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Coverage of Science, Technology, and Innovation by Major Broadcast Networks in Nigeria: an Exploratory Survey

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Abstract

This investigates the nature of reportage accorded Science, Technology, and Innovation (STI) matters by the African Independent Television (AIT), Federal Radio Corporation of Nigeria (FRCN) and Nigerian Television Authority (NTA). Science communication research is only beginning to feature in Nigeria as a key aspect of academic inquiry. However, science and technology broadcast has been going on for decades. The study aims at knowing the feedback those broadcast media houses have been receiving from the public about the dissemination of emerging science, technology, and innovation matters as well as the perception by the select broadcast houses of the contributions of Nigeria's science community to specific areas of national development. The study adopts interviews as the instrument of data collection from senior correspondents directly involved with the selected broadcast houses' coverage and reportage of science, technology, and innovation. The major findings of the research are that not all the broadcast houses have science desks and science correspondents, although all the media houses under study cover STI matters; though in varying degrees and only the NTA has a science correspondent who is a science graduate. Also, the FRCN and NTA provide extensive coverage of STI matters with dedicated programs and segments for STI on their stations and correspondents covering

major STI Agencies and the Ministry of Science and Technology Headquarters. It is recommended that broadcast media in the country should show greater commitment to the coverage of STI matters since the majority of audience members depend on the broadcast media for information on all aspects of life. Moreover, a content analysis of news bulletins of the selected broadcast houses and other news media should be conducted to have more data on the coverage of STI matter.

Keywords: STI dissemination, Electronic media, National development, Agenda setting, In depth interviews

Introduction

Science, technology, and innovation drive a sustainable economy. It is the products of science, technology, and innovation that make industrialization possible which in turn promotes science, technology, and innovation. However, society benefits less if the end-users and beneficiaries of STIs are not aware of their products. The mass media, particularly the broadcast media play a crucial role in the diffusion of the innovations made possible by STIs. This study, therefore, examined the extent to which the Nigerian Television Authority (NTA), African Independent Television (AIT), and Federal Radio Corporation of Nigeria (FRCN) covered science, technology, and innovation issues.

Nigeria, a major geopolitical entity in the West African sub-region has a landmass of 923,768 km² and a population of about 200 million people making it the 7th most populated country in the world (naionsonline.org, 2022). Though Nigeria gained political independence in 1960, its media history dates back to 1859 – an industry that has grown near 8.1 bn in 2019. There are over 700 television and radio stations, and well over 100 national and local newspapers with more than 180 million audience members (Oxford Business, February 2011). The significance of the media landscape especially the broadcast media is the huge opportunity for science, technology and innovation communication. The import of this for national development provides a rationale for this study.

Science, Technology, and Innovation are catalysts of development in modern societies. Products or results of emerging Science, Technology and Innovation (STI) are what give a country a competitive edge over others. However, without the dissemination of the results or products of emerging science, technology and innovation, little or no benefits would be derived from such efforts, especially if those who are in the position to commercialise or adopt such innovations are not in the know. It is therefore in this situation that the broadcast media play an important role in communicating STI to relevant stakeholders and the public. The problem has however been that, since science

communication is an emerging field itself in Nigeria, observation has shown that there is an acute deficit of research output in the area. Therefore, the key questions that this enquiry poses are several. To what extent have the broadcast media been communicating efforts and products of science, technology, and innovation in Nigeria? Have the relevant stakeholders in the Nigerian science community been engaging the broadcast media to inform the public of their activities and strides? Have the broadcast firms been cooperating with the science community in this regard? These constitute the concerns of this study.

The objectives of this study are to:

- i. examine the extent to which major networks in Nigeria broadcast communicate STI efforts with the public;
- ii. find out the extent to which select broadcast media have been cooperating with the science community to disseminate efforts in the area of science, technology and innovation;
- iii. ascertain the extent of commitment by the select broadcast media to integrate science, technology and innovation contents into programming;
- iv. determine the sorts of feedback the broadcast media have been receiving from the public about the dissemination of STI matters; and,
- v. evaluate the perception by the select broadcast media of the contributions of Nigeria's science community to specific areas of national development.
 - a. Five research questions are posed for this study.
- vi. To what extent have major Nigerian broadcast networks communicated STI efforts to the public?
- vii. In what ways have the select broadcast media been cooperating with the science community to disseminate STI in Nigeria?
- viii. To what extent have the select broadcast media demonstrated commitment to integrate science, technology, and innovation contents of their programming?
- ix. What sorts of feedback have the select broadcast media been receiving from the public about the dissemination of STI matters?
- x. What is the perception by the select broadcast media of the contribution of STI efforts in Nigeria to specific areas of national development?

