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Digital Switchover in Nigeria: A Robust Engineering Model for Rapid Transformation (Prospects, Benefits and Challenges)

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ABSTRACT

Many countries of the world commenced a digital switchover from analogue Television transmission to digital technology from the mid 2000 with only a few meeting the deadline of 2015 set by the International Telecommunication Union, ITU, for all broadcasting stations world-wide to go digital. Nigeria is no exception to this digital evolution but was plagued by political and economical factors not until 2016 it was kicked-off in Jos, the Plateau State capital to beat the June 2017 deadline set by the National Broadcasting Commission (NBC). Information and Communication Technology (ICT) has been a major tool of transformation that has changed the way in which media broadcasting is being done. Digital switchover refers to the transition from analogue to digital broadcasting of all networks, including terrestrial, cable, satellite and DSL (digital subscriber lines). It is technologically driven and global, including programs and formats and interactive networking technologies. This work examines the concept of digital switchover in Nigeria as an engineering model for rapid transformation of the overall economy. Emphasis is laid on its prospect, benefits and as well as its challenges. The paper concludes that for a viable digital switchover in Nigeria there is need for the public and stakeholders (commercial and public broadcasters) to be in the mainstream of event also government support in terms of provision of infrastructures, funding and subsidy, entrenching a mature business models and a feasible technology standards and economies. The Recommendations are made with a view to maintain the target aim and objective.

Keywords: Digital Switchover, Technology, Digitalization, Media, broadcasting, ICT.

INTRODUCTION

About two decades ago Television or TV was synonymous with analogue terrestrial television. With the development of new distribution channels, such as satellite TV and cable TV the demand for adaptors to link the new broadcasting technology to the existing TV and VCR equipment started to grow. These converters were the first set-top-boxes to be added to the existing TV-set by the consumer. Set-top-boxes opened the door to new broadcasting systems for the consumer. The set top box will still exist as a product genre to provide high functionality to basic television equipment as new broadcasting and home networking technologies emerge.

Compared to other media, television has, since the 1950s-60s, come to play a dominant role in many countries as a means of mass communication and entertainment; global television has become an important aspect of globalization [1].

Digital Television (DTV) is widely seen as a major paradigm shift in television history. The U.S. Federal Communications Commission states that DTV will "transform your television viewing experience" (FCC, 2007). Many developments technological, commercial, political and cultural are converging as the analog switch-off and digital roll-out take place globally [2], [3], [4], [5], [6].

The European Commission (EU, 2005) [6], refers to the term switch-off as the termination of terrestrial transmission of analog television; and switchover as the transition from analog to digital broadcasting of all networks, including terrestrial, cable, satellite and DSL (digital subscriber lines).

Digitization is a concept revolving the media industry including the prints and the electronic media. Digitization is a process through which information, whether relayed or through sound, text, voice or image is converted into digital, binary language for computer use FFC–Federal Communication Commission (2007) [7]. The use of digital technology facilitates the coverage of computer, telecommunication, audio and visual and consumer electrical and electronic gadgets. It is making considerable impact on the broadcasting industry, on individual, families and on society as a whole. All governments attach great importance to digitization and formulate policies and plans, reflecting active encouragement of digitization.

Non-addressability of cable systems was a big challenge with the analogue cable industry. Addressability can be achieved when the subscriber base is auditable or verifiable Hart, J. (2010). [8]. The actual number of subscribers was unknown. Information about the actual number of subscribers was available only to the local cable operators. Local cable operators often undervalued the amount collected. So the broadcasters had to incur heavy losses by way of revenue; and to revenues of the government by way of Service Tax and Entertainment Tax collection. Moreover, analogue transmission does not support emerging technologies like High Definition (HD). It does not provide a good quality viewing experience to the end user and has limitation on the number of channels that can be carried on the platform. The number of channels that can be carried on an analogue transmission is very low as 60-70; of which only 10-12 are of good quality; whereas a digital based system can carry over 1,000 channels [9].

In this light many countries developed a timetable for digital switchover and analog switch-off because of the relevance in today's highly technological, innovative and competitive media industry in the world.

Depending on the differentiation of the transmission signals of the television, digital television consists of three types – terrestrial DTV, cable DTV and satellite DTV. The development of these types of digital TV is also a factor any government will take into consideration in establishing a policy for the digital TV industry.

In compliance with the agreement with ITU Nigeria started the process of digital broadcasting because of the many advantages over analogue. According to Ihechu, I., & Uche, U. (2012). [10]. Since information technology has opened a world of possibilities for broadcasting industries, a wider scope will be available for radio and television broadcasting in the country. Therefore, more frequencies or wavelengths will be available for television stations in the country".

It is unarguable to state that digital broadcasting obviously has many advantages and benefits over the analogue however; it is not without its challenges.

The paper is aimed at highlighting the prospect, benefits and challenges of digital switchover in Nigeria from the engineering perspective with a view for government to put in place realizable policies to encourage the production of set top boxes in Nigeria thereby generating employment and empowering the teeming youths with the overall effect on the nation's gross domestic product (GDP).

