue services are switched off. Dual illumination is a costly exercise, eg it cost Sentech the signal distribution company in South Africa R150 million per annum to do simulcasting.

Consequently delaying ASO will be costly and undesirable given the country's constrained resources.

03

DTT migration in South Africa.

- Sentech was mandated by government to begin work on migrating the country's broadcasting infrastructure in 2006.
- Sentech received R 100 million for the project in 2006
- Simulcast or dual illumination commenced in 2006
- 2009 the broadcasting digital migration policy and implementation plan was completed. The technical specifications of DTT set top boxes and plan to subsidise 5 million households was put in place
- 2010 the director general of communications threw confusion to the project by advocating for change of technology from the European DVB-T standard to the Japanese ISDB-T standard. There was strong opposition from Sentech and M Net who had successfully carried out DVB-T trial transmissions to their satisfaction. Going ahead with adoption of the Japanese standard would throw away all the DVB-T infrastructure investments that had been put by Sentech and M Net, as well as all the progress made then to manufacture set top boxes in SA.
- In 2011 government confirmed that it was going ahead with DVB-T2 technology. New standard meant the regulator, Independent Communications Authority of SA ICASA had to revise the DTT decoder specifications to include DVB-T2 technology.
- 2010 -2012 Universal Services and Access Agency of SA- USAASA was given R86 million to fund capacity building for the set top box subsidy system.
- By end of 2012 Sentech had 63% population coverage of DTT transmission and 25% geographic coverage.
- Some parts of SA have already undergone analogue switch off -ASO. This includes Square Kilometer Array community in the Northern Cape and Free State.
- Cabinet set July 2020 as date for complete analogue switch off - ASO.
- Mnet a private player has already completely switched off analogue transmitters

04

South Africa's DTT Project Expenditure 2006-2016

The DTT migration project is one of the largest and most expensive public infrastructure projects ever undertaken in South Africa. The following is expenditure breakdown of the DTT migration components.

Table 04

South Africa DTT rollout expenditure:

Organisation	Activity	Cost (Rands)
1. Sentech – Signal Carrier	i) Rolling out digital transmission network	1.94 billion
	ii) Dual illumination	330 million

2. Universal Service and Access Agency of South Africa- USAASA	i) set top box subsidy scheme ii) capacity building for subsidy scheme	1.5 billion 86 million
3. SABC- public Broadcaster	i) DTT pilot project ii) Content, broadcast facilities, dual illumination iii) Digital library and digital play out centre iv) DTT awareness campaign	30 million 1.9 billion 203 million 140 million
4. Department of Communication	i) Awareness campaign ii) Travel and subsistence	756 million 5.7 million
5. USAF	Set top box subsidy scheme	1.48 billion
6. Independent Communication of south Africa- ICASA	DTT regulation expenditure	110 million
	TOTAL	8.48 billion

The project cost R8.48 billion from 2006 to 2016. A further R861 million was set aside for USAASA during the 2016/17 and 2017/18 financial years and SABC was allocated another R68 million for the digital library and play out centre.

NB: expenditure on DTT project to date is well over R10 billion including 2019/2020 budget allocation

05

Subsidised STB program in SA

The success of DTT program hinges on consumers having appropriate gadgets to receive the digital TV signal. Consumers should have either a decoder called set top box or television sets with decoders imbedded in them ie integrated digital TV sets IDTV. IDTVs are still very expensive with lower end brands still costing more than USD 300. Top end brands go for up to USD 1000. The IDTVs will in the long run replace the STBs as the prices eventually come down. Consequently DTT signals will mostly in the meantime be accessed using STBs. All these so called digital TV sets on the market do not receive the DTT signal. The appropriate TV sets should have specifically DVB-T2 decoders integrated in them to receive the DTT signal. SA has about 13 million TV households and the government put up policy to give 5 million free STBs. Qualifying households should meet the following criteria:

- must be South African citizen
- household should have combined income of less than R3 200-00 per month
- should be on social grant
- should have functioning TV
- household should already be covered by SABCs concessionary TV licence scheme
- must be South African living around the border
-
- Consequently those earning more than R3200 should purchase their own STBs.

To qualify for free STB, households register at the nearest post office and provide the following documents

- proof of South African citizenship
- proof of physical address, municipal bill, bank statement, retail account etc
- proof of TV ownership

06

STB Control

The government needs mechanisms to protect the free 5 million STBs it will issue to its citizens. This also ensures that consumers will not be forced to have several STBs to receive signals from each free to air service providers.