This study explores three broadcast stations, namely: African Independent Television (AIT), Nigerian Television Authority (NTA) and Federal Radio Corporation of Nigeria (FRCN) on how they cover issues about STI and the extent members of the science community engage them in the dissemination of STI. The structured interview was adopted to gather

information from science correspondents and heads of science desks in those stations.

Limitations of the Study

Considering the fact that this study was an exploratory one and it adopted by the structured interview as its research instrument, data so generated may not be sufficient to address all aspects of the subject matter. Moreover, researchers in this did not enjoy cooperation from appropriate personnel in the Channels TV which we originally included in the study. Moreover, the interviewees spoke generally about science, technology and innovations without specific reference to any aspect of STI as defined in the study. However, the result from this study would be useful in giving the various stakeholders a general idea about the extent of coverage and content of science, technology and innovation in the broadcasts of these stations.

Definition of Concepts

- i. **Communication:** Communication as a social phenomenon is a fundamental human activity and behaviour that involves the sharing of ideas, facts, symbols, images and other meanings between sources or senders of messages and receivers or destination of those messages. Communication often involves sharing of meaningful messages with oneself (intrapersonal); with others (interpersonal); with groups/organisations (group/organisational); with large, assembled audiences (public), through mechanical or electronic channels with large, heterogeneous, and scattered audiences simultaneously (mass communication); through mediated/ digital/virtual means (new media) or through ethnic/oral/limited means (traditional communication) (Wilson, 2006). This study investigated the broadcast media employed in the sharing of messages related to emerging science, technology, and innovation between the sources and receivers of those messages.
- ii. **Emerging Science, Technology, and Innovation:** Emerging STIs are newly developed, highly sophisticated, advanced and refined, as well as ultra-innovative fields of science and technology meant to propel human developments in education, health, ecology, trade and industry, agriculture, transportation, security, etc. Examples of emerging science and technology slated for exploration are synthetic biology, proteotronics, nutrigenomics, gastrophysics, agrobiotechnology and nanotechnology. Others are artificial intelligence/robotics, epigenomics, highspeed land transportation, agrodrones, and neuroparasitology (Dvorsky, 2013). This list is not exhaustive. However, this study concentrated on areas that bear relevance for Nigeria's national development.

- iii. National development: Development is appropriately conceptualised as those indices of human efforts that promote health, safety, education, clean environment, gainful employment, reduction of poverty, human suffering, and insecurity, and comfortable and affordable standards of living (Soola, 2002). In other words, national development in the context of this study consists of all the efforts in the area of emerging STI geared toward improving the livelihood of Nigerians. How, for instance, is the emerging agrobiotechnology championed by Nigeria's biotechnology agency being deployed to address Nigeria's food security aspiration? How is Nigeria's Institute involved in advanced engineering and materials research using nanoscience and nanotechnology to solve access to clean water or health problems? To what extent are these STI development efforts promoted by the broadcast media in Nigeria? This research was earmarked to provide answers to these questions.
- iv. Coverage: This refers to the general reportage of all matters or issues relating to emerging science, technology and innovation. This includes, but not limited to synthetic biology, proteotronics, nutrigenomics, gastrophysics, agrobiotechnology and nanotechnology. Others are artificial intelligence, robotics, diodynamics, epigenomics, high speed land transportation, agrodrones and neuroparasitology, among others.

Every society craves for development in all ramifications. One of the indices of any society's development is how it ranks in emerging science, technology and innovation. This study becomes important because its findings would provide the basis for assessing the extent of the progress Nigeria is making in the STI sectors. The findings might become useful in the creation, adoption, or modification of appropriate science, technology and innovations policy for Nigeria. It would also provide additional impetus for further or new research in this direction.

The study derives its foundation in the diffusion of innovation, agenda setting, and framing theories of communication.

Diffusion of Innovation Theory: Baran and Davis (2009: p. 271) recall that Everett Rogers "assembled data from numerous empirical studies to show that when new technological innovations are introduced, they pass through a series of stages before being widely adopted. First, most people become aware of them, often through information from the mass media. Second, the innovations will be adopted by a very small group of innovators, or early adopters. Third, opinion leaders learn from the early adopters and try the innovation themselves. Fourth, if opinion leaders find the innovation useful, they encourage their friends – the opinion followers. Finally, after most people

have adopted the innovation, a group of laggards, or late adopters, makes the change.” This process was not only found applicable to agricultural innovations, but it holds a promise for emerging science, technology and innovations both in developed and developing societies. The broadcast media play a very important role in creating awareness about and motivating the citizenry to adopt innovations.

