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Communication Satellite: Nigeria's Efforts at Bridging Digital Divide

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Abstract
Communication Satellite in the wireless age has the potentials of bridging the digital gulf that exists between civilized and developing nation. If well used, communication Satellite is a potent infrastructure of addressing technology convergence for holistic national development. This paper examines Nigeria's technological efforts so far at bridging the Digital Divide through communication Satellite. This discourse focuses on the uses and challenges of Satellite communication in Nigeria. The paper relies on secondary data to explore the fate of Nigeria nation in the era of digital divide and recommends that urgent need to increase penetration of broadband service, international networking and empowerment of information communication and technology experts as parts of the way forward for technological revolution of Satellite in Africa.
Key words: communication satellite, digital divide, Challenges.

1.0 Introduction

Marshal McLuhan, a cultural and media critic in the early 1960s predicted that the world would one day become a global village. The Canadian scholar based his prediction then on the likely rise of worldwide communication systems "where communication and electronic interactions could take place between geographically separate areas" Kirby et al (1997). The birth of satellite later proved that McLuhan indeed had a telescopic vision. The mass media messages according to Lasswell (1948) are meant by way of functions to keep surveillance of the society; correlate part of the society in responding to the environment; transmission of cultural heritage from one generation to another and to entertain.
In agreement with Lasswell, McCombs and Shaw (1979) gave a captivating resume of how media can be used. These include:

1. Surveillance
2. To form public opinion,
3. To be able to discuss with others;
4. To get the feelings of people actually participating in current events;
5. To provide reinforcement for views already held and;
6. For relaxation.

The hypodermic needle effect theory of communication states that the audience has no choice than to swallow hook, line and sinker any information that comes their way through the broadcast media. As opposed to the magic bullet theory, the theories of selective exposure and selective retention argued, in the words of Udeze (2002) that "media audiences are active choosers who take what they want and leave what they don't want….."

In view of the socio-political and economic gulf between western nations and the third world countries, between the poor and the rich, the powerful and the weak, there is the need to establish this

discourse on Knowledge Gap Hypothesis. This hypothesis, Okoye (2004) argues points to the fact that "overtime, there will be a "gap" in the knowledge of public affairs between a more attentive minority and the rest of the society." Citing the work of Tichenor, et al (1970), Okoye (2004) reasoned that the knowledge gap hypothesis showed an "increasing knowledge gap between the better educated and the less educated between 1949 and 1969 on three pieces of topical information''.

1.1 Objectives

This paper is set to address the following objectives:

1. Examine Nigeria's voyage in Communication Satellite;
2. Evaluate the uses or potentials uses of Communication Satellite in Nigeria;
3. Appraise Nigeria's challenges in bridging the digital gulf; and
4. Recommend the way forward for Nigeria and other African countries in the area of Communication Satellite.

1.2. Methodology

Since Nigeria's Communication Satellite history is an emerging one, this paper depends on secondary materials to investigate the phenomenon under probe. Experts' opinions are captured and analysed to address the paper's objectives.

1.3 Satellite Broadcasting

Historically, the idea of satellite technology was a brain child of the military, though it is now of immerse benefit to news organizations across the world. Haggins (2002) confirms that: In the 1950s, with the cold war at its peak, the 'race to space' between US and Russian was intense. The successful launch of the Sputnik Satellite by the former USSR in 1957 was a bitter blow to the US, was thus spurred on even more.

Precisely in July, 1962, the National Aeronautics and Space Administration (NASA) in collaboration with the American Telephone and Telegraph Company (AT&T) launched a satellite into space. The satellite was known as TELSTAR I, and it received TV signals from America, magnified them ten times and retransmitted them to England and France. The experiment lasted less than sixty minute because the satellite had passed out of sight of signals from the earth station. The following year, another satellite, SYNCOM II was launched and put into geosynchronous orbit at latitude of 36, 000km (22500 miles). This was to make sure that the satellite did not "get out of sight" again. At the above latitude, Iyongu (1995) asserts that, "the period of the satellite revolution around the earth is the same as the period of the earth's rotation."

A satellite is said to be in geosynchronous orbit and geostationary orbit Haggins, (2000) explain these principles:

> This satellite orbit is measured from the centre of the earth and is called 'geosynchronous' orbit. If the satellite orbit is above the Equator, then the satellite is said to be in 'geostationary' orbit. The geostationary orbit is at a distance of 42. 163km measured from the center of the earth and the Earth's radius is 6, 378km at the Equator. Therefore the satellite is calculated to be 35. 785km above the Earth's surface at any point on the Equator. The point on the Equator below the satellite is termed the 'sub-satellite' point.

