



Development, the Digital Divide and the Digital Switchover (DSO)

Why the DSO in Africa (really) matters

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The digital switchover (DSO) is a term used to describe the transition from analogue to digital technology for the delivery of television and radio broadcast services. It is a complicated global process and countries have taken widely differing amounts of time to complete it. Few African countries are likely to meet the International Telecommunication Union (ITU) deadline of 2015. The biggest impact of this transition is improved television service through better picture quality, improved national coverage, and a wider choice of channels. But improvements are also expected in broadband internet through the efficiency gains afforded by digital broadcast technology. The spectrum that the switchover liberates presents a significant opportunity for extending internet access (through mobile broadband). This is particularly significant for Africa, where the internet penetration rate is only 16%, half that of Asia and the Pacific¹

If managed effectively, the DSO could boost economic and social development and support the delivery of programs related to the Millennium Development Goals (MDGs) by enabling increased access to and delivery of digital services, for instance, remote educational content. The DSO process can also enable a range of competitive service offerings; improve the coverage of digital services even in remote areas; make access to communication networks more equitable; while serving as a catalyst for optimizing the management of public-domain spectrum resources.

Those countries that are least likely to achieve the DSO deadlines are also those which can least afford to miss out on this opportunity. Targeted policies and investment can contribute to a successful transition that supports information society goals and broader development objectives.

This series highlights transformative analytical and operational work and discusses emerging policy issues in the information and communication technologies sector.

1. DSO AND THE 'DIGITAL DIVIDEND'

The DSO represents a massive, one-time opportunity to enable more pervasive and affordable access through increased competition and innovation in both the broadcast and telecommunications sectors. The radio spectrum freed up by the transition from analogue to digital technologies is referred to as the Digital Dividend. The key impacts of the DSO are listed below:

- Efficiencies from digital broadcasting transmission will lower barriers to entry for new TV channels, improve picture quality and facilitate national coverage for all channels.
- Substantial demand for additional spectrum for mobile broadband has dramatically increased the value of the Digital Dividend spectrum. The sale of appropriate frequencies can raise funds for governments and proper spectrum pricing will ultimately have an impact on broadband service pricing to end users.

- The spectrum freed up by the DSO tends to be more suitable. It uses lower frequencies that have a greater range, and allows operators to rollout networks effectively thereby passing on those savings to consumers. This is particularly important for rural areas because the capital cost for networks using these frequencies can be lower than that of existing networks which must use the higher.

In the history of communications to date, there has generally been only a limited engagement between the broadcast and telecommunications sectors. From a governance and regulatory perspective, they are usually managed by different ministries. The DSO introduces 'competition' between the two sectors to retain control over the parts of the radio spectrum traditionally allocated to them. Convergence of these sectors has yet to happen in most African countries.

Because so little television broadcast spectrum is currently in use in Africa, the new spectrum freed

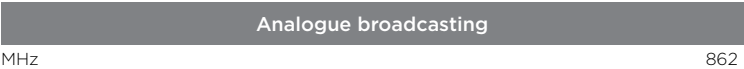


¹ "The World in 2013: ICT Facts and Figures", ITU, 2013

International regulatory framework of the Digital Dividend

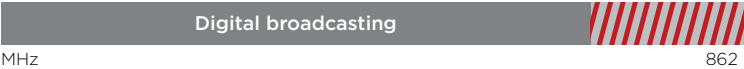
(source: GSMA)

- The spectrum allocation for analogue television



470 MHz 862 MHz

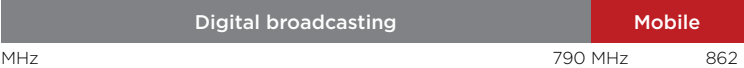
- In 2006, the Geneva 06 Agreement (GE-06) planned the migration from analogue to digital TV broadcasting for Europe, the Middle East and Africa, with the analogue switch-off (ASO) deadline set for June 2015.



470 MHz 862 MHz


- The transition will provide:
 - Significant improvement in programme choice and picture quality for viewers
 - An opportunity to use some of the radio spectrum currently used for TV for other purposes, such as expanded mobile broadband service.
- The Digital Dividend is the amount of spectrum made available by the transition of terrestrial television broadcasting from analogue to digital.