Agenda setting theory: Bernard Cohen is generally credited with the theory of agenda-setting. According to him, “the press is significantly more than a purveyor of information and opinion. It may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about” (Baran and Davis, 2006, p. 316). Through coverage of emerging science, technology and innovations, the broadcast media to a great extent assist their audience members to understand, appreciate, and perhaps adopt new ideas and discoveries presented in the programmes.

Literature Review

From the Laboratory to the Society: Science in Broadcast Messages and Development

Science, technology, and innovation (STI) play an indispensable role in the socio-economic transformation of any modern society, they further enable the creation of new knowledge technologies which engender wealth creation, social welfare, and all-round competitiveness. “At the economic front, science, technology, and innovation play a critical role in ensuring that productivity growth occurs, and that the economy is progressively transformed into a knowledge-based economy” (Wycliffe and Ayuya, 2013, p. 458). They argue that economic development of nations depends largely on how these nations conduct and apply science and technology in their societies and that scientific and technological developments offer tremendous opportunities for economic growth, poverty reduction, and human development. In related researches particularly affecting Nigeria, Batta, Ashong, and Obot (2014) content analysed Nigeria’s elite and popular press with a focus on framing and sociopolitical involvement as they relate to science, nano-science and nanotechnology. The results showed that there was a near absence of nano-science content in the papers whereas other science subjects were common. It would be interesting to note if the situation is different with the electronic media. In another similar enquiry on interest, awareness, and involvement of Nigerian university academics in science communication with particular reference to the utilization of the broadcast media, Batta, Ali, Ekeanyanwu, Obot, & Batta (2021) found out that a dismal 5.6% of science/technology academics along with communication and media scholars neither presented nor participated in science broadcast on radio and in television. The

importance of communicating science, technology, and innovation in a developing country such as Nigeria has been loudly canvassed by Falade, Batta, and Onifade (2020) when they state that, “science communication... has an important role to play in overcoming the many development challenges facing the Nigerian State in agriculture, health, industry and environment” (p. 632).

Were it not for the mass media, most people would either be unaware of or/lack understanding of the developments made or products from science, technology and innovation. Even to many people in the media, providing information about the latest discoveries about science, technology, engineering and mathematics (STEM) is a challenging endeavour. Therefore, science journalists should be a little bit of ‘scientists’ by themselves to be able to understand what is happening in the science arena. Even if the journalists did not study any of the life sciences: physics, technology, medicine or engineering, they should think and ask questions from a layperson’s perspective.

The way the media report on emerging science, technology and innovations influences public reaction to those issues. According to Ancilloti, Holmberg, Lindfelt, and Eriksson (2015) the media can influence public attitudes and therefore an important object of study. Moreover, how a new technology is perceived by the public influences the manner in which its products and applications would be received. In Shipman’s (2015) opinion, if news stories point to controversies in the science domain on an emerging technology, the audience who respect the credibility of scientists on scientific objects are predisposed to seeing the emerging technology as risky.

Similarly, Liang, Yi-Fan Su, Yeo; Scheufele, Xenos, Nealey, and Corley (2014) acknowledge that public communication about science is up against several new challenges, including the heightened intricacies of research areas and the fading of conventional journalistic infrastructures. In view of the important role the science journalist and the mass media as a whole play in science communication, they must understand efficiently the promise and challenge that emerging science, technology and innovation present to the society. It is in this regard that Cacciatore, Anderson, Choi, Brossard, Schedufele, Liang, Ladwig and Xenos (2012, p. 3) state that, “for lay publics attempting to make sense of scientific issues, the mass media are often the most accessible source for information and opinions. The media act as cues for how lay audiences think about emerging scientific issues”. The cues that the general public receives are most likely based on the types of frames employed around a particular issue. Quoting Scheufele and Tewksbury (2007), Cacciatore, Anderson, Choi, Brossard *et al.* (2012, p. 3) state that framing refers to, “modes of presentation that journalists and other

communicators use to present information in a way that resonates with existing underlying schema among their audience”.

According to Groboljsek and Mali (2012, p. 31), “media coverage of and public attitudes to new emerging technologies focus on three outcome variables: the dominant frame, general support for the emerging technology, and the perception of the risks versus benefits.” These approaches to science communication is obviously a complete perspective on emerging science, technology and innovations. The volume and nature of science coverage to a great extent determine or influence public attitude to STI. Public acceptance of any aspect of technology largely depends on what is presented about that technology. Buttressing this, Groboljsek and Mali (2012, p. 38) agrees that, “the impact of the new media has tended to be crucial to shaping public discourse about nanotechnology when framing the debate on the benefits and risks. These processes may also be referred to as agenda-setting or priming powers of the media.