REVIEW OF RELATED WORK

According to Iosifidis, P. (2006) [11], the word digital is "a process or device that operates by processing or transforming data and information that is supplied and stored in the form of a series of binary digits. Kumabe (2012) [12] states "Through digitization, the capacity of communication channels are greatly expanded, there is a wider scope for consumer choice, and more possibilities for interactive system". Also, Kumabe (2012) [12] in his own opinion on digital radio says: Digital radio is the pure digital transmission medium or channel that improves and modifies the sound quality of radio broadcasts, virtually eliminating static, hiss, pops and fades and offers data display capabilities on receivers and opens up opportunity for multicasting: Broadcasting multiple high and better quality channels on each frequency. Researchers have stated times without number the importance of digital technology in today's broadcasting. Law on electronic communication (Ekomloven) (2003) [13], says "the traditional broadcast television industry is in a state of transition". He also gave some of the benefits of digital technology by stating that: "Hoping to capitalize and utilize the public's increasing awareness of high-definition television (HDTV) the radio industry is introducing high-definition (HD) radio, a digital service that generally improves the signal quality of terrestrial radio stations broadcast." Although digitization is technology-driven and global, including programs and formats, it is important to realize that television content remains largely local Leiva, M. T. G., Starks, M. & Tambini, D. (2006) [14]. European public broadcasters are promoting DTTV, MCCA - Ministry of Culture and Church Affairs. St.melding nr. 30 (2006-2007) [15], but Norwegians are questioning whether their government's longstanding advocacy of DTTV is viable in the face of commercial DTV competition based on satellite, cable or IPTV transmissions. Mitchell, R. K., (1997) [16], finds that Cable is still the most used distribution system in Germany, reaching about 51% of all households. The study also brings out some failures on the part of media policy framework. Mitchell & Agle, (1997) [17] studies the achievements and challenges from digitization in Hungary [17]. present the development of the digitization process in Serbia from 2006 until 2014, and the current state year prior to the deadline for analogue broadcasting switch-off. The study suggests that the lack of citizens'awareness in Serbia may create constraints at the moment of analogue switch-off. Kumabe (2012) [12] confirms that switchover in Japan has been accomplished as scheduled without any major trouble. The government has increased subsidies to promote the penetration of digital television receivers. Actually, it decided to grant converter boxes free of charge to 2.6 million low-income households. The Government introduced various assistance programmes to promote the sales of DTT receivers and the installation of aerials, and the prices of DTT receivers have dropped considerably. Xing, W, Hanhui, H, Chong, W. (2009) [18] presents a theoretical and empirical analysis on China's transition to digital TV. The study suggests that in an introductory phase of digital TV, educating consumers with a convenient and pleasing experience is essential.

Starks, M. (2010) [19] studies the Broadcasting and television digitization strategy in China. The study confirms that public service and content supervision are the two main features of broadcasting and TV's digitization strategy in China. Wang, (2005). [20] studies the switching off of analogue television and the delays in USA. The study confirms that all digital transitions are difficult but the US transition was successful in the end, in spite of a number of decisions and policies that made life confusing and complicated at one time or another for all concerned. The decision to delay the analogue switch off from 17 February to 12 June 2009 was one of the first initiatives undertaken by the newly elected Obama administration. This delay was required because of the under-funding of a programme and to provide coupons for analogue digital converter boxes to those still dependent on over-the-air broadcasts.

ANALOGUE SWITCH-OFF (ASO) VERSUS DIGITAL SWITCH-OVER (DSO) PROCESSES IN SOME COUNTRIES

THE CHINA'S EXPERIENCE

China is not among the first group of countries to complete digital television switchover but it is certainly be the biggest. The route to China's digital switchover is quite different as Michael Starks (2010) argues, China's full digital switchover took a long time to complete because of economic and political factors. Deqiang Ji in his book "Digitalizing China: The Political Economy of China's Digital Switchover" shows how the state, the market and the society jointly played significant roles to the completion of China's digital switch-over. He stated that China's digitalization was heavily influenced by State policy whereby it initiated the process of digitalization of the cable system in 2003 and committed to its switch-over completion by 2015. And by May 2015, 83.5% of China's TV owning households had completed the switchover, which indicated that the State successfully carried out its schedule of digitalization. Another important factor of the digitalization was capital. Ji pointed out that both internal and external capital forced the Chinese State to design and adopt a resource-based strategy to achieve full digitalization.
China's situation and experience is distinctive based on the following:

- The structure of its broadcasting sector
- The approach to digital terrestrial television
- The role of State funding

