The Role of Technology and Engineering in Securing Nigeria's Border

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ABSTRACT

Security challenges in Nigeria have reached an all-time high, with the government confronted with multiple security challenges, notably the Boko Haram Islamist insurgency, armed banditry, farmers-herders clash, the Niger Delta Militancy, piracy, kidnapping, etc. Among the many causes of these security challenges is the porosity of the Nigerian borderline and cross-border security challenges. This has aided crime and security challenges across Nigeria. Some of the pertinent questions raised in the paper are: do the agencies responsible for securing our borders have the proper technological infrastructure in place for the purpose of surveillance and detection of potential threats or contraband items? Do they have technological means of recognizing and stopping illegal immigration? If properly harnessed, engineering technology will play a critical role in strengthening Nigeria's national security. The use of intelligent monitoring systems, data mining and database tracking systems, and information sharing will greatly improve the ability of the security agencies to combat security challenges in Nigeria. As a recommendation for securing Nigeria's border, the government should invest more in our boarder control and management sector, especially in the purchase of state-of-the-art equipment, thereby promoting national security.

KEYWORDS: Border, Security agencies, Border control, National security, Nigeria

INTRODUCTION

Nigeria, which lies between latitudes 4° and 14°N and longitudes 2° and 15°E, has a total area of 923,768 km2 (356,669 sq. mi). Nigeria's border spans 4,047 kilometers (2,515 mi) and shares borders with Benin (773 km), Niger (1,497 km), Chad (87 km), and Cameroon (1,690 km), and has a coastline of at least 853 km ("Nigeria," n.d.). The border region, which has conventionally been used as a passage and a trade route, has over the years become very difficult to control and monitor by immigration and customs authorities. In most parts of the country, hardly any natural boundaries exist between these borders; the exact demarcation

remains ambiguous and porous. For too long, the Nigerian state has failed to take the appropriate actions to stem the influx of arms and ammunition into the country. According to Transparency International, militias and sundry criminals bribe officials to smuggle weapons into the country at the country's entry points, which include seaports, airports, and even land borders. The adverse effect of illicit weapon trafficking in Nigeria can be said to be the basis of insecurity in the country, accounting for increasing violence and mass killings. Our porous borders pave the way for the free flow of arms in and out of Nigeria. It also contributes to an increasing number of human and drug trafficking incidents, which remains a challenge to authorities within and outside Nigeria.

Since the death of the former Libyan leader, Muammar Gaddafi, a huge number of weapons have been taken away from Libya, and these fire arms and other sophisticated weapons are being used for cross-border crimes as well as insurgency. Also, it is no secret that some of the Boko Haram terrorists are recruited and trained outside our borders, then brought in to cause mayhem. They have even been speculated to retreat into neighbouring Niger, Chad and even Cameroon when under severe offensive by the Nigerian army. This also has a significant impact on our electioneering process as our politicians, for some odd reasons, engage youth gangs, arm them while using them for ballot snatching, assassination, and thuggery. In the Niger Delta, arms proliferation plays a role in gang activities (cultism) and the vandalism of crude oil assets by armed groups. There is also the activity of militia groups in the Middle Belt, which has claimed so many lives since the beginning of the year. Also worthy of mention is the trade-off between oil bunkers in the Niger Delta and people who bring weapons to them via the sea borders in exchange for crude oil. Nigeria, which has been tackling multiple challenges posed by our border porosity, has had its efforts compounded by globalization that is tearing down traditional borders.

According to Opanike and Aduloju (2015), African states have realized they cannot exist in isolation and are now increasingly interdependent. This current global trend of interdependence between and among states has encouraged the opening of borders among them. Countries with varying degrees of development in socio-economic, political, and cultural spheres are thrown together in one form of regional arrangement or the other, and this has further helped in facilitating the activities of transnational criminal activities. The dimension of trans-border crimes, with its implications for regional and global peace and security at large, has taken a new turn in this era of globalization. The dwindling security situation in Nigeria has over the years been the focus of a lot of theoretical studies in academia targeted at pinpointing the roots and proffering likely solutions. In his work, Agena (2012) focused on the issue of the Nigerian state and terrorism; Babatola (2015) examined the Challenges of Nigeria's Borders and Frontier Security; Adeola & Oluyemi (2012) dealt with the Political and Security Implications of Cross-Border Migration Between Nigeria and Her Francophone Neighbours. However, none of these studies has looked at the possibility of harnessing the power of modern technology and engineering innovations to combat the security challenges posed by trans-border immigration as well as other aforementioned factors.