In covering or reporting emerging science, technology and innovations, key sources or actors are usually identified. These actors include scientists, journalists themselves, policy makers and civil society organisations. Scientists are central to any reportage on STI. They provide most of the information through their researches or discoveries on any area of science. Through their discreet investigations, journalists themselves can become key actors or sources of information on science-related matters. In the 1980s, for example, it was a journalist who broke the news of the dumping of toxic wastes in the village of Koko in the defunct Bendel State, now in Edo State, Nigeria and the health hazards people in the community were experiencing. Many cases abound where journalists are attributable sources of STI information (Ogbodo, 2009).

Political actors, in and out of government, play a crucial role in the chain of science communication. Often they do this as policy makers or law makers as it affects science, technology and innovation. In any case, they provide inputs for or perspectives to science coverage. Also, civil society organisations such as environment or consumer protection organisations tend to adopt a critical approach, and that for good reasons, to controversial, or almost all, scientific/technological developments.

Some challenges have been identified in communicating science, technology and innovations. These include knowledge, interest and engagement deficits. In Boholm and Larsson’s (2019) opinion, lack of knowledge and engagement among the public makes information difficult for the public to comprehend and create a disinterest among the citizenry towards emerging science, technology and innovation. Others are the fact that the public is heterogeneous with different values and emotions and these impact

greatly and variously on their researches towards products of science. This calls for building of trust with and transparency towards the public.

Moreover, many members of the science community live or appear to live and conduct their business in isolation. They may not often interact with journalists during the process of their research and development. Even after their researches had been concluded, many scientists do not engage the mass media in disseminating their efforts. It is in view of this that Aiswarya, Sanju, and Babu (2018) state that for people to know about science, the media should play a great role. It is the responsibility, nay obligation of the media to report the complicated scientific researches and deliver the same to the public in a simple manner to enable them understand. The mass media create awareness about new scientific findings and help them understand and appreciate such findings. The media serve as a link for the scientists, the public and the government.

Extending the discourse and quoting Zhao (2014); Aiswarya, Sanju and Babu (2018) identify some of the challenges of science communication among African media to include: complexities surrounding scientific matters, lack of capacity among most journalists to report STI issues, lack of investment in capacity building of journalists, fear of being misquoted or quoted out of perspective, and lack of trust between scientists and journalists. Others are conflict of interest, commercialisation, sensationalism, and negativity.

Coverage of science, technology and innovation in a few countries can provide an insight into some patterns of such reportage. In their study, Ramalho, Polino, and Massarani (2012) found out that medical science and health were the ones which received the greatest attention in the main Brazilian TV newscast (44.1%). This was followed by “Exact Sciences and Earth Sciences” – 12.9%; engineering, technology, and biological sciences (11.7%); environmental sciences – 10.4%. Focusing on ‘Synthetic Biology: Friend and Foe?’, Jewett and Caplan (2021) noted that scientists have merged biology, chemistry, genetics and other sciences to create new, synthetic organisms.’

On a survey entitled, “Public Accepts Nano risks if benefits are high,” Anna Salleh of the ABC (2006) found that people perceived nanotechnology as less risky and more beneficial than a number of other technologies such as genetically modified organisms, pesticides, chemical disinfectants and human genetic engineering. Technology has also increasingly impacted positively on the broadcast industry in a unique way. An example is the ‘use of Drones in Broadcasting.’ According to Ayranci (2017), drones offer broadcasters and journalists many benefits that traditional news-gathering techniques cannot, by allowing the journalists to get much closer to the subject than regular cameramen. The cameras attached to the unmanned aerial systems (UAS)

capture incredible videography and photography from such vantage points, which were previously possible, if at all, by helicopters and zeppelins, at a dramatically higher operation cost compared to drones.

In a “comparative analysis of the news coverage and content of science and technology in two English Dailies in India, Verghese (2016) discovered that the two dailies gave the highest percentage of coverage to environment category (environment, nature, ecology and evolution) with 29.74%, followed by medicine and health with 20.49% and astronomy and astrophysics (14.1%) and the least coverage was given to physical sciences (1.40%). Also, in another study on, “Coverage of Science News in the Three National Dailies in India, Aiswarya, Sanju and Babu (2018) discovered that issues bordering on behaviour received the highest coverage by the three national dailies (42.4%), followed by health with 40.4% reportage and technology coming third with 35.2% coverage, while the fourth position was occupied by environment with 38.7% coverage.