CHINA'S BROADCASTING SECTOR

China has over 2500 television channels, serving around 380 million TV households. Central China Television (CCTV) is the dominant force at national level with a dozen channels. The provinces and autonomous regions has its own broadcasts, including one satellite channel for distribution across the whole country. In China, the State Council prioritized broadcasting digitization since 2004. The State Administration of Radio, Film and Television (SARFT), which is the authority over the radio, TV and film industries in China and a main stakeholder, is saddled with the responsibilities of supervision of programme production companies, under an established policy for digital TV regulation in the form of a series of rules and regulations (SARFT, 2000-2005). [21] Thus in 2004, SARFT estimated in the *10th five-year plan of radio, film and TV technology and plan of 2010 prospect* that digital television users will exceed 30 million households in 2005, that digital broadcasting will be fully applied in 2010, and that analog switch-off will be achieved by 2015 (SARFT, 2004b) [21]. In China, DTTV was never a real option; instead policy makers opted for cable TV as the main platform for DTV development. Analog switch-off and digital roll-out was planned region-by-region over a 10- year-period: 2005-2015.
Cable reception of satellite services, however, provides a filter between the broadcaster and the viewer through which control over foreign transmissions can be exercised.
Zhao Yuezhi and Guo Zhenzhi observed that "The Chinese television industry is characterized by a unique form of state monopoly capitalism: commercialized operations organized into a hierarchical structure of administrative monopoly [22].

THE APPROACH TO DIGITAL TERRESTRIAL TELEVISION

The Chinese standard for digital terrestrial television is known as DMB-T (Digital Media Broadcasting Terrestrial). China being the world's largest manufacturer of TV sets; since it joined the World Trade Organization, with its very competitively priced consumer electronic goods has played a major role in its export boom. The global switch to digital transmission is now transforming this business. The world market for digital receivers (TV sets and set-top boxes) is growing rapidly in most economies of the world, where analogue TV sets are becoming obsolete. Digital switchover represents a beckoning export opportunity, especially as countries that are making digital switchover mandatory are keen to keep down the compulsory cost to their consumers and look to China as a prime source of low-cost mass production. Digital terrestrial television was piloted during the 2008

Olympics, with high definition (HDTV) as an ingredient, but no digital terrestrial receivers were yet on sale in the shops.

THE ROLE OF STATE FUNDING

The Chinese government's support is evident in all the circulars as seen below through the State Administration of Radio, Film and Television (SARFT). It carried out research on digital television 1996 and arrived at the following "In the *Transition plan of the digitization of satellite broadcasting* (SARFT, 2000) [21], SARFT made it clear that the promotion of digital television begins with cable DTV. In November 2001, SARFT approved that cable DTV will be a pilot commercial operation in the first 13 cities nationwide." That number had grown to 49 at the end of 2006. On January 17, 2003, SARFT issued a *Work outline of the radio, film, TV in 2003*, in which it was stated clearly that the focus is "to establish the new system of the cable DTV, to construct four platforms, to promote the transformation of the broadband, optical-cable and bi-direction in the cable DTV, to clarify the key technology on the user regulation system, electrical program guide information and the set-top-box" (SARFT, 2003a) [21]. In May 2003, SARFT promulgated a *Transition Time Schedule of the Cable TV Digitalization in China* (SARFT, 2003b) [21]. This document defined the strategy of China's digital switchover beginning with Cable TV. A plan was advanced to fulfill the transition period of cable TV digitalization region-by-region. The digitization in the East, Central and West regions was conducted in four stages in the years 2005, 2008, 2010 and 2015 gradually, then realizing the digitization of the cable TV in full scale. In the first stage from 2003 to 2005, cable digitization was fulfilled in the municipalities directly under the central government, the cities at higher levels of the municipality of the East region and the capitals of the provinces in the Central region. In the

second stage from 2006 to 2008, cable digitization was fulfilled in the cities at higher levels of the districts, the districts in the Central region, the majority counties, part of the cities at higher levels of districts, and the minority counties in the West region. In the third stage from 2009 to 2010, cable digitization was realized in the counties in the Central region and the cities at higher levels of counties in the West region. In the fourth stage from 2011 to 2015, cable digitization was carried out in the counties of the West region and simulating radio and TV was cancelled.

From June to November 2003, the SARFT [21] approved a total of 46 cable digital TV pilot areas, covering 26 provinces (automatic regions/municipalities) and 4 municipalities directly under the central government. A month later, the SARFT issued *Implementation advice on establishing the new system of the cable digital TV technology* (SARFT, 2003c) [21]. This formally raised China's digital television industry chain constructed by "four platforms" and emphasized the strategy of the overall parallel movement of set-top and the core of the new system of new cable digital television technology – the orientation, technology standard and the construction requirement of all links of the four platforms. By 2004, the ground-breaking year for China's digital switchover was nominated as the "Digital Development Year" by the broadcasting system. SARFT formally made it clear that the target strategy of the digital transition is to fully transfer to digital cable television. After the release of the *Work Outline of the Radio, Film and TV Development Year* (SARFT, 2004a) [21], SARFT tried to get support from national governments and relative authorities. It introduced a series of circulars promoting and standardizing digital pay-TV channels. This applied to the running scale, the industry operation, the business criteria and the introduction of the competition. These elements combined to bring the gradual industry policy transition to maturity. In 2004, SARFT also issued the *Circular on Speeding up the Surveillance Platform Construction of the Cable Digital TV.* Here it pointed out "the establishment of the national cable digital surveillance platform could guarantee the sound development of coordinating and monitoring the program platform, transmitting platform, the operating order of the service platform, the service quality, and the cable DTV" (SARFT, 2004c). SARFT furthermore promulgated a *Guideline of the Cable DTV Service Platform*

