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# Forensic Technology, Deoxyribonucleic Acid (DNA) profiling in Security Management and fight against insecurity/terrorism in Nigeria

Adenyi Theophilus Okechukwu[1] (Ph.D candidate)
Onah Oliver Onyekaneze[2] (Ph.D candidate)
*Department of Political Science University of Nigeria Nsukka*.

**Abstract:** Nigeria has been battling with several criminal activities such as kidnapping, armed robbery, herdsmen/Farmers attack, terrorism, armed banditry among others for over two decades now. This paper examines the relevance of forensic technology, Deoxyribonucleic Acid (DNA) profiling in security management and fights against insecurity/terrorism in Nigeria. The objectives of the paper are to discover the usefulness of DNA Profiling Technology in Security Management and fight against insecurity/terrorism in Nigeria and to find out factors militating against the use of DNA profiling technology by security agencies in Nigeria. Diffusion of Innovations Theory was used in the paper as a framework of analysis. Data were generated through secondary sources. The paper found that Deoxyribonucleic Acid (DNA) profiling is very useful in security management as it helps to identify who the actual criminals are. It was also found that the use of Deoxyribonucleic Acid profiling in Nigeria is a very low rate. The paper, therefore, argues that for Nigeria to extricate itself from the web of insecurity across the country, the use of technology must be introduced to fight all forms of criminalities. The paper recommends among others that Nigeria Government should through a legal framework make use of forensic technology by Security agencies mandatory and that security agencies should establish a special unit to be equipped with forensic technology such as Deoxyribonucleic Acid profiling to fight insecurity and maintain peace in the country

**Keywords:** forensic Technology, Deoxyribonucleic Acid, Profiling, Security Management, Insecurity

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## I. BACKGROUND TO THE STUDY/STATEMENT OF THE PROBLEM

Nigeria forover two decades now has been battling with several criminal activities such as kidnapping, armed robbery, herdsmen/Farmers attack, terrorism, armed banditry among others. In the advanced and developed countries of the world, forensic technology is used in crime management and fight against insecurity. A forensic Technology is a technology used for investigation and identification of facts surrounding a crime, sometimes using carbon related chemicals around the crime scene. One of the forensic technology that helps in crime management and the fight against insecurity is Deoxyribonucleic acid (DNA). The introduction of DNA profiling is one of the benefits of the advance in technology in the fight against criminal elements. Ayinde and Agwu (2016) observed that DNA is the hereditary material found in every cell in humans and other organisms. DNA test identify unique individual genetic codes from DNA samples that are extracted from biological evidence such as blood, semen, hair and saliva. It was developed in the 1980s, and has become a common method of identification, majorly for sex crimes and other violent offences.

Murphy (2007) avers that DNA profiling is most commonly used as a forensic technique in criminal investigations to identify an unidentified person or whose identity needs to be confirmed, or to place a person at a crime scene or to eliminate a person from consideration. DNA fingerprinting used in the crime fighting is also used in the study of animal and floral populations and in the fields of zoology, botany, and agriculture (Chambers, Curtis, Millar, Huynen and Lambert 2014).

According to Nte (2012), one of the guiding principles in forensic science as postulated by Edmond Locard, an authority in the field of forensic science is that every contact leaves a trace; these traces are usually the physical, biological or trace evidence collected from a crime scene for onward transmission to the laboratory for scientific examination. In this context physical evidence according to Onashile (2009) refers to any item that comes from a non living origin. The most important kinds of physical evidence as noted by Onashile (2009), are finger prints, fire marks, footprints, fibres, paint and building materials etc. Biological evidence always originates from a living being. It includes blood stains and DNA. Trace evidence found in minute quantities and

examples are textile fibres, hair stands also form part of the trace elements. Typically, trace evidence are invisible to the naked eye and are collected by brushing or vacuuming a suspect surface. The result of the scientific examination usually links the suspect(s), victim and the crime together, thereby making the identification of the suspect possible with or without eye-witnesses (Onashile, 2009).

On the benefits of use of technology such as DNA profiling in fighting crime, Koper and Lum (2015), notes that such advancement in technology have high influence for enhancing police work. For instance, use of technology such as DNA Profilling may improve crime control by strengthening the police ability to identify and monitor offenders (most importantly repeat, high-rate offenders); making it easy to identify places and conditions which unequally contributes to crime; quick detection and rapid response to crimes, enhancement in the collection of evidence, police deployment and strategies improvement, creating efficiency in organization which put more officers in the field and for a long period of time, communication enhancement between police and citizens, increasing perception that punishment is certain, and strengthening the ability of law enforcement agencies to deal with technologically sophisticated forms of crime (e.g. suicide bombing and cyber-crime, terrorism). Furthermore Koper *et al.* (2009) argued that persistent operational needs come in a large number of areas to which technology is key, including crime analysis and information-led policing, information technology and database integration, and managing dispatch and calls for service.