- Digital Dividend 1: In 2012, as proposed by the African Telecommunication Union (ATU), a second international decision (ITU treaty—WRC-12) allocated the 694–790MHz band to mobile broadband after 2015.



470 MHz 790 MHz 862 MHz

- After the 2012 decision, the ATU organised a series of regional coordination meetings to re-evaluate the frequency plan adopted in 2006 (GE-06 plan) for terrestrial television broadcasting.



470 MHz 694 MHz 790 MHz 862 MHz

- In October 2012, the ATU positively concluded that it is feasible to limit broadcasting to 470–694MHz, for four multiplexes with nationwide coverage.

Mauritius – the experience of Africa’s early adopter

Mauritius is a small island with a relatively high standard of living. Some 360,000 households have Televisions, there is one Television operator, the state-run MBC, and one signal carrier, Mauritius Multi Carrier Ltd (MMCL).

Digital transmission launch: The Digital transmission was launched in 2006 with 70% geographic coverage of the island. Today, there are three multiplexes offering 12 channels. By the end of 2011, some 250,000 set top boxes had been sold. Mauritius anticipates turning off the analogue signal in 2013.

Duration of DSO: 7 years in circumstances far more favorable than in most of Africa.

Key lessons:

- 1) Existing rooftop aerials were not suitable for Digital Terrestrial Television (DTT) and had to be replaced. There was poor installation of the replacement aerials and a training program for installers was launched.
- 2) Retail staff was not familiar with DTT, which led to a high volume of customer queries. A video was made available to staff and customers, explaining DTT.
- 3) Where cheap set-top boxes were purchased, there was sometimes a problem with asynchronous audio and video. A touring van was used to check and adjust coverage to overcome this problem.

up through the DSO is potentially the biggest windfall of spectrum for the next 20 years. In this respect, it represents a special opportunity to boost both broadcast and telecommunications in Africa.

Decisions on spectrum allocation tend to have impacts that can last a generation or more. As a result, the long-term consequences of how well the DSO is managed are significant. African governments can learn from the experiences of countries that have already completed or are further along in the process of their DSO implementations.

2. POLICY ISSUES AND CHALLENGES FOR AFRICAN POLICY-MAKERS

The DSO is a technology-driven process internationally driven by ITU with consensus from all countries. Because it has been set by the imminent obsolescence of a technology, DSO is in danger of being treated solely as a

technical process. However it involves a wider set of policy issues related to cost, access, market structure, resource allocation and broadcast content.

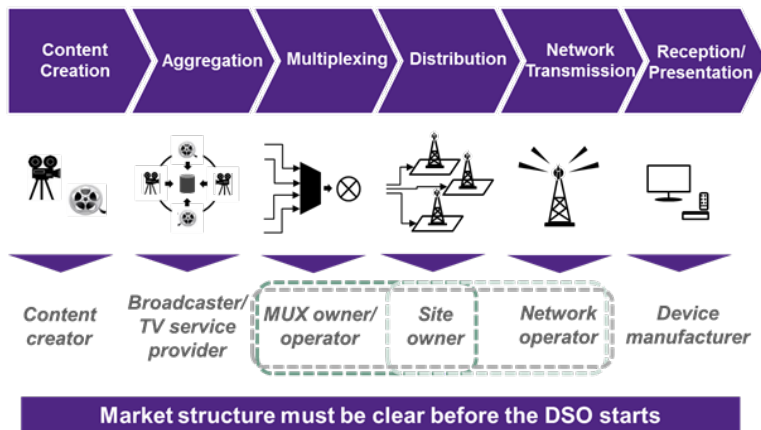
Cost of the process and access issues: A digital transmission network is costly to establish and generally requires that consumers acquire new devices. As a result, there is a risk that the DSO will reinforce the exclusion of poorer citizens from access to television if they have to bear the full cost of the upgrade. Historically, African governments have financed broader transmission coverage area for public broadcasters with private broadcasters focusing on the wealthier urban areas. The DSO offers an opportunity to create signal carrier platforms that will extend nationwide television transmission to all broadcasters, allowing audiences outside urban areas to access a more diverse offering than just the public broadcaster. But this will not be achieved solely through government funds - private investment or some combination

of the two will be required. One option is public private partnership (PPP) structures for signal carriers (of the kind that have been used widely for international fibre cable ownership in Africa) to ensure that development purposes remain central to the process.