Construction (SARFT, 2004d), 10 major forms of basic business of cable DTV. The ten forms of basic business of cable DTV in China are: (a) the basic business of standard definition TV; (b) the paying business of standard definition TV; (c) the business of multi-direction radio; (d) the guide for the electronic program; (e) the radio information service; (f) the business of pay-view on-demand to be; (g) the business of pay-view on-demand; (h) the commercial service; (i) the games business; (j) the business of high-definition TV. These forms cover the current program service, information service and commercial service of cable DTV. By the end of 2004, SARFT had approved 134 pay-TV channels and 31 pay-radio frequencies [23].

So far, there are five comprehensive operation platforms of digital TV approved by SARFT: (a) CCTV; (b) SMG, the Program Production Center of the Satellite TV Channel; (c) the Corporation of the Central Radio, Film, TV Transmitting Network; (d) the financial group formed by Beijing Broadcasting Group, Tianjin TV Station, National Radio Station, Shandong Radio and TV Station; and (e) Anhui TV Station.

In 2005, SARFT further defined the strategic mission of "three steps" and the development target: promoting cable TV digitization in full scale from 2003, implementing the broadcasting experiment of terrestrial DTV and the business of the satellite television live broadcasting in 2006, and promoting all-round terrestrial digital broadcasting and expanding its prevalence in 2008.

The State funding was on the limited spending power of rural families – constituting the majority of China's TV households dependent on free-to-view analogue television, as for the areas to which television is being delivered for the first time through a combination of Direct Satellite and local relay technology, the state take on a significant role in funding. Also the urban cable areas got their fair share of the State funding due to the fact that they are reluctant to purchase new digital set-top boxes, partly because the number of services they receive in analogue is already high and partly because of the relative weakness of additional new digital content. The scope for selling high-cost premium subscription services is also limited, primarily because much of the content potentially most attractive for a premium tier, sport and movies, remains part of the basic service.

To this effect government began to make digital switchover compulsory, starting in small cities. Instead of being sold a new service package, consumers were informed that their systems would be modernized, normally with a modest increase in the charge. The basic idea was to install one new digital set top box per household for free and to control subscription increases strictly, to guard against any significant consumer revolt. Cable companies were offered the regulatory carrot of a subsidy or soft loan and urged to invest, knowing that the alternative could be an end to their quasi-monopoly status.

The resultant 'full transition' business model is therefore one in which state policy, state financial support and commercial income are closely intertwined.

For instance in Beijing, the government provided a direct subsidy of 100 RMB to the Gehua cable company for every digital set-top box it provides to its customers, but required the company to hold the basic digital subscription to the same 18 RMB per month that it charged for analogue. Gehua's sources of new revenue were therefore limited to pay-TV subscriptions and income from a variety of sponsorship, product placement and merchandizing deals. Cable operators receive new revenue from the basic subscription increase but, as in Beijing, it needed to supplement the basic revenue by selling subscription services, a range of add-on services, new forms of advertising, sponsorship and other commercial deals.

DETERMINANT FOR CHINA'S DTV POLICIES

China's choice for its digital switchover from cable DTV and not from terrestrial DTV, as done by most countries in the world can be seen against the background of her situation. We already know that the development of digital television depends on at least three

factors: support of government, mature business models, advanced technology standards and economics. We saw earlier the government support in all the circulars it offered and also how it struggled to find an effective business models for the digital television progress. The technology is also very important because the cable network has been the most popular platform for Chinese people to watch TV, be informed and be entertained due to wide coverage of its cities, towns and some villages. The cable system is technologically advanced with the possibility to transmit digital signals only through a set-top-box. These are the main technical reasons why SARFT has chosen switchover from cable DTV.

Economic considerations were also considered as most cable TV subscribers live in cities, either big or small, and they are more affluent than villagers. Urban subscribers require more TV channels, especially the target channels and qualified programs. Most cable digital pay-TV includes these types of channels. They have more need and can pay more for the service. With the transfer from analog to digital television, maintenance expenses grew and cable viewers have to pay more. This was not a big deal for urban citizens, but it was a burden for some suburban people. It was therefore a good choice to begin the transition in urban areas.

KEY CHALLENGE TO CHINA'S DIGITAL SWITCHOVER (DSO)

The major key challenge for China's slow switchover to the terrestrial digital television standard was in some ways caused by the uncertainty regarding technology standards. Most cable users who watch pay-TV are highly educated and have a well paid job, and they are not satisfied with traditional programs and TV channels. So the cable companies tailored some channel and programs toward these viewers but the vast majority of Chinese who cannot afford to invest large amounts of money in pay-TV. Just as in some European countries, not all Chinese want to switch from analog to digital television. Therefore, SARFT had to request regional cable companies to let TV audiences choose whether they want to transfer to digital television. Cable companies have to transmit six analog channels, including CCTV-1 and their own province's first channel [23].