A satellite has receiving and transmitting equipment known as **transponders.** It also has a directional (parabolic) antenna to beam signals to virtually all visible parts of the globe. It is expedient to note that since the earth is spherical, a geostationary satellite is able to "see" only about one third of the earth. For satellite transmission to be effective, an earth station is a child of necessity. This is needed to transmit the signal (in microwave form) to the satellite. The antennas that are used in the earth stations (for transmitting and receiving) make use of **reflectors.** When such a reflector is used in transmitting, the

power from the transmitter is directed to antenna by **feed** towards the reflector. The reflector focuses the power into narrow conical beam which is then transmitted to the satellite. Iyongu, (1995)

It is crucial to point out here that when a similar antenna is used in receiving the parabolic reflector, according to Iyongu (1995) "it collects the signal energy that strikes it and directs this energy towards the feed where it then goes into the microwave receiver Remarkable achievements have been recorded in the media world since the first satellite was launched in 1962. Many satellites are designed to relay signals within a specific country or region. These types of satellite are known as domestic satellite or **domsats.** A single earth station can make use of the one **domsat** to "connect" many networks. For instance, the Cable News Network (CNN) uses its base in Atlanta, Georgia to serve the rest of USA. It beamed signals directly into people's homes through Direct Satellite Broadcast System (DBS). All that one needs to have is a satellite dish (parabolic antenna) to receive signals, a low noise amplifier as well as a decoder and the process is through. With this development, anybody with a satellite dish and accessories can simply 'tune in' to any satellite within his region and watch the programme of his choice.

One person needs to be commended for his ideas and predictions in the presatellite era which later on added a cubit to the development of satellite. He is Arthur C. Clarke who in 1945 (a RAF technical officer) authored an article that was published in the British Magazine – **Wireless World.** In his honour, the orbit he proposed in his write-up i.e. the Geostationary Earth Orbit (GEO) is named after him- it is known as 'Clarke Belt' or 'Clarke Orbit'. Haggins (2000). There speculations that point to the fact that Clarke might have been the man behind the invention of geostationary orbit. However, Haggins (2004) argues that Clarke never claimed to have invented the geostationary orbit. He, according to Haggins simply made deductions from the laws of Newton and Kepler. That position notwithstanding did not invalidate Clarke's well acknowledged contribution in the satellite communication theory.

Coordination of satellite communication business lies squarely in the hands of communication satellite corporation, (Comsat). Comsat operates on International consortium made up of over a hundred countries that jointly finance the service. This consortium is called International Telecommunication Satellite Organization, INTELSAT. Today, the world has moved from analogue to digital in terms of satellite explosion. Aihe cited by Akase (2011) appraised the strength of digital satellite over analogue. He contended that one needs a transponder for each TV channel but digital makes room for 5 to 8 to be compressed into transmitter.

1.4. The Nigerian Satellite Efforts

Nigeria until September 27, 2003 was a mere consumer of satellite products. However, when the administration of President Olusegun Obasanjo came on board in 1999, it had a project of going to the space. That dream became a reality with the launching of the country's first satellite called Nigeria Sat-I on September 27, 2003. That satellite was an observational type. It was a low Earth Orbit micro satellite for disaster monitoring. It had the capacity of 100kg spacecraft, orbit 700km and five year design life-span. The launching of the satellite had attracted a tidal wave of appreciations from Nigerians within and outside the country. The launching was carried out by Russian Cosmos launcher, Cosmos-3m.

It is expedient to point out here that though the Nigeria Sat I was not a communication satellite; it no doubt served as a forerunner of the nation's communication satellite which was launched on May 13, 2007 by China. Nigeria spent over $400 million for the satellite project whose major mission was to be the leading satellite operator and service provider in Africa. Oyesanya, (2007). Unfortunately, the communication satellite known as NIGCOMSAT-I crashed on the space and was de-orbited in 2008 due to anomaly in its solar arrays. The following year, the Federal Ministry of Science and Technology in conjunction with the Nigeria Communication Satellite Ltd (NigComSat Ltd) signed a contract with China great Wall Industry Corporation (CGWIC) in Beijing to replace the damaged Satellite with NigComSat-IR. The new satellite is due for launch in December this year.