The switchover requires that all households that have a television will need to pay as much as US\$50 (for a set-top-box), or purchase a new TV, for a service they are already receiving. Without substantial improvement in programming or picture quality, it would be hard to justify the cost for users. Although South Africa, Kenya and Tanzania have subsidy schemes planned, other countries have not and therefore the estimated 30% or more who cannot afford a set-top box may lose the use of their TV.

Aside from set top boxes, the process of making the public aware of the DSO is also costly. Producing and packaging information on what

DTT Market Structure and Licensing



individual households need to do to avoid losing access to television broadcasts, and making sure it reaches everyone in time, is a massive effort, particularly in countries with large rural populations.

The speed with which the process is carried out in light of these obstacles will have a direct impact on when telecoms operators can start using the most effective spectrum for high-capacity mobile broadband, particularly

for sub-urban and rural areas. A number of countries may have difficulty in meeting the ITU deadline of completion by 2015. The slowness of the process is underlined in the table below.

Regulatory issues: African broadcast and communications regulators have limited capacity (in terms of staff, skills and resources) and are subject to political interference. In many countries, broadcast and telecoms

Table 1: Africa’s Digital Transition – Summary of the State of Play

Status	Number	Countries
Total countries	54	
No announcement of timeline	35	See footnote ²
Affected by civil disturbance	4	Cote d’Ivoire, Libya, Somalia and South Sudan
Policy paper or Task Force/Committee	7	Benin, Botswana, Cameroon, Ghana, Mali, Senegal, Zambia, Nigeria
Policy paper or Task Force/ Committee within 6 months	4	Congo-B, Mozambique, Namibia, Niger
Pilots	6	Angola (short), Burundi (commercial), CAR (small-scale), DRC (small-scale), Guinea (small-scale), South Africa Note: Only (Angola and South Africa) look likely to lead to a public transition process.
Launched	9	Algeria, Gabon (private), Kenya, Morocco, Nigeria (Star Times/NTA), Rwanda (Star Times), Tanzania (Star Times/TBC), Tunisia, Uganda Note: No policy yet announced in Nigeria
Completed	1	Mauritius

Source: Balancing Act for the African Telecommunications Union, November 2011

² The following 43 countries look unlikely to meet the ITU’s 2015 deadline: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo-Brazzaville, Cote d’Ivoire, Djibouti, DRC, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Swaziland, Uganda, Zambia and Zimbabwe

regulation is assigned to different institutions. Broadcast regulators are often only responsible for monitoring content, leaving spectrum allocation issues to the telecoms regulator or other government department.

Currently in many countries there is a lack of clarity over: how digital channels will be allocated to broadcasters; if new entrants will be allowed; and how local content quotas will operate.

Some African countries lack comprehensive spectrum plans and the capacity to manage spectrum allocations effectively. The DSO offers new challenges in terms of effectively freeing up new spectrum for broadband technologies such as LTE. This spectrum is a public good and it is important to ensure that it becomes available in a way that supports rapid and widespread broadband roll-out.

3. DSO AS AN AGENDA FOR POLICY-MAKERS AND FOR DEVELOPMENT FINANCIAL INSTITUTIONS (DFIS)

Whilst ITU is doing some work on technical issues and on regulator capacity building, policy-makers, and possibly several players in the Development Financial Institutions (DFIs) need to make a concerted effort to ensure that development benefits flow from national DSO processes. If they do not, the opportunity cost of the status quo is enormous, as noted above.

Policy goals, to be adopted by policy-makers and the development community, could include:

- **Avoid widening the digital divide and foster innovation:** If the DSO process is not managed effectively the digital divide may widen and citizens may be excluded from global digital developments and opportunities. Moreover DSO could help produce the next wave of development opportunities in Africa (e.g. innovation in multimedia content production – access to education, job / recruitment adverts?).
- **Maximize opportunities for fast-tracking widespread affordable broadband:** A successful DSO process will accelerate the freeing up of spectrum that can be deployed to provide broadband. This is a potential game-changer in Africa, both for economic competitiveness and for rural broadband rollout.
- **Promote awareness:** Many governments are either unaware of the DSO, ill-prepared to manage it successfully or ill-prepared to build the necessary public awareness.