It could be said that the goal of emerging science, technology and innovation is to bring about the improvement in the standard of living, solve problems confronting humanity and enhance the wellbeing of people. Without the mass media, the potential beneficiaries will not get to know about the products of STIs. Therefore, the mass media play a vital role in STI diffusion.

Method

The interview schedule was the instrument of data collection, and was utilised to analyse the data. An-eight item schedule was used to gather information from senior correspondents directly involved with the coverage and reportage of science, technology and innovation by the affected broadcast houses. The following were the interviewees: Mr Chukwuma Agbanisi - Defense Correspondent/Editor- FRCN and Rabi Momoh – Science Correspondent – FRCN; Mr. Mohammed Ali – Assistant Director, News – NTA Headquarters, Abuja; Roluke Ogundele – ICT Correspondent – AIT and Sola Jayesimi – News Editor, AIT. The interviews which were conducted between May and December 2021, were recorded and transcribed for analysis.

The interviews had as their subject matters the existence of a science, technology and innovation desk in those broadcast media houses, if their editor/science correspondent were science journalists, the extent the media firm cover or report STI matters in terms of newshole, airtime/programme schedule and the proportion of their general news coverage that deals with emerging STI matters.

Others were the extent to which STI agencies seek coverage/reportage of emerging STI matters, extent the broadcast media houses source reports on STI from the relevant agencies in Nigeria, extent to which universities and STI centres receive coverage/reportage of their activities from those media firms,

the sorts of feedback the broadcast media houses receive from the public about their dissemination of STI matters and media perception of the contributions of STI agencies to specific sectors of national development.

Brief Profiles of the Selected Broadcast Stations

African Independent Television (AIT)

African Independent Television (AIT), also known by its acronym AIT, is a privately owned Television broadcaster in Nigeria. It operates free to air in Nigeria as the largest privately operated terrestrial television network with stations in twenty-four out of thirty-six States in Nigeria. It was founded in 1996 with Headquarters in Abuja and its parent-organisation is Daar Communications (AIT, 2022).

Nigerian Television Authority (NTA)

The Nigerian Television Authority (NTA) is a Nigerian government-owned and partly commercial broadcaster established in May 1977 with headquarters in Abuja. It broadcasts nationwide with stations in all the thirty-six States of the Federation and Abuja, the Federal Capital. It is the legal successor of all previous regional and state governments-owned television stations in Nigeria. These included the Western Nigerian Government Broadcasting Corporation (WNTV) established in October 31, 1959, Radio – Kaduna Television (RKTV), the Nigerian Broadcasting Corporation (NBC) established by the Federal Government in 1962, the Midwest TV established in 1972 and the Benue-Plateau Television Corporation (BPTV) established in 1974. It became the first television station to launch regular/permanent colour broadcast in Africa. The colour test transmission began on October 1, 1975. BPTV was later rebranded as NTV- Jos. (NTA, 2022).

Federal Radio Corporation of Nigeria (FRCN)

The Radio station known as Federal Radio Corporation of Nigeria (FRCN) was founded in 1933 by the British Colonial Government. Named the Radio Diffusion Service (RDS), it allowed the public to hear the British Broadcasting Corporation's Foreign Radio Service broadcasts in certain public locations over loud speakers.

In April 1950, the "Radio Station" became the Nigerian Broadcasting Service and introduced radio stations in Lagos, Kaduna, Enugu, Ibadan and Kano. This service was reorganised into the Nigerian Broadcasting Corporation (NBC) on April 1, 1957 by act of parliament. Its mission was to "provide public service." In 1978, during the General Olusegun Obasanjo's regime, the Federal Corporation of Nigeria Decree No. 8 of April, 1978 was promulgated. By that Decree, the NBC had its name changed to Federal Radio Corporation of Nigeria (FRCN). The Decree also stipulated that NBC stations in each of the then nineteen States of the Federation be handed over to the

respective governments of the States in which they were located, as their bonafide property (FRCN, 2022).

The AIT, FRCN and NTA were selected for the study because of the network of coverage.