THE NORWAY'S EXPERIENCE

Norway's digital technology for the transfer and reception of television (DTV) started in 1974 with the introduction of text television. The analogue television technology which was developed between 1930 and 1950 did not allow signal compression and demanded consideration transmission capacity.

Digitalization and the use of computers, however, allow signal compression, new services and regulation of access to content. It allows TV suppliers expert interactive services to be profitable, including electronic program guides (EPG), super text-TV, additional information about programs, electronic games, interactive response services e-commerce, 16:9 broadband transmissions, high resolution TV (HDTV), innumerable radio channels and Internet access (Norwegian Post and Telecommunication Authority, 2007).

Norway's "national policy" on DTV and DTTV understood as "management by objectives" (MBO) was introduced in 1989 as the main planning tool throughout the public sector, despite its known weaknesses (Wang, Y. & Vaagan, R. (2007) [22]. The policy is the only policy goals identified by the government and sanctioned by Parliament. The stakeholders both in the public and private sectors advocated for the development of DTTV and their arguments are its alleged better provision of coverage, better possibilities for mobile and portable reception, stable sound and picture quality. It further stated that digital terrestrial network was cheaper to maintain in the long run than an analogue network. Also, DTTV allows for freer valuable band frequency.

There are a number of stakeholders – public and private involved in the digitalization process in Norway. The situation was characterized by the spread of market-driven DTV

and pay-TV on the one hand while the government advocated for a DTTV policy on the other hand. The government's advocacy of DTTV were brushed aside, due to concern about the considerable cost involved in parallel analog and digital distribution which had caused financial problems for DTTV in many other countries. But the solution to the perceived problem above was tackled by the closure of the analogue network as soon as the entire Norwegian population could technically receive digital transmissions. Also, the access to reception equipment and technical assistance was solved by the Norwegian authorities stating the cost for reception equipment must be limited (to 1500 NOK for a decoder), and switchover must represent an added value for viewers (St.melding nr. 44, 2002-2003; Syvertsen, 2004). The development of national DTV and DTTV policies has been influenced by the European Union (EU) and the Nordic region. DTV plays an important role in the EU "information society" vision, and several EU directives and standards have made an impact. Two examples here are The Law on Electronic Communication passed in 2004, and a common definition of SMP (Significant Market Position).

The DTV and DTTV policies are formulated by the Ministry of Transport and Communications (MTC) and the Ministry of Culture and Church Affairs (MCCA), and passed by the Norwegian Parliament (NP). The MTC supervises The Post and Telecommunications Authority and is responsible for all technical aspects in the telecommunications sector. This includes the Law on electronic communications passed in 2003 regulating technical standards and band frequencies. The MCCA supervises the Norwegian Media Authority regarding media and sports. The Ministry's Department of Media Policy and Copyright was established in 1991 and it is responsible for broadcasting legislation, copyright issues, press subsidies and film policy. The ministries left the detailed supervision of DTV and DTTV policies to the Norwegian Post and Telecommunications Authority and The Norwegian Media Authority, parts of its implementation was also entrusted to three limited companies, demonstrating a mixture of state and private ownership which reflects Norway's mixed economy. All seven stakeholders play important roles regarding DTV policy.

By 2006 almost half of the Norwegian population (47%), had access to cable-TV, compared with 32% to private dish/satellite, 35% to ordinary antenna with multi-channel and 4% to communal/joint antenna. Some had several systems. The analog terrestrial network system comprised the two last groups. As for IPTV (Internet-TV), about 85% of all Norwegians in the same period from 1999-2006 acquired home PCs and 80% had broadband access. Of these, about 20% report using IPTV. The Government announced on 15 May 2007 during its revised budget presentation for 2007, additional funds for the remaining 80,000 Norwegians without broadband.

DETERMINANT FOR NORWAY'S DTV AND DTTV POLICIES

The determinant for DTV and DTTV policies in Norway is the market which is estimated at over 15 billion. It is comprised of distribution/subscription, license fees, advertisements and end user equipment and many stakeholders in terms of DTV and DTTV policy. Its structure is complicated with producers of contents, artists, broadcasters, distributions and end users. Also, there is an umbrella organization for the protection of audio-visual intellectual property rights (Norwaco) embracing 34 organizations representing 34,000 individual owners and there are affiliated industries in advertising/marketing and TV equipment.

The market is dominated by a few large stakeholders: Norsk Rikskringkasting AS (the state-owned licensed-financed public service broadcaster), TV2 (privately owned commercial public service broadcaster) and the semi-private Telenor (Norway's largest telecommunication company).

These three stakeholders have a financial market share of 75% [23].

The analogue switch-off and digital roll-out started in the autumn of 2007 and it is done region-by-region.