1.5. Uses of Satellite Communication

Bitner (1989,P.271) speaking in respect of communication satellite reasoned that " with the advent of satellite, sounds of other cultures could be received across national boundaries." Mowlana (186, P.67) collaborating Bitner's view gives a resume of the advantages of satellite broadcasting thus:

> Satellites offer several advantages over more conventional methods of communication. Because the satellites are located high above the earth, they cover a much larger distance than do traditional broadcast systems. In an addition, there is no corresponding increase in cost to greater distances. A second advantage is that satellites are much more flexible than terrestrial systems, which rely on infrastructure of cables and wires. In the first place, they do not require the costly physical networking of a region to establish communication ties. In the second place, satellite beams can be easily redirected to other areas whereas physical infrastructure is rigid; a third advantage of satellite communication system is their greater capacity in carrying messages.

To summarise Mowlana's views, satellite communication systems have wider reach, they are flexible and have a robust capacity for carrying messages.

Binkowski (1988, P. 45) applauded satellite broadcasting for its insensitivity to distance. According to him, the "terrestrial microwave propagation requires repeaters stations every few miles as the necessary line of signal is lost beyond the curvature of the earth: a single satellite signal can reach the entire continental United States simultaneously…" To Rees (1990, P. 131), satellite are good instruments for entertainment and education. He argues that apart from entertainment, "satellite has enormous uses in education which are slowly being implemented in the most needful parts of the world and it has largely replaced radio broadcasting as the world ''information media."

Looking at the uses of satellite communication with particular emphasis on the Nigerian environment , The Punch (2007, P.16) in its editorial titled " Satellite Communication Breakthrough " stressed that the NICOMSAT-I will " complement telephony service in that it will assist telecommunication service providers to improve quality delivery and expand services to the remotest parts of the country. The Punch also stated that the communication satellite will enhance widespread internet facilities while prohibitive cost of service may drop if properly managed. Satellite communication technology according to The Punch (2007, p. 16) will "enhance electronic commerce, e-learning in schools, e-governance to get government activities closer to the grassroots, telemedicine, distance learning/training and rural telephony.

Satellite as a money-spinning venture is expected to boost the revenue base of the country. The Punch (2007, P. 16) states that "Nigeria expects to reap one billion dollars annually from the sales of transponders – the transmitting device which relays communications signals from the space to the earth."

Communication experts and industry watchers in Nigeria have offered their views on the benefits of the new Communication Satellite in Nigeria NigComSat-IR. Former Executive Chairman of the Nigeria Communication Commission, (NCC) Mr. Ernest Ndukwe in Sunday Punch (2011, P. 24) opined that Nigeria can use the satellite to reach remote areas. Even though Ndukwe believes that satellite can reach the underserved and un-served parts of the country, he categorically warned:

> We required a consensus on the way to achieve universal reach for broadcast services. Last miles deployments based on wire-line infrastructure will be difficult to achieve and investments will be exceedingly costly and largely unaffordable especially for rural and dispersed communities.

In his position, Adline Atili, a Nigerian Journalist in The Nation (2011, P. 43), rhetorically pontificates that the new communication satellite whirlwind in Nigeria will catch up with everybody. Hear him:

> Did you watch TV today? Did you make a telephone call, talk on your mobile phone, send an SMS, instant message or listen to the radio in your car? Did you read the weather forecasts in the newspapers? If yes, then most likely a communication satellite was used. In today's world, it is certainly difficult to go through the day without using communication satellite on the way of the other.

Moving from general to specific, Atili submits that the target applications of NigComSat-IR include but are not limited to: telecommunications, broadcasting, internet and real-time monitoring services, navigation and global positioning system. In the same vein, the president, Institute of Software Practitioners of Nigeria (ISPON) Dr. Chris Uwaje in The Nation (2011, P. 43) affirms that NigComsat-IR will not only serve Nigeria but will transform the communication map of Africa.

1.6. Challenges in bridging the Digital gap

Nigeria will have to contend with a lot of challenges in bridging digital divide via communication satellite. The challenges are examined below:

- **High cost of broadband**

Former executive chairman of Nigerian Communication Commission, Ernest Ndukwe bemoaned lack of incentives for widespread broadband deployments in the country. He regretted that Nigerians operating companies are paying relatively high bandwidth charges for satellite links in the country, a development, he argued has discouraged extensive use of satellite as alternative medium for long distance transmission requirements. Ndukwe (2011, P. 24) further buttress his point:

> These high charges have prevailed in spite of the fact that the Nigerian business represents our 60 percent of the African business portfolio for a number of the international satellite organizations…. There have been discussions on how to drive down the charges. NigComSat can achieve this by consolidating the requirements of the service providers and using that to offer better bandwidth prices.