Data Presentation

Table 1: Responses by Broadcast Stations on Reportage/ Coverage of Science, Technology and Innovation

0	Existence of a Science Desk	Existence of a Science Correspondent	Extent of STI Coverage	Proportion of Coverage of Emerging STIs	Proportion of General Coverage dealing with STIs	Extent to which STI Agencies seek Coverage of STI Matters	Extent Broadcast Stations Source their STI reports from Relevant Agencies	Coverage of Universities and STI Centres by Broadcast Station	Feedback on Stations' Coverage of STI Matters
AIT	NO	NO	Unable to ascertain	As often as invited	Routine and general	As often as the need arises	Often	Whenever invited	Not often as it should be. Not encouraging
FRCN	Yes	Yes	Extensive	Integral to general news coverage	STIs occupy a significant proportion of our general news coverage. STI feature daily in all our bulletins	We receive frequent invitation and do oblige them; in addition to the unsolicited coverage we give them. We service all the 17 STI-related Agencies including the Ministry of Science and Technology Headquarters	We frequently and routinely do so. We do not wait for their invitation. We also do special reports on trending STI issues	We offer coverage to all strata of the society. We do realise the role played by Universities and STI centres. We frequently invite them to serve as resource persons on our programmes, especially on STI matters.	Frequently and especially after we carried reports about innovations. For example, after we aired a report about remedy for epilepsy. We frequently get emails, phone calls, etc.
NTA	YES	YES. B.Sc. in Microbiology	Significantly . There is a dedicated science and Technology programme called "TECHHUB".	Very significant. There is a science reporter assigned to the Federal Ministry of Science, Technology, and Innovation	Significant. 5 Minutes of all the general news of the station is dedicated to news and issues from the Ministry of STI and STI related issues	Most STI agencies do seek and get coverage for STI matters	This is routinely done, given that we have a science desk, and dedicated science reporters to cover STI beats.	As much as possible, provided that such information is meant to be put in the public domain.	Basically commendation for creating awareness about STI matters.

Table 2: Responses on Ways STI Agencies have Contributed to National Development in various Sectors of the Polity

Station	Literacy and Education	Health and Wellbeing	Food Security and Agriculture	Environmental Protection	Water and Sanitation	Communication and Information Technology	Economic Empowerment/ Poverty Alleviation	National Security
AIT	The impact of STO is to some extent	STIs have contributed significantly	STIs have done a lot in this regard	STIs have contributed significantly	This is another area STIs have made positive impact	STIs have scored high in this sector	STIs have gained a lot of mileage in this sector	STIs have not done much in this sector. They don't open up.
FRCN	Ministry of S & T has done a lot to promote the study of Science and Technology, e.g. through sponsorship of "Young Presidential Award" science competition. The ST infrastructure have aided online learning.	Researches in this area are hampered by inadequate funding	STI innovations have led to improved agricultural inputs and productivity. 'Open forum on biotechnology' sponsored a programme on FRCN.	A lot of information has been disseminated on safe environmental practices, climate change issues, among others	A lot of progress has been made in the areas of safe and accessible potable water supply	STI agencies have made a lot of progress in this sector. The Galaxy backbone which has improved communication in the country is a product of STIs	STIs have contributed to economic empowerment and poverty alleviation through creation of opportunities for entrepreneurship, startups, small and medium scale enterprises in the telecom and POS financial services.	STIs have led to repairs and upgrading of grounded fighter aircraft. We now have locally made and purpose-built military vehicles used in the fight against terrorism`
NTA	Development of education-related software has helped in the area of acquisition of knowledge and learning	There has been improvement in healthcare delivery due to several health technologies, and innovations in drug manufacturing	New farm implements and improved seedlings have been made available to boost food security and agriculture	Improvement in safer means of preserving the ecosystem have been developed	STIs have made safer water available	STIs have made the world a smaller global village. More and cheaper access to internet services have been made possible.	Economic opportunities have been expanded courtesy of STI	National security and fight against terrorism have been improved through local advances in STIs through drones, satellite, information and communication technology and artificial intelligence.

Discussion of Findings

Data gathered through the structured interviewed with select correspondents with the three broadcast stations are used here to answer the following research questions of this study.

To what extent have the Nigerian science community been engaging the select broadcast media to communicate the STI efforts to the public?

All the respondents confirmed that they frequently receive requests from STIs agencies for coverage of their activities as well as invitations to events that border on STIs. The Federal Radio Corporation of Nigeria (FRCN) for instance stated that it services all the 17 – STI related agencies spread all over Nigeria. On its part, the African Independent Television (AIT) stated that the STI agencies seek coverage as often as the need arises, while the Nigerian Television Authority (NTA) also affirmed that most of the STI agencies do seek and receive coverage of emerging STI matters. This is a departure from the general tendency for members of the science community to live in isolation and removed from the media. This indicates the fact that the volume and nature of science coverage to a great extent determine or influence public attitude to STI. Moreover, public acceptance of any aspect of technology largely depends on what is presented about that technology.