The control system should have the following :

- it should not have conditional access system or encryption of the signal to control access to content by viewers
- should have security features to encourage local electronic manufacturing sector
- the STB must have minimal switching on/off security features to protect the subsidised STBs from theft or leaving the South African borders
- must have capabilities to enable the provision of government information and service

07

DTT migration in Zambia

Zambia had a phased approach to the DTT migration. It has 95 transmission sites to cover the whole country. By December 2018, 90% of the DTT migration work had been done. The government secured a loan of USD 273 million from China to cover the digital migration process.

- Phase 1- has 7 sites along the main railway line that runs from Chililabombwe to livingstone at a cost of USD 9.5 million
- Phase 2 –second phase of the project included the following:
 - construction of six TV studios at all provincial centres
 - transmission and other attendant equipment at the six provincial centres
 - 64 transmission sites to cover the length and breadth of the country
 - Phase 3- covers remote sites

NB Areas where landscape can not allow for DTT deployment will be covered by satellite

08

Analogue Switch Off progress

- In October 2017 all the analogue transmitters along the main railway line were switched off
- Most of the country's analogue TV transmission was switched off by December 2018
- Only five districts are yet to be switched off

09

STB distribution

- Consumers buy their own STBs
- No free STB program

-Signal distributor, TopStar putting mechanisms to stimulate STB acquisitions by consumers to ensure all households own an STB in time for ASO. In August 2017 TopStar discounted STBs from 199 kwacha to K99 and record sales were achieved. Five hundred thousand STBs were sold in a single day as a result. TopStar has STB distribution centres dotted throughout the country .

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DTT migration in Namibia

- DTT budget was N\$ 350 million (approx. USD 25 million)
- 58 transmitter sites to cover the country
- Country has a population of about 2.2 million and about 800 000 households
- 260 000 TV households in the country
- The DTT gaps are covered by satellite DTH – direct to home

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STB distribution

- Distribution of STBs open to any company
- STBs subsidised from about N\$ 1000 to N\$199
- N\$99.50 for pensioners war veterans and disabled
- Requirements to purchase decoder; current TV licence, ID document, proof of special status to qualify for half price.

12

DTT migration in Tanzania

- Was among the pioneer countries to migrate to DTT in Africa
- Completed DTT migration in 2012
- Commenced staggered ASO in 2012

Phase 1- involved 7 cities, Dar Es Salaam, Mwanza, Arusha, Moshi, Dodoma, Tanga and Mbeya

Table 5

Tanzania phase 1 Analogue Switch Off Dates

Broadcast service area	Analogue switch off date
1. Mbeya	30/04/12
2. Dar Es Salaam	31/12/2012
3. Dodoma and Tanga	31/01/13
4. Mwanza	28/02/13
5. Moshi and Arusha	31/08/2013

Phase 2 involved 7 cities , Kigoma, Morogoro, Tabora, Sugwida, Musoma, Bukoba and Kahama

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ASO Criteria employed

- Analogue TV service area should be well covered with digital TV signal
- Public awareness campaign on DTT migration adequately done
- Availability of STBs
- Tax exemptions of STBs to ensure affordability

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Key Success Factors in DTT migration

- Effective awareness campaign
- Effective regulatory environment
- Subsidies to enable consumers to acquire STBs and IDTVs
- Tax exemptions on STBs and IDTVs

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DTT migration in Mauritius

- Was first African country to fully digitise TV broadcasting for all regions and Islands in 2007 Initiated DTT migration process in 2005. Its first digital services consisted of 6 free to air channels 2 digital channels were launched in 2008 to speed up consumer purchase of IDTV sets and STBs
- Full analogue switch off was completed in December 2013
- To speed up uptake of STBs and IDTV sets subsidies were put in place
- Introduced attractive content eg 24x7 movie channel
- Penetration increased from 30% to 50% in 6 months
- Penetration was more than 75% by end of 2010

Regional Comparative Analysis of DTT Migration

The cost of DTT migration varies from country to country depending on size of country and population distribution patterns. Small countries like Malawi, Lesotho, Swaziland, Madagascar and Mauritius can easily be covered by a few transmitting sites. Malawi has only 8 transmitter sites deployed throughout the country and achieving about 48 % geographic coverage and reaching more than 80% of the population. Malawi only introduced analogue TV transmission 21 years ago in 1997. Botswana and Namibia have large land areas but have very small populations scattered throughout the countries. Most of the land is vast expanse of desert with no habitation.

