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INSECURITY AND DRONE TECHNOLOGY: HOW TO SECURE NIGERIA'S FUTURE

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Abstract
Drone application is spreading like wild fire into virtually all facets of human endeavour all over the world, from military to civilian, agriculture to industry, surveillance to photography, transport to construction, just name it. All these are indicators of economic growth and stability yet Nigeria is grappling with high-level insecurity, kidnapping, mineral resources theft (oil, gold, californium 252 stone, uranium, etc) and oil pipe line vandalization, banditry attacks, poor border and port control and management, unstable power supply arising from a host of problems one of which is power line cable theft and falls. When put together, these run into trillions of Naira losses annually with the attendant implication of economic woos, unemployment, starvation, human displacement (refugees) and fear of the unknown (a total wipe out of the middle class and destitution). Embracing drone technology in Nigeria will reduce this economic hemorrhage by a minimum of 96%, stimulate economic activities in all the facets, create jobs and self-esteem of the common Nigerian.
Keywords: Economic growth, insecurity, Economic woos, drone technology

Introduction

Nigeria's Economic woos

1. On 18 Dec 2024, SaharaTV reported that the National Bureau of Statistics (NBC) published that Nigerians paid a whopping N2.23 trillion ransom to secure the release of their kidnapped (1). This report estimated 2,235,954 kidnapping cases over the 12-month period from May 2023 to April 2024. , with a staggering ₦2.23 trillion paid as ransom—averaging ₦2.7 million per incident over the 12-month period from May 2023 to April 2024. According to the report, 1% of Nigerians—approximately 2.24 million people—were kidnapped in the past year, placing Nigeria at the top of global kidnapping . The same report indicated that no fewer than 614,937 Nigerians were killed. The alarming revelation is contained in the NBS report titled "The Crime Experienced and Security Perception Survey (CESPS) 2024", based on surveys conducted within the review period. Among the reported kidnapping cases, 82.1% of victims were released, 12.8% were killed, 3.3% remained in captivity, and 1.3% had an unknown outcome.

It is worthy of note that for every one case reported, more than 4 cases were left. This means that there were more than (2,235,954 * 5) kidnapping cases within the 12 months in question and a whopping N2.23 trillion * 5 paid, which is N11.15 trillion. That is just for the 12 months period from May 2023 to April 2024.

On motor vehicle theft, the report stated that 1,587,363 vehicles were stolen nationwide.

2. Nigeria, Africa's largest economy and most populous nation, is blessed with 44 different types of mineral resources in commercial quantities, which are found in over 500 locations in the 36 states of the country and the Federal Capital Territory (2)

In the words of Olamilekan Adegbite, who is Nigeria's Minister of Mines and Steel Development, some of the minerals include baryte, kaolin, gypsum, feldspar, limestone, coal, bitumen, lignite, uranium, gold, cassiterite, columbite, iron ore, lead-zinc, copper, granite, laterite, sapphire, tourmaline, emerald, topaz, amethyst, garnet, among others.

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Nigeria's mining sector is diverse in mineral resources that make a significant contribution to the nation's gross domestic product. The country is endowed with an estimated US$700 billion in commercially viable minerals, giving it the capacity to diversify its revenue sources and boost foreign exchange earnings. However, the mining sector faces multiple challenges. Its poor performance can be attributed to various factors including opaque extraction, insecurity and organised crime.

Nigeria's natural resources have been exploited by foreign criminals for decades, and the extractive sector is the most recent target. Since early 2020, several Chinese nationals have been arrested in Nigeria for their involvement in illegal mining (3).

3. Business Day Newspaper of November 25, 2024 reported that the NNPC and the Ministry of Petroleum had estimated that Nigeria loses between 200,000 and 400,000 barrels of crude oil daily due to theft at the cost of $77.96 per barrel.

- A recent report by Nigeria Extractive Industry Transparent Initiatives (NE- ITI) estimated that Nigeria loses about 9 billion dollars annually to illegal mining and smuggling of gold. This revelation highlights a deep-rooted issue that has severe implications for the nation's economy and environment (4) MMS Plus of July26, 2024 (5) indicated that Between January and July 2024, Nigeria lost an average of 437,000 barrels of crude oil daily, worth about $10bn due to theft, vandalism, and other criminal activities, the House of Representatives declared. It must be noted that these are under reportage because even currently, Nigeria's crude export is not metered, neither is the number of export terminals authenticated (completely known).

The table below indicates the losses Nigeria had due to oil theft from 2015 to 2022.