This vindicates the fact that but for the mass media, most people would either not be aware of or understand the developments made or products from science, technology and innovations. This has been emphasised by Analloti, Holmberg, Lindfelt and Erikson (2015) that the media can influence public attitudes toward emerging science, technology and innovations. This also buttresses the relevance of the theory of diffusion of innovation.

In what ways have the select broadcast media been cooperating with the science community to disseminate emerging science, technology, and innovations?

The findings show readiness and commitment of the select broadcast media to cooperate with the science community to promote emerging science, technology and innovation. This is confirmed by the fact that most of the broadcast stations - FRCN and NTA for example have science desks and science correspondents. Of particular interest is the fact that the science correspondent at the NTA holds a B.Sc. degree in Microbiology. This strengthens the capacity of the correspondent to achieve greater efficiency and productivity in science communication. With this, NTA has not only justified its agenda setting role of ensuring that through its coverage of emerging science, technology and innovations, its audience members get to understand, appreciate, and adopt new ideas and discoveries presented in the broadcasts. Moreover, the broadcast stations confirmed that they frequently receive

invitations from the STI agencies for coverage, to which they have been obliging. This also buttresses the fact that were it not for the mass media, most people would either be unaware of or lack understanding of the developments made or products from STI. This has underscored the diffusion of innovation theory which holds that, when new technological innovations are introduced, they pass through a series of stages before being widely adopted. First, most people become aware of them through information from the mass media... (Baran and Davis, 2009: 271).

To what extent have the select broadcast stations demonstrated commitment to disseminate science, technology, and innovation contents of their programming?

There was a unanimous commitment by the broadcast media in this regard. Africa Independent Television (AIT) spotted that though it cannot ascertain the extent of their STI coverage, there has been a serious and significant coverage of STI matters in their news bulletins. The FRCN described its commitment as being extensive, while NTA held that the STI contents of their programmes were significant. It also added that there is a dedicated science and technology news and current affairs programme on their station named “TECHHUB”.

On the proportion of coverage of STI, AIT stated that it does it as often as they invited. For the FRCN, STI is integral to its general news coverage. The NTA in particular pointed out that it has assigned a science reporter to cover the Ministry of Science, Technology and Innovation Headquarters, Abuja. This is a good testimony of its commitment to promoting the science, technology and innovation through its programmes.

Regarding the proportion of reports dealing with STI, AIT said that its STI contents is generally routine. Such categories of reports feature daily in all the FRCN news bulletins, while five minutes of all the general news programmes on NTA are dedicated to news and issues emanating from the Ministry of Science and Technology. This is a clear indication of the commitment by NTA to include the STI contents of the news.

The extent to which broadcast stations source STI information from relevant agencies also indicate the commitment to integrate STI contents of the news. The AIT stated that it does so very often, the FRCN said it was routine, without waiting for invitation as well as when the station does special report on trending STI issues. For NTA, the fact that it have a science desk and dedicated reporters to cover STI beats is evidence of its commitment to disseminate STI information.

Coverage of universities and STI centres also provide broadcast stations the avenues to project STI contents of their news. AIT said it always do so when invited. FRCN said it provides coverage to all sectors of the

economy including universities and STI centres in realisation of the important role universities and STI centres play. Moreover, experts from such places are often invited as resource persons to all news and current affairs programmes of FRCN. On its part, NTA said that universities and STI centres are often consulted on issues of public interest. It is in this light that Cacciatorre, Anderson, Schedufefe, Liang, Ladwig and Xenos (2012, p. 3) affirms that, “for lay publics attempting to make sense of scientific issues, the mass media are often the most accessible source for information and opinions. The media act as cues for how lay audiences think about emerging scientific issues.” This is where and how framing theory plays out. This also finds correlation with the findings by Ramalho, Polino and Massarani (2012) to the effect that medical science and health were the ones which received the greatest attention in the main Brazilian TV Newscast. Both the agenda setting and framing theories have been justified here.

What sorts of feedback have the select broadcast stations been receiving from the public about the dissemination of emerging STI matters?

The AIT said the feedback it has been receiving from the public has not been frequent and encouraging as it should be. On its part, the FRCN said feedback received from the public has been frequent, especially after carrying reports about innovations in the area of remedies for health conditions or challenges as it was the case with their report about pharmaceutical intervention for epilepsy. The NTA said the feedback received have been commendations for the awareness it has created on and about STI matters. This resonates with what Boholm and Larsson (2019) stated: “lack of knowledge and engagement among the public makes information difficult for the public to comprehend and creates a disinterest among the citizenry towards emerging science, technology and innovation.” The volume of feedback a broadcast station receives may be directly proportional to the extent to which the medium has disseminated STI matters.