Managing Director of NigComSat Ltd, Timasaniyu Ahmed Rufai also figures out broadband access as a challenge to Nigeria's satellite endeavour.

- **Lack of technological know-how**

The high dosage of technological impotence in Nigeria poses a great challenge for the satellite project. Nigeria relied on Russian engineers for its first satellite. It also depended on China for the aborted satellite-Nigcomsat-I and the new one to be launched in December this year. Looking at the issue from the information technology perspective, the president, Institute of Software Practitioners of Nigeria (ISPON), Dr. Chris Uwaje in The Nation (2011, P.43) admitted the challenge:

> It is, therefore our professional opinion that our nation is faced with monumental challenge on how to structure, configure and reposition Information and Communications Technology and especially software in Nigeria as a prime industry for nation building, economic survival, national security and global competitiveness.

While arguing that knowledge begets knowledge, he however proposed that "we want to see an army of satellite experts in this country to make sure that people understand the benefits and criticality of the issue and role of satellite technology in the future of Nigeria."

- **External influence.**

There is a challenge imperialism and neo-colonialism in Nigeria's effort to join the League of Nations in the space. A lecturer at the University of Jos, Joe. Anuga stated that "Africa is currently being dominated in all spheres militarily, medically and educationally to the control or near complete dominance of the communications technology space" by western powers. While encouraging Nigerians to be watchful, he said that "Europeans political conquest of the whole of West Africa was hinged on its extensive advantages in communication technology." He therefore feared that if Nigerians will not take their communication destiny in their hands, history might repeat itself.

- **Political influence.**

Most appointments into sensitive areas in the country are done not on merit but on political considerations. Communication satellite is so sensitive a venture to be politicized. The challenge of political influence within the country along partisan politics remains daunting in Nigeria's question in bridging the digital divide.

- **Economic challenge**

Most African countries including Nigeria often have economic challenges especially in the take off and continued sustainability of critical projects. The communication satellite project is capital intensive and needs more funds and adequate time to realize its objectives. This, indeed, is a challenge to contend with.

- **Policy somersaults**

Successive governments in Nigeria usually come up with new policies in order to score political goals. There is a challenge of policy formulation and sustained application of same by our leaders. This poses a critical challenge for the communication satellite project.

1.7 **The Way Forward**

For Nigeria nation to make any headway in its quest to bridge the digital gap through communication satellite, the following things should be considered:

- **Urgent need to increase penetration of broadband services**. This can be achieved by cutting down the cost with a view to offering incentives for users. According to former Executive Chairman of the Nigerian Communication Commission, Ernest Ndukwe, broadband is an enabler of development in the modern world as daily activities such as shopping, entertainment, banking, manufacturing, office work, education, medical care and even commuting had been become increasingly dependent on communication network.

- **Empowerment of Information Communications and Technology experts in the country through training of international standard**. In this vein, we endorse the recommendation of former president of Nigeria Computer Society, Professor Charles Uwadia that the Federal Government should established a technology convergence centre for satellite and other technologies for professionals to acquire international quality standard. Satellite engineers need to be trained and re-trained from time to time to be able to cope with the trends and patterns of new technologies.

- **Increase Funding**. Adequate funding is needed for maintenance of hard and soft ware components of the satellite facilities. A robust and effective maintenance culture should be built and sustained by all stakeholders in the NIGCOMSAT-IR project.

- **Partnership**. Nigeria should be ready to partner with other African countries like South Africa, Egypt and many others to rob mind together and learn from one another to improve the fortunes of satellite communication in the continent.

- **International networking.** Nigeria and other international African countries must partner with developed nations in the art and science of building a solid communication superstructure. Developing nation can be assisted in area of technology, finance and expertise. The partnership agreement should not be such that would undermine and relegate African culture to the background. The sovereignty and culture of Africans should not, and must not, be sacrificed on the altars of the proposed partnership. The assisted countries on their own must be ready to give

detail account of whatever assistance which may be rendered to them by the international community.

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