Each of these border sectors is different, and so are the threats from each of our borders. It has been observed that the threats from the southern border significantly differ from the threats to our northern, eastern, and western borders. The differences in terrain and climate require that we understand each aspect individually and develop a holistic strategy for deploying various resources across our borders with the hope of securing these borders. One can say that the Nigerian government has been more concerned with revenue generation at

our borders than taking steps to man them and prevent the flow of contraband goods and items as well as illegal immigrants. In developed countries, the traditional procedures of physical border controls over the movement of goods and people using documentary checks and physical inspection have become altered with more emphasis on intelligence procedures that are technologically advanced and designed to identify illegal activities at the borders. Organized criminal groups or individuals carry out their illicit activities using major technological tools such as information networks, financial systems, and other sophisticated means, and this seriously hampers state efforts to respond adequately to the threat of organized or trans-border crimes (Osimen 2017). That these trans-border criminal groups conveniently escape national security and laws promulgated to combat their operations is a pointer to the level of sophistication of their methods and techniques, thus the need for the government to invest in technology and engineering innovations as a counter measure aimed at securing the nation's borders. The application of modern technology in our everyday lives has proven to be of greater advantage than disadvantage, especially in the area of security. Therefore, the question this study is out to answer is: how can engineering innovations and technology contribute to securing Nigeria's borders?

CONCEPTUAL ISSUES

What does Border Security Mean?

According to Osimen, Goddy et al (2017), Border security which is a factor of border management means different things: border control, border monitoring, border protection, etc. Usually, border security has been used to mean border control, which seeks to facilitate or limit the movements of people, animals, plants, and goods in and out of a country. Border control is divided into two main categories: securing borderlines (activities along the boundary), and controlling ports (harbors, border posts and airports) of entry.

He adds that States are recognized under international law by their capability to maintain their boundaries, secure their territories, and protect their citizens. The ability to secure national borders is one of the criteria used to classify states as strong, weak, or failed. A state has a primary responsibility of protecting its citizens from both internal and external threats to their livelihoods. It must be pointed out that the strategic location of a country determines opportunities for illegal activities that exists or can take place in its border areas. Some countries are more threatened by insecurities or mismanagement of other countries borders than their own.

How can Border be Managed?

Even with the increasing number of insecurities, borders need not be shut. It must remain open to the movement of people, goods and services. But openness without adequate control allows the possibility of threats such as transitional crimes and even terrorism to be successful (Eselebor 2008) as Nigeria is experiencing in recent times, thus there is need for border management. Border management which is best performed as a joint activity amongst bordering countries cannot be done unilaterally. It is most efficient and effective when organized regionally. Border management which is the primary function of government agencies such as immigration, customs, police and other security apparatus of government, aims at controlling and regulating the flow of people and goods across a country's border/boundary in the national interest (particularly economic development, security and peace). Border management also includes maintenance of boundary beacons that mark the physical limits of the country's territory.

Issues and Challenges in Nigeria Border Security

Trans-border criminal activities, which have existed in Nigeria since the 1980s, became more visible during this time period. Although without much empirical evidence, Nigeria is counted amongst the top-ranking global criminal syndicates (Bayard et al., 1999:10-11; Williams, P.1998:263-4). Osimen, Goddy et al. (2017) enumerate the following as key issues in border management in Nigeria: Human trafficking, arms smuggling, drug trafficking, and contraband smuggling. This study discovered in detail the challenges to border security as described by Akinyemi (2013) and they are discussed below.

Porosity of Borders

Porous borders contribute to and continue to encourage cross-border crimes and instability in the region. It also promotes the increasing number of illegal trades such as smuggling of contraband goods, including stolen cars that have exceeded the permissible age limit prescribed for use in Nigeria, and other goods like shoes, poultry products, and many more. The porous borders could also be explained by the use of dried trees, oil drums, as well as rims of tyres to demarcate the national borders. This makes the border disorganized, poorly managed, and insecure. This promotes the unrestrained influx of illegal migrants and cross-border activities. However, there are indefinable corridors or regions that serve as a route for these illegal migrants, thereby posing a serious threat to the country and the national borders. For instance, it has been discovered that Nigeria has 1497 irregular and 84 regular routes as movements were done through illegal routes (Nigeria Immigration Service). There are so many outlets for smuggling various goods across the border.

Corruption

The corrupt practices of the security operatives at the borders pose a serious challenge to border security. The corrupt and inept attitudes of border officials, resulting in the numerous check points of bamboo suspended by oil drums, also negatively affected border security. It is important to note that these checkpoints are not meant to check passports but to extort money from people. Hence, criminals easily infiltrate the borders as smugglers bribe their way into the country. It also explains why we have many criminals involved in trans-border activities and terrorists in the country as criminals move in arms and ammunition and thousands of innocent Nigerians have been killed and many more die in the hands of Islamic sects with the influx of weapons into the country as smugglers continue with their business without being punished.