Year	Crude Oil Production (Volume Million Barrels)	Crude Oil Loss (Volume Million Barrels)	Crude Oil Revenue (Naira Billion)	Crude Oil Revenue Loss (=N= Value)	Crude Oil Revenue ($ Value)	Crude Oil Loss ($ Value)
2015	775.54	27.12	9,783.93	54.096 billion	50.63	1.43 billion
2016	661.09	101.05	7,364.73	1.591 trillion	29.05	4.42 billion
2017	690.01	36.46	11,571.15	717.65 billion	37.89	1.99 billion
2018	700.84	53.281	15,484.29	1.172 trillion	50.67	3.857 billion
2019	734.70	42.248	15,067.18	849.4 billion	49.15	2.772 billion
2020	649.42	53.056	10,484.85	787.7 billion	29.26	2.21 billion
2021	583.66	43.457	16,597.16	698.2 billion	41.14	2.18 billion
2022	498.16	41.679	21,216.26	654.3billion	50.06	2.09 billion

Source: National Bureau of Statistics (2022)

4. The effects of banditry on agriculture production in Nigeria:
   Among the socio-economic impacts of banditry include: loss of income and economic opportunities, displacement and migration of the rural population,

reduced productivity and infrastructural degradation. These led to food shortages, hikes in food prices, malnutrition and increased poverty level in Nigeria.

5. Furthermore, the findings show that poor electricity supply has resulted to decay and collapse infrastructure, closure of industries as well as rapid decline in the availability of social amenities like potable drinking water, improved health care services , etc.

Implications of Poor Electricity Supply on Nigeria's National Development

Besides, the installed capacity is 8,000MW, but only 4,000MW is operable of which only about 1,500MW

is available to generate electricity. At 125 kWh per capita, electricity consumption is one of the lowest in the world (Ajumogobia and Okeke, 2015) and remains a critical challenge for Nigeria despite her natural resource endoument and population.

6. Based on the exploratory and qualitative study done so far, the study revealed that the main issues and challenges affecting the seaport cargo operations in Nigeria as a developing economy are: Decline in the number of vessels calling at ports in Nigeria as compared to neighbouring countries, issue of poor data base for activities going on in the ports, poor computerization of port operations data, port congestions, high container dwell time, high turnaround time of vessels and trucks, inadequate port facilities (berths), lack of standard port facilities leading to inefficiency and poor logistics report, lack of capital, poor incentives for investors and poor integrated transport system, poor innovations in technologies, inadequate shipping management skills, paucity of port infrastructure, inadequate super-structures, interference of government on the operations of the ports causing bureaucratic bottlenecks in decision making process, corruption, non-abiding to international conventions, rules and regulations on port operations, insecurity in the waterways. Other challenges confronting seaport cargo operations in Nigeria, inadequate equipment; dominance of foreign vessel and deficiency in export and lack of regulatory oversight
7. Nigeria's 2025 Proposed Budget- Budget of restoration. On 18 December 2024, the President presented the 2025 Budget - a record N49.74 trillion. Now estimated ransom paid to kidnappers in 2024 stood at N11.15 trillion. Crude oil theft for the year 2024 stood at 10 billion USD, i.e. 15 trillion Naira (at N1,500/USD). Annual solid mineral losses to theft stands at 12 billion USD for the year 2024 (7). i.e. 18 trillion Naira.. Nigeria's persistent power challenges are costing the economy an estimated $26 billion annually, according to the Africa Trade Barometer report by Standard Bank (8), i.e. N39.0 trillion.

When one looks at the table for 2024:

1. Ransom paid to kidnappers N11.5 trillion
2. Losses due to oil theft N15.0 trillion
3. Losses due to solid mineral theft N18.0 trillion
4. Losses due to poor power supply N39.0 trillion
5. Losses due to poor border control -----

TOTAL N83.5 trillion

But the year 2025 budget is N49.74 trillion, the losses is in excess of the budget by N33.76 trillion. This is the fund that should be in the economy and grow the wealth, life and wellbeing of the citizenry but is floated away as haemorrhage, economic disaster, economic downturn, due to insecurity and bad governance. Ordinarily, a just committed seamless people-oriented security and good governance will put paid to this dark period in the life of Nigeria.

It is note worthy that Between 2020 and 2024, N9.17 trillion was allocated to seven security units. These are the Army, Air Force, Navy, police, Defence Headquarters, Nigeria Security and Civil Defence Corps, and Ministry of Defence (9)

Drone Technology Solution

These multitude of security challenges is threatening the peace and stability of the nation. From terrorism to violent insurgencies, kidnapping to oil theft, illegal migration to low power supply, banditry to herder-farmers clash, etc, they have defied traditional solution measures and demand innovative solutions. Here's where transformative power of advanced technology comes in.