KEY CHALLENGES TO NORWAY'S DIGITAL SWITCHOVER (DSO)

The challenges encountered are the private commercial distributors and the forces of marketing and advertising. An argument was made to favour the formulation of a national policy on DTTV that DTTV would offer national broadcasters better survival possibilities than leaving the field to commercial digital satellite and cable operators.

BROADCAST STANDARDS

The digital television standards are categorized as seen below:

- ATSC (Advanced Television Systems Committee)
- DVB (Digital Video Broadcast)
- ISDB (Integrated Services Digital Broadcasting)
- ARIB (Association of Radio Industries and Businesses)
- IPTV (including DVB and ARIB over IP)
- Open digital cable standards, such as OpenCable
- Proprietary digital cable standards
- Proprietary digital satellite standards

ATSC DIGITAL TELEVISION

The ATSC (Advanced Television Systems Committee) digital television (DTV) broadcast standard is used in the United States, Canada, South Korea, Mexico and Argentina. It is actually a group of standards. It uses MPEG-2 transport stream to convey compressed digital video, compressed digital audio, and data over a single 6-MHz channel.

DVB DIGITAL TELEVISION

The DVB (Digital Video Broadcast) digital television (DTV) broadcast standard is used in most regions except the United States, Canada, South Korea, Taiwan, Brazil, and Argentina. The DVB standard is a group of ETSI (European Telecommunications Standards Institute) standards. The variants of the DVB are DVB-T (Terrestrial), DVB-C (Cable), DVB-S/-S2 (Satellite), DVB-H and DVB-SH (Handheld). DVB-H and DVB-SH are for mobile applications and they use IP datacasting within DVB-T and DVB-S respectively.

OPENCABLE DIGITAL TELEVISION

OpenCable is a digital cable standard used in the United States, designed to offer interoperability between different hardware and software suppliers. OpenCable receivers use four communication channels over the digital cable network: a 6-MHz NTSC analogue channel is located in the 54-450MHz range. Each channel carries one program. 6-MHz Forward Application Transport (FAT) channels, carries content via MPEG-2 (Motion Picture Expert Group-2) transport streams. Each channel can carry multiple programs. Out-of-Band (OOB) Forward Data Channels (FDC) and Out-of-Band (OOB) Reverse Data Channels (RDC). OpenCable receivers obtain content by tuning to one of many 6-MHz channels available via the cable TV connection.

ISDB DIGITAL TELEVISION

The ISDB (Integrated Services Digital Broadcasting) digital television (DTV) broadcast standard is used in Japan. ISDB builds on DVB with additional services required for Japan. ISDB standard is a group of ARIB standards that uses an MPEG-2 transport stream to convey compressed digital video, compressed digital audio and data. It is compared to DVB where the transport stream is transmitted either by terrestrial, cable, or satellite. Interactive applications uses BML (Broadcast Mark-up Language). It has two variants ISDB-S (Satellite) also known as BS (broadcast satellite) used to rebroadcast satellite information. ISDB-C (Cable) uses 64-quadrature amplitude modulation (QAM) with two versions: one that supports a single transport stream per transmission channel and one that supports multiple transport streams per transmission channel.

ANALOGUE SWITCH-OFF (ASO) AND DIGITAL SWITCHOVER (DSO) DATES OF SOME COUNTRIES ACROSS THE CONTINENTS OF THE WORLD

DTT have been launched on all continents. Each country goes at its own pace.

EUROPE

The European Commission recommended DSO to be completed by 1 January 2012 (EU REC 2009/848/EC Oct 2009).

- The Netherlands completed their DSO by 11 Dec 2006.
  - 90% are cable subscribers
- The following countries in Europe completed their DSO by 2007
  - Finland – Many viewers refused to pay TV license fee due to high price of DTV.
  - Sweden
  - Switzerland
- By 2008 Germany made available its Cable and satellite network.
- Denmark and Norway followed suit in the completion of its DTV by 2009.
- By 2010: Belgium, Spain, Latvia, Estonia, Croatia, Slovenia, Luxembourg completed their DTV network.
- By 2011: Israel, Wales, Monaco, Austria, Scotland, Cyprus, Malta and France including overseas departments and territories had completed their DTV.

The following countries in Europe as at the stated dates their DTV implementation is in progress they are:

- By 2012: Azerbaijan, Bulgaria, Czech Republic, Ireland, Lithuania, Portugal, Slovakia, UK had ASO while DSO was in process.
- By 2012: Greece ($), Hungary, Iceland, Italy (2006!), Poland, Serbia had ASO while DSO was on-going.
- 2014 - Turkey had its own analogue switch-off while switch-over was on-going.
- 2015 – Russia (30% population had ASO), Macedonia, Romania.