South Africa, Zambia and DRC have relatively large DTT budgets because of the size their land areas. Most countries in SADC employed phased approach to DTT migration. They simultaneously rolled out STB distribution with transmission equipment deployment. Zimbabwe has so far fully equipped 17 backbone sites with DTT equipment and erected towers at 8 gap filler sites but still no DTT services are available to the consumers because of unavailability of set top boxes. Establishment of DTT infrastructure should have been synchronised with STB access and availability. It is of no benefit to roll out DTT infrastructure without

STBs. STB distribution must be done as early as possible to gather enough momentum of consumers' desire to acquire the gadgets. Slow uptake of STBs will result in longer periods of dual illumination and that

will be costly. To speed up uptake of STBs the government must subsidise the STBs but given the prevailing economic situation the Zimbabwean government may have no capacity to do so since STBs are imported. Switching on the already installed DTT equipment will serve no purpose when viewers do not have receive gadgets.

Exciting content is also key to consumers' desire to acquire STBs. Botswana and Swaziland are having challenges of low STB uptake because consumers feel content is not exciting. There is therefore need for governments to heavily invest in the production of exciting local content.

Table 06

Comparative DTT budgets for SADC countries

Country	DTT Budget USD	Comment
1. Zimbabwe	142 million	40 million USD disbursed so far. No policy on STB distribution yet. No DTT services available about a year before the ITU June 2020 ASO date.
2. South Africa	650 million	Provided 5 million free STBs to poor households. STBs are subsidised for the rest. Will most likely meet the ITU June 2020 ASO deadline
3. Malawi	5 million	Is reaching more than 80% of population. Have already achieved ASO. Country had few analogue transmitter sites since it only introduced TV services as late as 1997

4. Zambia	273 million	Subsidised STBs to about 20USD, Secured a loan from China to implement DTT project
5. Namibia	25 million	Completed DTT migration in 2015 and ASO has been done throughout the country. STBs were heavily subsidised from N\$1000 to N\$199. Remote areas covered by satellite
6. Botswana	19 million	No subsidies and no tax relief for STBs. Botswana chose DTT standard different from the rest in SADC. Went along with ISDB-T the Japanese standard. Have challenges of low uptake of STBs due to unexciting content. Has achieved 85% coverage and will cover remote areas using satellite
7. Swaziland	13 million	Swaziland is a small country. Whole country can be covered by a few transmitter sites, Have already-achieved ASO. Subsidised STBs by 63%. Having challenges of low uptake of STBs and local content production

Table 07

Analogue switch off dates (ASO) of SADC countries

Country	Targeted complete ASO date
1. Lesotho	completed
2. Malawi	completed
3. Mauritius	completed
4. Swaziland	completed
5. Tanzania	completed
6. DRC	2019
7. Zambia	2019
8. SA	2019

9. Madagascar	2020
10. Botswana	Date not defined
11. Mozambique	Date not defined
12. Zimbabwe	Date not defined
13. Namibia	completed
14. Angola	Date not defined

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Digital Dividend

Digital dividend refers to the frequency spectrum that is released after the digital terrestrial television transmission migration is completed.. Digital television transmission requires less spectrum than analogue transmission. This is because digital television transmission deploys compression technologies that enable transmission of numerous TV channels on the same frequency spectrum occupied by one analogue channel. DVBT-2 standard can transmit up to 20 standard definition television channels on the same frequency space used by one analogue TV channel. The frequency bands that are going to be released after complete migration to DTT are 698-790 MHz and 790-862 MHz frequency bands referred to as digital dividend 1 and digital dividend 2 respectively.

The following countries in SADC have already authorised use of the spectrum 790-862 MHz for mobile broadband.DRC

- Lesotho
- Madagascar
- Mozambique

- South Africa
- Swaziland
- Zimbabwe

Zambia, Botswana and Mauritius are yet to authorise. Zimbabwe is currently transmitting its analogue TV services in the VHF band 175-230 MHz. It has no TV transmission in the UHF band so there is nothing to rearrange and reassign. Implementation of the digital dividend is as easy to roll out.

In 2014 the government of Zimbabwe offered mobile network operator Netone the digital dividend spectrum at a discounted price of \$200 million to fund the DTT migration project. The \$200 million charged Netone would have been adequate to meet the \$142,9 million that was required for the project through an off budget facility.

Netone failed to raise the \$ 200 million and in 2016 government started looking for new buyers. The spectrum has still not been sold to date. There is no clarity on how the spectrum will be sold. Other countries worldwide auction the spectrum to derive

maximum value from it. Consequently the DTT project to date has only relied on funding from the fiscus and hence continuous failure to meet project implementation targets.

South Africa commissioned financial services firm Deloitte to conduct a study on the use of the digital dividend. The study was to determine social and economic benefits of using the spectrum either for mobile broadband services or broadcasting services taking into consideration future spectrum requirements for 3DTV , SHDTV etc.