What is the perception by the select broadcast media of the contributions of Nigeria’s STI engagements to specific areas of national development?

This assessment was done under the following areas: literacy and education, health and wellbeing, food security and agriculture, environmental protection, water and sanitation, communication and information, economic empowerment and poverty alleviation as well as national security.

Literacy and Education: In AIT’s submission, Nigeria’s science community has helped to some extent. For the FRCN, the Ministry of Science and Technology has done a lot to promote Science and Technology through their sponsorship of the “Young Presidential Award” Science competition. Moreover, the improved STI infrastructure has aided online learning. For

NTA, the development and advancement in educational software has helped in the acquisition of education.

Health and Wellbeing: For AIT, the science community has contributed significantly. Also, to FRCN, researches in this area have been hampered by inadequate funding and in the assessment of NTA, there has been some improvement in health-care delivery due to several technological innovations in drug manufacturing.

Food Security and Agriculture: The African Independent Television (AIT) stated that the Nigerian science community, has done a lot in this regard. To FRCN, STI innovations have led to improved agricultural inputs and productivity. One of such examples is the sponsorship of Open Forum on Biotechnology for the station. For NTA, genetic modifications for improved seedlings have been made available to boost food security and agriculture.

Environmental Protection: For AIT, the Nigerian science community has contributed significantly to environmental protection. FRCN noted the science community has been disseminating a lot of information on safe environmental practices, climate change issues, among others. On its part, NTA stated that there has been some improvement in safer means of preserving the ecosystem.

Water and Sanitation: In this area, AIT stated that the Nigerian Science Community has made a positive impact. FRCN held that a lot of progress has been made in the area of safe and accessible portable water supply. NTA agreed that the Nigerian science community has made safer water available.

Communication and Information: AIT stated that STI has scored high in this sector. FRCN also agreed that there is a lot of progress in this area as well. For example, the adoption of the Galaxy Backbone has improved communication and information in the country. Also, NTA assessed that the Nigerian science community has made Internet access and services more accessible and affordable.

Economic Empowerment and Poverty Alleviation: AIT noted that it has made a lot of mileage in this sector. FRCN stated that STI agencies have contributed a lot to economic empowerment and poverty alleviation through the creation of opportunities for entrepreneurship, especially in the telecommunication and franchise banking services, such as POS services. The NTA pointed out that economic opportunities have been expanded through STI.

National Security: In the estimation of African Independent Television (AIT), the Nigerian science community has not done much in this sector, and may be so because security agencies do not open up to interact with the media. For FRCN, STI agencies have helped in the repairs and upgrading of grounded Nigerian fighter aircrafts, to the extent that there are locally-made

and purpose-built military vehicles which have been deployed in the fight against terrorism in the country. Similarly, NTA noted that national security and war against terrorism have improved through advancement in STI.

On the whole, both the FRCN and NTA reported extensive interactions with the Nigerian science community and that explains their robust assessment of the contributions of the major players in the Nigerian science community to national development. This perception may be influenced by and limited to how much the broadcast stations know about or are carried along by members of the science community. This is because many members of the science community live or appear to live and conduct their business in isolation. They may not often interact with journalists during the process of their research and development. Even after researches had been conclude, many scientists do not engage the mass media in disseminating their efforts. Therefore, the relevance or efficacy of the diffusion of innovation theory becomes frustrated.

Conclusion

From this study, it became apparent that there is a lot more to be done in science communication in Nigeria. There is a lot of information gaps involving the mass media and the public. STI researchers appear not to be opening up and collaborating with the broadcast media which are the major avenues of information for most members of the public. This communication gap and information deficit have manifested in the little or no feedback between the public and the broadcast media over STI coverage. Moreover, the perception by the media of the contributions of STI agencies is to a great extent determined by the extent of interactions and collaboration that exist between the media and STI agencies.

Recommendations

In view of the important role played by STI agencies and research centres, more funding for research and development should be provided. Dissemination of activities by STI agencies, and research centres should improve, because this is the only means through which their efforts would be made known to the public for eventual adoption and commercialisation. Moreover, since STIs are not done in a vacuum, media coverage should be mainstreamed in the research and development stages so that the potential beneficiaries would know about the opportunities and risks involved in such activities and products.

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