The following countries in Europe have not yet started the DSO process they are:

Albania – 2015
  - unlicensed DTT for many years

Ukraine – 2015
Other former Soviet Union countries

AFRICA

The technology standard DVB-T was deployed with dates in the following countries:

- 2005 – Namibia
- 2009 – Algeria, Gabon, Kenya
- 2010 - Ghana, Nigeria, Uganda

- Majority adopted/planned DVB-T/T2
- ASO announced date
  - 2012 – Kenya, Nigeria, Uganda
  - 2013 – Tanzania, Zimbabwe

Recently, East African Community (EAC) at the end of 2011 arrived at the following:

- adopted DVB-T2/MPEG-4
- developing minimum standards for set top box (STB)
- adopted Unified Licensing Framework: signal distributors and content providers

Also, SADC adopted DVB-T2 / MPEG4 and countries members who had started with DVB-T, can continue with its implementation and migrate to DVB-T2 at later date.
Furthermore, there are private initiatives by private companies that are deploying DTV and their activities includes thus:

- Multichoice Africa rolling out DVB-T2 networks (50 programs) over 15 countries
- Gotv Africa DVB-T2 Pay TV services on air in Zambia, Kenya and Nigeria
- TNT Africa DVB-T pay-TV in Gabon (300 000 households) with plans in other West and Central AFRICA.

MIDDLE EAST

It has DVB-T deployed with dates of countries under its region.
2008 Saudi Arabia had its deployment. 2009: Iran, Israel followed suit in the implementation and the ASO target date was 2015.

ASIA-PACIFIC DTT DEPLOYED

In 2001 Australia had its DTTV deployed, 2002 India, Singapore was next, followed by Japan in 2003 (ISDB-T). 2005 was the turn of South Korea (ATSC), Viet Nam, while 2007 was New Zealand, Hong Kong (DTMB) and then 2008 China (DTMB) deployed.

Those that endorsed DTTV include the following:

- Philippines with the technology standard ISDB-T
- Pakistan was undecided
- The 9th Conference of ASEAN Ministers (Indonesia, 2007) endorsed DVB-T as standards for member nations (Brunei, Cambodia, Indonesia, Laos, Malaysia, Singapore, Thailand and Vietnam).

Some of the countries under that region that had their ASO dates fixed and they include:

- Japan completed its ASO in the year 2011.
- 2012 was the date set for ASO in South Korea, Hong Kong by their authorities.
- 2013 Australia, New Zealand proposed that date.
- 2014 Mongolia, Taiwan fixed their ASO date.
- 2015/20 Malaysia, Thailand, Vietnam was their proposed date for ASO.

LATIN AMERICA

The countries below have DTT deployed with the technology standard they include the following:

- Argentina, Brazil deployed the ISDB-Tb technology standard.
- Colombia deployed the DVB-T technology standard in the year 2008.
- Mexico deployed the ATSC technology standard.

While the following Latin American countries adopted DTT and the stated technology standards, they include:

- Chile, Ecuador, Paraguay, Peru, Uruguay and Venezuela adopted ISDB-Tb technology standard.
- Colombia adopted DVB-T/T2 technology standard.

The countries below also have their ASO set to the dates attached to them and they are:

- 2014: Peru
- 2015: Uruguay

- 2016: Brazil. Mexico
- 2018: Chile, Venezuela
- 2020: Colombia
- 2023: Paraguay

NORTH AMERICA

United States had three kinds of DTTV phases as seen below:

- High power was concluded June 2009.
- TV 52-69 was concluded December 2011.
- Low power was concluded September 2015.

Canada had the following:

- Mandatory markets fully deplored August 2011, some CBC delayed to August 2012.
- Low power outside MM continues analogue operations.

The following countries in Central America have not started deployment of DTTV. Attached to them are the set dates for them to start deployment. They include the following:

- Cuba – 2014
- Costa Rica – 2018
- El Salvador – 2019
- Caribbean countries

LESSONS FOR NIGERIA

A careful study of the aforementioned DSOs models indicates that;

1. They identified and involved all stakeholders and structures in their respective countries (China and Norway) regarding government policy formulation of digital TV.
2. The customers are key by making available and affordable DTT receivers/STBs, Marketing and communication, compelling content, consumer change NOT technology project
3. The transition to DTV was carried out in phases and region-by-region.
4. There was a commitment by their respective government to the completion of the project by securing funds to help the scheme, marking and communicating cost.

PROSPECTS TO THE NIGERIAN ECONOMY

Digital broadcasting has enormous prospects for our economy; it will cause a proliferation of businesses whereby investors will establish their factories to manufacture set top boxes (STBs) thereby people will be gainfully employed which add to the nation's GDP. Speaking at the event at the switch on of digital transmission, television viewers in Jos, Chairman of the digital transmission team, Engineer Edward Amana, said, a total of 30 million setup boxes were required for the whole country. Amana added that, the setup boxes for the pilot scheme were imported by the 13 companies licensed to provide the boxes but subsequent ones would be produced in the country. He stated that four out of the 13 companies have already established their factories in Calabar and Port Harcourt and will soon start production.

The Chairman further explained that each of the companies would employ not less than 2000 Nigerians and setup boxes manufactured in Nigeria would also be exported to other West African countries.