Inadequate Manpower and Logistic Support

Another problem related to border security in Nigeria is the inadequate manpower or personnel which has a negative impact on the security of our national borders. It makes it difficult for the security operatives to adequately control the national boundaries and effectively patrol these several corridors that lead to the country. The inadequate manpower does not allow for adequate patrolling of these illegal routes as criminals use the illegal routes as a means of entry into the country. Also, the criminals sometimes outsmarted the security operatives at the borders due to inadequate personnel and logistics problems.

Poorly Patterned Borders

Nigeria borders are artificial creation from colonialism which continues to pose a serious threat to the country. The demarcation of the borders was done by the colonial masters without considerations to the culture of the people as can be seen in the cultural ties of marriages, celebration of religious festivities, language and many more. It should be noted therefore, that boundary delimitation affects the cultural and ethnic homogeneity of the border communities to the extent that one cannot differentiate a Nigerian from Nigerien due to culture and linguistics in which communities with homogeneous culture and language are found at different sides of the borderline hence makes it difficult to put in place immigration laws when members can just change their identity when they feel like.

Institutional Framework

ECOWAS Protocol on Free Movement of People, Goods and Services was established by the ECOWAS Member States in 1979. The main aim of this Protocol is to facilitate the free movement of people, goods and services within the West Africa without Visa; this simply means that any ECOWAS citizen who poses valid travelling document and International Health Certificate can transverse the entire region without a visa. Thereby, compelling all member states to abolish the use of visa in order to ease the movement of people in the region. However, in spite of the positive pronouncement of this protocol, it has its own negative effects. This protocol allows the movement of criminals to move across the border and also engage in cross border activities under the pretext of this protocol. It is important to note that; border has become a safe passage for people without identities as ECOWAS Protocol on Free Movement has been abused to mean an entry without valid documents. The following factors pose a serious threat to the internal security of lives and property in the country, as the infractions at the border calls for enforcement of reforms of the border control system. While terrorists move from in and out of the country, smugglers of all kinds of contrabands continue with their business. For instance, the recent security challenges in Nigeria, there are speculations that these groups are also from neighboring countries, this would not have been possible if there were adequate security at our national borders. The borders are seen as means of smuggling of illegal weapons and all contrabands goods; even armed robbers usually escape through the boundaries after committing crimes in the country. All these tend to endanger the socioeconomic development of the country as well as the political stability. Also, the integrity and the image of the country is now put to questioning as Nigerians face a lot of harassment and subject to all kinds of humiliation outside the country.

Lack of Provision of Basic Amenities

The lack of development by the government to provide basic social amenities in the rural areas as well as the border communities. This is another factor militating against good border security. When the people in the rural areas and the border communities are living in abject poverty and lack basic infrastructure, it makes them encourage cross-border activities and also involve them in clandestine activities such as armed banditry, smuggling and many more. There is a need for the government to develop the rural areas and the border communities.

Political Instability and Economic Crisis in Neighboring Countries

Nigeria is the most populous as well as the richest country in West Africa. In terms of economy, population preponderance, and military capability, Nigeria dwarfs all these countries. This explains the reason why crises in neighboring countries, such as political instability, famine, and diseases, spill over into Nigeria, as her proximate neighbors depend solely on Nigeria. This was also evident in Babangida's speech, the former President of Nigeria, when he said that none could benefit from the economic collapse of any country in the sub-region. This simply means that the national security of Nigeria is dependent on the security of its immediate neighbors, as this is demonstrated in both the scope and intensity of cross-border smuggling activities that take place in their daily interaction. However, when Ghana was suffering from an economic downturn, many citizens of Ghana flew to Nigeria to make ends meet. Nigeria was so badly affected that she had to send them back to their country due to these illegal aliens that invaded the country.

Furthermore, the factors enumerated above tend to pose a serious challenge to the country by adding to the internal insecurity of lives and properties. Also, in the 21st century, which is characterized by globalization, there is a need for integration and cooperation. If not, we will lose out in the new global order. As globalization emerges, so do the challenges, which become more complex and require a new approach. It is against this background that we cannot be dormant in the pursuit of security at our national borders in Nigeria or else the environment will continue to be hostile and insecure for the people therein.