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One key area where technology can revolutionize Nigeria's security is through drone use. Drones, or unmanned aerial vehicles (UAVs), offer a significant leap in our ability to monitor borders and vulnerable areas. Equipped with high-resolution cameras and advanced sensors, they provide valuable tools in the fight against crime. Drones give security forces a bird's-eye view of remote areas, allowing for real-time intelligence gathering and faster response to threats. Whether patrolling borders or monitoring high-risk zones, drones significantly improve situational awareness and enable proactive intervention by law enforcement. Their ability to cover large areas efficiently makes drones a valuable asset in strengthening Nigeria's security and protecting its citizens.

Empowering citizens to participate in crime prevention goes beyond public safety; it demonstrates the collective will to protect our communities. Mobile applications, designed for easy reporting of emergencies and suspicious activities, offer a powerful tool for building a safer society. These digital platforms bridge the gap between citizens and law enforcement, transforming bystanders into active allies. Features like GPS tracking allow citizens to provide precise location data, enabling swift and accurate responses from security forces. Additionally, anonymous reporting options encourage individuals to come forward without fear, fostering trust and cooperation within neighbourhoods. These innovative applications empower communities to take ownership of their safety, working hand-in-hand with law enforcement to address security concerns effectively.

Today's Uses of Drone Technology

Drone technology has evolved and thrived in recent years, from technically staffing critical military regions to enticing enthusiasts all over the world. Individuals, businesses, and governments have realized that drones have a variety of valuable qualities, including:

- Law enforcement and border control surveillance: This will detect and demobilize kidnapping, insurgency, banditry, farmers-herders clashes and illegal migration as well as oil theft, bunkering and pipe line vandalization. In doing these, the trillions of Naira paid as ransom, oil and solid mineral theft will be in the Nigerian economy, stabilizing and securing the economy.
- Aerial photography for journalism and film: Thousands of photographers and cinematographers have fallen in love with the new technologies of unmanned aerial systems (UAS) and drones. Drones are revolutionizing film and television, news, and real estate photography. They provide endless new opportunities to capture high-quality photos and video, including angles that were previously impossible or simply incredibly difficult to attain. Even better, it's all doable at prices that you can confidently work into your budget. These are new avenues of employment and wealth generation for the youth.
- Express shipping and delivery: Drone delivery is the idea of shipping packages via an aerial vehicle that takes flight from a base location and delivers goods directly to a customer or company's site. Companies want to deliver goods to their customers as fast as possible, with 2-day shipping becoming the industry standard. As a result, shippers are enthusiastic about drone technology because the devices could greatly reduce delivery times and the associated costs. Using trucks is the current and traditional way for companies to ship goods to consumers. Still, companies have been looking for alternative solutions due to the increasing demand for quick deliveries, supply chain lags, and an increase in online shopping among consumers. Drone logistics offer benefits to retailers, but they could also disrupt eCommerce as we've grown to know it. Drones scan through inventory and navigate warehouse isles much faster than a human worker could. Advancements in technology could potentially eliminate the need for human warehouse workers. They can also keep track of inventory locations and storage containers much more organized than traditional note-keeping methods. As a

result, drones can help retailers integrate their supply chains more seamlessly with less human error and decreased lead times

- Gathering information or supplying essentials for disaster management: Drone can be used for fire detection, intervention monitoring and also for post-fire monitoring. In case of nuclear accident or hazardous material leakage drone is also very effective or can be the only one tool for supporting disaster management
- Thermal sensor drones for search and rescue operations: Thermal imaging operates within the infrared spectrum of the electromagnetic field, just beyond the visible range. While the human eye can only perceive light wavelengths between 400 and 700 nanometers (like the colors in a rainbow), thermal cameras capture longer wavelengths—between 8,000 and 14,000 nanometers. These wavelengths correspond to heat emissions, meaning that thermal cameras can visualize even faint sources of heat against cooler backgrounds. In search and rescue, this is invaluable. A human body emits heat at roughly 98.6°F, and a thermal sensor can distinguish this heat signature from a colder forest floor or rocky terrain. By translating heat levels into visual gradients, thermal sensors provide clear, high-contrast images, making it easier for SAR teams to locate individuals.

Geographic mapping of inaccessible terrain and locations: Drone surveying refers to using a drone, or unmanned aerial vehicle (UAV), to capture aerial data. An aerial survey is performed utilizing drones and unique cameras having downward-facing sensors. During a drone survey, the ground is photographed several times from different angles, and each image is geo-tagged with coordinates. Drone/ Aerial survey is utilized by surveyors and engineers in the construction field for terrain assessments and mapping. Drone surveying can be done 90% quicker than we used to do normal surveying methods. It is used in making highly exact maps and survey points. Unlike manned aircraft or satellite imagery, drones can fly at a much lower altitude, making the generation of high-resolution, high-accuracy data, much faster and less expensive.