- **Promote cooperation and support improved regional integration:** Electromagnetic spectrum doesn't recognize or respect national boundaries. Without regional coordination countries run the risk of interfering with the broadcast or telecommunications networks of their neighbors. With 55 countries each addressing the same problem in roughly the same timeframe, there are many opportunities for the DFIs to assist in the development of templates and good practice standards.
- **Minimize e-Waste:** Analogue broadcasting equipment is rapidly being phased out. This in turn could lead to an even greater e-waste problem at the end of the switchover process.
- **Alignment of the DSO process with existing strategies:** The DSO impacts many priority areas for regional development strategies, including competitiveness and employment, vulnerability and resilience and governance and public sector capacity. A converged digital communications structure (that includes both television and broadband) has the potential to provide information and ideas that will address all of these priorities.

4. RECOMMENDATIONS TO MEET THE CHALLENGES OF DSO

African countries have little choice but to complete the DSO process and will therefore face considerable challenges by 2015. The DSO should be seen not just as an add-on to the broadcasting sector, but as an opportunity for building an Information Society. There are three proposed areas of focus to support the switchover.

1: Developing an enabling legal and regulatory environment

Countries will need to build regulatory capacity and undertake activities specifically related to the DSO and spectrum management. Areas recommended for attention include:

- Spectrum auditing, management and assignment strategies, including "spectrum trading".
- Liberalization that encourages new services and technologies. Specific targeting of spectrum liberation for mobile services in the 700 and 800MHz bands, and potentially, in the future, use of TV White Space Technologies (TVWS).
- Security and state integrity related issues (the rationalization and optimization of public domain spectrum resources for use by government).

It will be necessary to support development of open access policies around signal carriage and licensing. Areas recommended could include:

- Support for open access approaches to digital broadcast transmission infrastructure. Options include shared infrastructure for digital broadcast signal distribution, possibly supported by PPPs, and business planning support for converged approaches to open

access models for the signal carrier.

- Financial modeling and loan support to help implement the signal carrier approach and for cross subsidy strategies linking auctions of mobile spectrum to the re-farming of broadcast spectrum.

It will be important to create momentum for broadband policies through the DSO switchover and to provide a local content incentive for TV owners to make the switch. Therefore we recommend the following additional areas:

- Support for local content promotion policies, particularly those that support MDG objectives such as education and learning channels.
- Support for the development of policies that lock media together with the roll-out of a converged communications system that breaks down the urban-rural divide and assistance to link electricity roll-out to a converged communications network roll-out.

2: Mitigating market failure, and improving social and environmental sustainability

There are financial barriers on the demand side that will delay the DSO. The recommendations to overcome these are the following:

- Investment in subsidy schemes for set top boxes (STBs) to ensure that the DSO does not create new inequalities in access to television.
- Investment in e-waste programs and facilities to deal with redundant analogue televisions.
- Rural electrification – vital to provide power in the many areas where there is none.

3: Supporting regional coordination, collaboration and public awareness

The DSO process will be achieved more quickly and successfully if there is support for regional co-ordination between countries and an acceleration of understanding best practices in the African continent. The recommendations to support this objective are as follows:

- Promotion of best practices for speedy implementation of the DSO
- Cross border co-ordination including frequency allocations and shared regional e-waste/recycling facilities.

One of the weaknesses of existing DSO rollouts in Africa is raising public awareness. Therefore countries could undertake the following:

- Provision of the expertise required and the formation of the bodies for devising practical strategies to speed up the DSO process.
- Support for national multi-stakeholder consultation processes.

POLICY NOTES

This series highlights transformative analytical and operational work and discusses emerging policy issues in the information and communication technologies sector. The findings, interpretations and conclusions expressed herein are entirely those of the author(s) and do not necessarily reflect the view of the International Bank for Reconstruction and Development/The World Bank and its affiliated organizations, the Board of Executive Directors of the World Bank or the governments they represent. The World Bank cannot guarantee the accuracy of the data included in this work.

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