Engineering Innovation/Technology and Border Security

Ogedebe & Jacob (2012) opined that for the Nigerian security services to be able to address security issues adequately, there is a need to focus on three research areas: security (this includes detection, identification, recovery, and new security models); information fusion (information fusion includes research in data and text mining, data integration, language technologies, image and video processing, and evidence combination); and critical infrastructure-base as recommended by the National Research Council Committee on Science and Technology for Countering Terrorism in the USA. None of this can be achieved without the contribution of engineering research. The protection of our borders cannot be possible without the incorporation of modern technology. Due to the improvement in technology being brought about by engineering research, most advanced countries have been able to incorporate this technology into their national security strategy. This has not only improved its efficiency in securing the nation, but it has also reduced losses in both manpower and resources. For example, with the use of surveillance drones, the Americans have been able to monitor and manage their borders against illegal migrants and drug traffickers.

Recently, it was speculated that the insurgent group Boko Haram now has access to drones which they use to survey and monitor their targets before and during attacks. This could have been mitigated with the right technology in the hands of our military. Advancement in technology has brought about a fast and effective anti-drone surveillance system that is designed to detect, distract, and disable any anonymous drone from flying into a protected area. Smugglers don't care if it is night or day, and they are known to hide in the covers of the night to move illegal goods and prohibited items across borders. But technology has improved greatly, even to the point of providing clear and near-perfect vision in the dark. With technologies like long-range thermal imaging border cameras, night time surveillance is now made possible. Deployment of new technologies within our borders will not only

improve security but will also help guarantee good surveillance of the largely unmanned areas.

Technology and Engineering Innovation as a Mechanism for Securing Nigeria's Border

As proposed in his work, Cosmas, (2013) enumerated mechanisms under which Digital Image Processing assist in reducing crime. The mechanism aims to reduce crime based upon the following assumptions:

- (i) **Deterrence:** The potential offender becomes aware of the presence of surveillance and other physical obstructions, assesses the risks of offending in this location to outweigh the benefits and chooses either not to offend or to offend elsewhere.
- (ii) *Efficient Deployment:* CCTV Cameras, Underground Movement Sensors, and other surveillance apparatus ensure that resources are called upon only when and where best needed thereby saving cost while increasing efficiency. Also, with the use of unmanned surveillance technology, deployment to extremely dangerous or hostile environment and harsh environmental conditions are now possible. This has helped reduce personnel casualty. Drone technology offers undetected coverage of large area due to flying at high altitude offering real time data feeds. This has offered extended surveillance capability coupled with ease of deployment.
- (iii) **Detection:** Real-time surveillance equipment captures images of crimes in progress. In some cases, this may lead to the capture of the offender and the removal of the offender's ability to offend. In other cases, images of the offender captured while perpetrating the offense have aided their detection and subsequent arrest and also served as evidence during their prosecution.

Suggested Ways of Border Security Using Technology and Engineering Innovation

The Nigerian government spends millions of dollars yearly to procure weaponry and other logistics aimed at combating heinous crimes, but this has not yielded the desired result. It has become necessary for the government to realize that physical combat alone would not be able to successfully curb these present-day crimes, but rather a scientific approach through the use of hi-tech equipment for intelligence gathering and forensics could be used to aid physical combat for a successful operation. This, as well as some others, are some of the key components or ingredients missing in our efforts to combat crime. Also, a lack of political will could not be ruled out in some quarters. Crimes that could have been nipped in the bud go completely undetected because of a lack of effective surveillance and tracking tools. Highprofile murder cases have remained unresolved because there is no reliable database, surveillance, tracking, or forensic tools that could aid in the investigations (Adegoke, Phillips & Keshinro, 2015).

This paper presents a unique approach to ending the menaces associated with border porosity in our country through the use of technological tools such that if these tools are well harnessed, they will stem this menace in our society (Nigeria). A special focus should be placed on the use of new and advanced technologies specially developed for the surveillance and protection of our country's borders. Listed below are the technical tools suggested for border security.

Sensors:

- > Radar and Sonar: Both being the acronym for Radio Detection and Ranging and Sound Navigation and Ranging respectfully, they are similar in that they both are detection systems that can identify objects and their position when they are not visible.
- ➤ Intelligent Unattended Ground Sensors: These are easy to deploy and conceal ground sensors which combines seismic, acoustic, passive infrared and intelligent day and night motion cameras which enables all round surveillance without being seen.
- ➤ Underground Movement Sensors: These are completely invisible and environmental condition immune sensors buried underground for detection and tracking of personnel and vehicular movements used mainly for perimeter defense and boarder monitoring.