Building safety inspections: Drone inspections involve using unmanned aerial vehicles (UAVs) or drones equipped with high-resolution cameras, sensors, or other technology to perform visual checks and gather data on assets. Drone Inspections are done using the inspector's naked eyes—called visual inspections—or aided by sensors. Drones can be fitted with various sensors such as;

i. LIDAR (Light Detection and Ranging): Drone inspection with LIDAR can accurately measure tank dimensions and volume, monitor tank foundation stability, assess vegetation health and soil erosion, etc.
ii. Thermal Imaging Cameras: These sensors can detect heat patterns and abnormalities. Drone inspections with thermal imaging cameras can be used in agriculture to monitor crops and identify areas of stress or disease.

- Safety: Drone inspections make inspections safer, eliminating the need to enter confined spaces. When inspecting tall structures, drones eliminate the need to build scaffolding and the need for the inspector to climb the scaffolding to inspect, thus eliminating the risk of falling for both the workers building the scaffolding and the inspector climbing it. Drones also make inspections safer by preventing personnel exposure to hazardous environments when inspections are needed in areas such as structurally compromised structures, disaster-affected areas, active mining sites, and areas with chemical or radiation exposure.
- Reduced Costs: Drone inspections reduce inspection costs by saving on erecting and dismantling temporary structures like scaffolding for inspections. They also save costs by reducing operational downtime. In many cases, drone inspections can be done alongside live operations.

- Increased Efficiency & Accuracy**:** Drones can inspect large areas quicker and more effectively than traditional methods. Because they capture high-resolution images and videos, they can help identify potential problems more quickly and allow the inspector to revisit records in case any detail is missed.
- Improved Data Collection & Record Keeping**:** Drones capture and record vast amounts of data during inspections, and the accumulated data aids in identifying trends over time and quickly identifying anomalies.

Drone inspection can be used in the oil and gas industry to safely and efficiently carry out inspection tasks such as;

- Pipeline Inspection & Surveillance**:** Drones can detect leaks, corrosion, erosion, and interference along pipelines, thus reducing the risks of accidents, environmental pollution, and operational downtime.
- Tank Inspection & Leak Detection**:** Drones can inspect tanks for signs of leaks, corrosion, or damage, ensuring they are structurally sound.
- Flare Stack Inspection**:** Gas flares burn excess gases and liquids in industrial plants to prevent equipment from overpressurizing; drones can safely inspect flare stacks for blockages and leaks.

- Platform and Rig Inspection**:** Drones can reach hard-to-access offshore platforms and inspect rigs for structural damage, corrosion, and equipment malfunctions.
- Gas Emission Detection**:** Drones can accurately detect gas emissions, such as methane (CH4), enabling proactive measures to mitigate environmental hazards and maintain air quality.

Drone inspections help to solve some pressing challenges the agriculture industry faces, such as:

- Crop Health Monitoring**:** Drones with UV sensors can monitor crop health, growth, diseases, and nutrient deficiencies.
- Precision Agriculture**:** Drones can create detailed maps for pest and weed monitoring, irrigation, and soil erosion management. This, in turn, helps farmers optimize the application of fertilizers, pesticides, water, and any other resources the crops need.
- Livestock Management: Large livestock farms face the challenge of keeping stock of their animals. Drones can assist by monitoring livestock health and identifying potential risks like disease breakouts.
- Irrigation system inspection**:** Irrigation is essential to agriculture; it ensures plants receive adequate water and nutrients. Drones can inspect irrigation systems for blockages or leaks, ensuring optimal and efficient crop irrigation.

Drones are used in construction to solve pressing construction issues such as;

- Site Progress Monitoring**:** In most construction projects, time is usually of the essence, and efforts are made to minimize delays. Drones can capture high-resolution images and videos, helping to track and record progress and quickly identify and eliminate delays.
- Structural Inspection**:** Drones can inspect structures while still under construction or finished for signs of defects or damage. These inspections are crucial for maintaining asset structural integrity and also save money that would have been spent on scaffolding.
- Safety Monitoring**:** Drones can monitor safety compliance on a job site and quickly identify safety hazards.

- Precision crop monitoring: Agriculture drone empowers the farmer to adapt to specific environments and make mindful choices accordingly. The gained data helps regulate crop health, crop treatment, crop scouting, irrigation, and carry out field soil analysis and crop damage assessements at a reduced cost

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- Unmanned cargo transport: Drone based cargo transportation can increase effectiveness in SCM by streamlining the delivery process, educe the cost of transportation and allowing for better supply operation. Drones can quickly and safely deliver goods to their destination, reducing the time and cost of transportation.

Economic Benefit Analysis of Drone Manufacturing in Nigeria

Drone manufacturing is critical to driving Nigeria's economic growth and ensuring a sustainable future for its people if backed by policies that will encourage growth. Drone manufacturing will promote shared prosperity by creating opportunities for job creation, increased productivity, and innovation. It will create an environment where economic growth will benefit all members of society rather than just a select few.

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