Also, the broadcast industry will experience an exponential increase in the capacity of broadcast platform, it will reduces the costs of both production and distribution of content, increase in the range of format, portable, mobile to 3D, launch of new multimedia services, it will close the digital divides regionally and globally and it will serve as an avenue to use the "golden" spectrum effectively and efficiently.

BENEFITS OF DIGITAL SWITCHOVER (DSO) TO NIGERIA

Enumerating the benefits of the switchover, the Minister for Information, Culture and Tourism, Alhaji Lai Mohammed, said, "More importantly, digitization will revolutionize the economy of Nigeria, not just changing the face of broadcasting, it is going to be a spinner, that in its wake, will create more wealth, jobs and create more avenues, for our talented youths, to achieve their potentials.

"Prior to our going digital, we have only four national channels which are AIT, Channels TV, STV and of course NTA. These are channels you can tune into and without paying any fee, you can watch what is going on; but with digitization we are going to have 30 channels that would be national and free. Mohammed said, "Apart from giving you quality pictures and more platforms; it is going to create more jobs.

"With digitization, you are going to have distributors in every local government of the country. Invariably, it will cause a reduction in cost of receivers and STB due to economies of scales. It also allows for better interaction between government and the governed, because unlike advertisement, where you can only see the advertisement on the channel you have paid for, with digitization you can get government's message on its policies, programmes on any channel you tune into. The Minister further explained that, "This process is also going to encourage many of our young talented youths, in the area of content production. With digitization, there will be strict division of labour. We have what we call signal distributors and content producers."Another good spin of the process is the fact that we have encouraged all those who are licensed to bring in the set up boxes, to manufacture them locally in Nigeria here. He added that Nigeria free TV DTT will be the largest in the world compared to UK with 10 million, Australia with 13 million and New Zealand with 3 million, adding that Nigeria will have 30 million free TV households by the time it completely switch over from analogue to digital. Furthermore, it will bring about spectrum efficiency and minimize interference as the nation/regulators will generate huge revenue from the sales of spectrum space. It will encourage specialized areas of broadcasting and facilitate ASO and DSO with neighbouring countries. Another benefit is media convergence which is a new and good source for advertisers and the advertising industry. It will promote e-government and other public services.

CHALLENGES TO FULL DIGITAL SWITCHOVER (DSO) TRANSITION IN NIGERIA

Although there are so many vital benefits associated with DTV broadcasting, Nigeria's quest for DTV may suffer a setback when the following are lacking:

- Technical requirement: The need for huge investment in the various new compliant equipments such as the Microwave links, Fiber Optics links, Communication Satellite links, Encoders, Decoders, Subscriber's Management System, Conditional Access Systems for data processor, transmission and reception.

- Personnel/Operator and Content providers: Training and retraining of the personnel/operators is a basic necessity because of the subtle and complex technology employed. Some of the technical personnel still do not understand what the transition entails.

- Infrastructures: The provision of a stable power supply is inevitable for the transmitters because the epileptic power and dependence of generators will not augur well as this will translate to high cost of programme production and presentation.

- Low awareness/sensitization: The concentration of the digitization process is in the urban areas leaving the rural dwellers/audience with little or no information. This will cause a drawback by these set of people who do not understand the issues and other intricacies of the digitization programme.

- Availability of fund: The government cash crunch due to economic recession pose a great challenge to the digitization process most especially the dwindling revenue from oil and the attendant effects on the economy will slow the speed.

- Poverty/Low Standard of Living: The free viewership culture of Nigerians mostly the vast populace is in the remote communities; it will take a long while for the people to imbibe the culture of pay TV.

CONCLUSION

With the 2016 flag-off of the Digital Terrestrial TV (DTTV) in Nigeria a lot is expected from the project however, it is not without its challenges. Two countries that are very different and yet so alike in several ways China and Norway DSO's experiences was regarded, and their step-by-step processes and progresses was considered based on their need to weigh public interest and state broadcasting services against market-driven pressures, viewership preferences and affordability ushered in by globalization, economic progress and technological advancement. Nigeria's DSO experience is expected to learn from the lessons of these countries. Also, the prospects, and benefits of DTTV are emphasized like employment generation, clearer picture and quality audio, high production level, government is also expected to collect more revenues in terms of entertainment and service tax collection. However, the challenges are grouped under technical, socio-economic, citizen's awareness and low standard of living.

RECOMMENDATION

Government should endeavour to involve all stakeholders: Regulators, National public and commercial broadcasters, Telecommunications operators, Manufacturers, Installers.
Consumers should be key by making available and affordable DTT receivers/STBs, Marketing and communication, Compelling content.
Secure funding is necessary to help the project/scheme for long term planning to facilitate a smooth switchover and communication costs subsidy by government to provide set top boxes for distribution to people in remote areas.
Also, the need for an adequate simulcast period necessitated by the need for gradual switch-over and minimizes the viewers' shut out at analogue switch-off. This will create time for operators and government to address coverage issues.

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