Deloitte concluded the following:

- Spectrum must be used for mobile broadband
- valued the frequency spectrum at R3.5 billion.

The digital dividend frequency spectrum is ideal for mobile broadband because it is lower than the current mobile broadband spectrum and requires fewer

base stations to cover the same geographic area. This lowers deployment costs and allows mobile operators broader more affordable rural coverage.

Giving people access to internet is high priority for governments. The economic benefits of broadband combined with a range of opportunities to enhance social wellbeing in healthcare, education and all sectors of the economy mean that affordable and equitable access to broadband is a political imperative. Achieving this goal breaks down the rural urban digital divide.

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Social , educational and cultural value of digital dividend

The value of the digital dividend cannot always be expressed in financial terms. The economic value also referred to as private value is the value the end consumers place on the services minus the cost of producing the service. The social, educational and cultural value is a value that is not directly reflected in the value of the service to the consumers. The social, educational and cultural value is also referred to as external value. There are several sources of external value as follows:

- educated citizens
-
- sustainable development
-
- informed democracy
-
- cultural understanding and exchange
-
- belonging to a community
-
- access and social inclusion
-
- quality of life
-
- health public services

Two services are generally perceived as being the most strongly associated with external value.

Television particularly public broadcasting

Broadband access in rural areas – like telephony or TV governments are considering more and more broad band access to the internet as crucial in people's social inclusion and educational development.

Table 8

Evaluation of sources of external value associated with digital dividend

Social value	Digital terrestrial transmission	Wireless broadband
1. citizen education	**	***
2. cultural exchange	**	***
3. social inclusion	*	***
4. sustainable development	*	**
5. regional development	**	***
6. health public services	*	***
7. competitive advantage	***	***
8. research and development	**	***

Key: extend of social value is rated between zero and three stars. Zero= negligible or no value. *** = significant positive social value

19 Implications of DTT migration on broadcasting and communications industries in Zimbabwe

The DTT migration brings the following benefits and opportunities to the industry:

- Good quality clear picture which enhances viewing pleasure
- Shortage of spectral space has been used as an excuse to deny new players in the broadcasting industry. DTT creates plenty of spectral space and there is no more reason to shut out new entrants
- More players imply diversity of content and opinions, market competition and innovation depending on composition of the new players
- Plurality of players creates demand for local content production, and this galvanises local film industry and local content producers
- There is great opportunity for empowerment of youths through installation, distribution and servicing of STBs
- There is scope for broadcasters and operators to offer new services that generate new revenue streams such as:
 - Pay TV services through conditional access (CAS)
 - Data services eg weather services, stock markets, enhanced teletext etc
 - New reception modes possible with DTT eg mobile TV
 - Ancillary services can now be offered eg electronic program guide EPG

- Interactive services possible if STB has an Ethernet port and viewer is connected externally to internet
- There is wider choice of TV programs
- People with hearing disability now able to use subtitle feature of STB to enjoy their viewing experience
- People with visual impairment can use the audio description of picture function on STBs (not all STBs support the function)
- DTT will bring viewing convenience eg catch up services that allow users to watch programs at times of their choice
- DTT enhances better profitability than analogue services because cost/service is lower
- Release of spectrum in the frequency band 790- 862 MHz ie digital dividend allows telecommunications players to offer mobile broadband in rural areas at lower cost thereby bridging the digital divide between the rural and urban populations.

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Policy proposals

STB policy- the DTT migration project must be consumer centred and not infrastructure centred. There is need for policy to make STBs available and affordable. There is need to subsidise the STBs and the nature and level of subsidy must be clearly stipulated.

There must be policy positions on:

1. Who will do the sourcing and distribution of the STBs
2. Structured training of STB installers as a youth empowerment program
3. Technical specifications of the STBs and integrated digital TVs IDTV sets must be put in place to avoid dumbing of substandard gadgets into the country
4. There must be mechanisms to enforce quality controls of the STBs / IDTVs, and receive antennae.
5. Interoperability of decoders to protect viewers from having to buy separate decoders to access services from different service providers.
6. There must be proper communication strategy on consumer awareness and preparedness through all media platforms ie electronic, print, road shows, talk shows, outdoor advertising , jingles. The jingles must be made to cater for different age groups.
7. There must be clarity on dual illumination guidelines. There must be a minimum threshold of viewers with STBs before switching off the analogue services to avoid consumer blackout.
8. Multiplex and transmission charges-: There should be costing and pricing framework in the DTT market to promote fair charges by the multiplex operator and signal carrier company. The regulator must put a cap on charges per transmission site to avoid high transmission fees that will suffocate new entrants.



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