Ground Facilities:

- ➤ Command and Control Centers: These are typically a secure room or building in a government, military or prison facility that operates as the agency's dispatch center, surveillance monitoring center, coordination office and alarm monitoring center all in one (see Fig. 3).
- ➤ Fusion Centers: These are intelligence gathering, analysis and dissemination centers. They are designed to promote information sharing between security agencies. They may also be affiliated with emergency operations.
- Fixed and Mobile Observation Towers: These are fixed or mobile structures mostly giving a full 360-degree range of vision to conduct a long-distant observation (see Fig. 5 and Fig. 6).
- ➤ Remote Video Surveillance System (RVSS): These are remotely operated surveillance systems(cameras) which provide round the clock surveillance feeds (including in low visibility conditions) (see Fig. 2).
- Fixed Wide Area Persistent Surveillance (FWAPS): These are surveillance systems with the ability to provide surveillance over regions known to be associated with a specific activity in order to increase the chance of detecting and observing the activity, identify the entity, track the entity forward in real time or backwards forensically.
- ➤ Real-Time, Assured Communications: Real-time communications (RTC) is a mode of telecommunications in which all users can exchange information instantly or with negligible latency. In most case, it can come embedded with Tactical Communications system which has critical secure voice, data, and video communications.
- Obstacle plans (walls, fences, berms, barriers)

Aerial and Maritime Systems:

- ➤ Maritime Patrol Aircrafts/ helicopters
- ➤ Long Range Trackers and Airborne Early Warning Aircraft

- ➤ Persistent Surveillance System/Aerostat
- Overhead imagery for coherent change detection
- Unmanned aerial systems for a variety of missions
- ➤ Vehicle and Dismount Exploitation Radar (VADER)



Fig 1: Mobile Vehicle Surveillance Systems (MVSS)



Fig 2: Remote Video Surveillance System (RVSS)



Fig. 3: Command and Control Centers



Fig. 4: Unmanned Aircraft System



Fig. 5: Perimeter Fence



Fig. 6: Mobile Observation Towers

CONCLUSION

Developing specialized 21st-century border management potential entails establishing a balance between security and the licit flow of people and trade. The border should present an obstruction and a deterrent to illicit crossings and smuggling. Attaining this balance is vital to the nation's security and, in turn, supports trade and tourism. Understanding the risks posed by such cross-border security issues will give direction for policy makers who will formulate laws and channel resources where they are most required. This paper focused on the blue-print recommendations of ECOWAS and other alternative options to address cross-border crime and security in the West African sub-region. Some attempts have been made to thwart, limit, and perhaps eliminate cross-border crime activities in Nigeria, but these attempts have not done well in decreasing the on-going cross-border crimes. The on-going insecurity within and outside our borders calls for more efficient responses to the various categories of crime. Nigeria can reduce illicit border activity and criminality if it focuses on developing infrastructure and economic conditions in the border communities. Unfortunately, the effort made by the government is not delivering the desired effect and has not lessened illegal activities along the porous borders to the degree desired.

This paper has examined the issue of engineering/technology and its role in national security, especially on our borders. Some of the issues include corruption, inadequate research, lack of technological knowhow, inadequate funds, and political instability. All these make up a major source of insecurity in Nigeria. It is quite evident that technology has an excessive part to play in national security in Nigeria. The growing importance of engineering and technology offers new opportunities to benefit modern society. To effectively tackle Nigerian security challenges, modern intelligence gathering devices must be procured and deployed by security agencies like the police, the SSS, the Army, the Navy, the Air Force and other paramilitary services involved in securing the nation. A surveillance system that can monitor public places must be put in place. There is a need for adequate border patrol and the use of GIS and surveillance equipment to monitor people and weapon proliferation. There is a need to ensure the loyalty of security agents and a need to purge the system of corrupt ones.

RECOMMENDATIONS

The insecurity situation in Nigeria has been compounded by a lack of technological knowhow, especially in the aspect of using technology as a tool in tackling illegal crossings and smuggling. Hence, some recommendations were derived from this study:

- 1. The government should invest more in our border control and management sector, especially in the purchase of state-of-the-art equipment.
- 2. Governments and individuals should focus more on engineering and technology-related research.
- 3. Fused intelligence must be available to all agencies. It is important to have representatives from the military, intelligence, internal security, and other groups in the fusion center.
- 4. The government of Nigeria should continue in the fight against corruption.
- 5. There should be proper collaboration between agencies of the government, especially those responsible for immigration and security.

- 6. The government should do more than mere talking and establishing acts on anti-terrorism, but see it through to implementation.
- 7. Incentivizing participation in the border forces (with higher pay or rations) can prove helpful in offsetting boredom and frustration with postings to remote locations.
- 8. The government should ensure an effective, dynamic career development and training program which is crucial in developing and sustaining a strong, highly skilled, technology-savvy workforce.

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