The use of Deoxyribonucleic Acid (DNA) profiling in crime management and fight against insecurity in Nigeria has been a matter of concern and controversy. DNA Profiling can be applied to any human sample that contains cells with nuclei, such as saliva, semen, urine and hair. It was reported in Punch Newspaper (2016:9) that for the nation to really keep crimes such as armed robbery, kidnapping, murder, rape, arson, bomb attacks, terrorism and other security threats at bay and in check, there is need to adopt the use of technological base equipment such as Closed-Circuit Television (CCTV) Deoxyribonucleic Acid (DNA) adequate data base, surveillance system among others in order to prevent, reduce, analyze and most importantly control criminal activities. DNA can play a crucial role in convicting – or clearing – suspects of a crime, and can also be used to identify missing persons. According Onashile, (2009) the threats of crime enmeshed in the political fabric of the country have further frustrated investigations into serious crime such as "assassinations and murders" in the country. The result is a serious dent on the forensic investigative ability of the Nigeria police and other such security agencies. The identification of murder suspects according to Onashile is a critical element in forensic investigation. However, it is apparent that finger prints of arrestees and storage of a finger print data bank to deter criminals and repeat offenders appear to be on existent. Onashile further argued, that the police records not based on strong forensic evidence are largely useless as many criminals will escape detection because names and faces change everyday. This situation has created a criminal investigation quagmire in the country

However, attempts to introduce the equipment in Nigeria was hobbled by corruption. Also, there are barriers to the adoption of these technologies, ranging from cost of procurement identified by police departments, training of police on how to use the technologies, knowledge about how and why certain innovations are adopted and their consequences, and to the opinion of the public about the technology. However, this technology brings with it new legal challenges, majorly as it regards to the balance between crime control and the private interests of citizens. In recent years the security apparatus of Nigeria has received a lot of bashing in the way and manner they conduct investigation of crime. Instead of investigation to arrest, what Nigeria Police Force, the State Security Service and other security agencies do is to arrest before investigation and this often leads to miscarriage to justice. The Nigerian criminal justice system is not entirely ignorant or unaware of the use and the merits of the application of DNA profiling as a tool in crime management and fight against insecurity. However, DNA profiling in Nigeria has not nearly reached the level of recognition, functionality or institutionalization that it has attained in the advance countries as the trend here is to arrest a suspect first before investigation.

The rise in insecurity in Nigeria has created enormous uncertainty in the security of lives and property of individual and of social stability in Nigeria. The incidents of crimes such as armed robbery, arson, murder, kidnapping, rape, hired assassinations and ritual killings are examples of the most serious and violent crimes that have portrayed Nigeria as an unsafe country and this to leads low foreign investment and threat to peace. The worst is that many crimes go unsolved because of a lack of adequate equipment and training. Very rarely do the security agencies in charges of criminal investigation and prosecution such as the police, Civil Defense and the State Security Service take fingerprints, there are no DNA laboratories, and there is an extreme paucity of forensic and ballistics experts in the country. With over 60 million people, Nigeria is Africa's most populous nation and also one of its longest democracies but even Nigerians admit their criminal justice system is woeful. Many criminals have gone scot free and many innocent people have been condemned by our justice system because there was no forensic linkage to the crimes to convict and vindicate them respectively. This situation prompted Owen (2014) to state that the problems of Nigeria Security agencies especially the Police includes that they are working to orientate itself but is doing so amidst serious security challenges and instructional limitation. The performance of the police in Nigeria is overstretched by the operational challenges and issues of resources; but the human and material resources which do exist tend to be concentrated towards the center.

While in advanced countries of the world crime or crime suspects are profiled using modern techniques such as DNA Profiling in determining who a real culprit is, the Nigeria Police Force has over the years not keyed into these innovations and has continued to use the orthordox method of crime investigation, the effect of this is that many innocent people are today wallowing and suffering in Prisons and Police cells while some hardened criminals charged to court are discharged and acquitted because of want of evidence.

This paper examines Forensic Technology, Deoxyribonucleic Acid (DNA) profiling in Security Management and fight against insecurity/terrorism in Nigeria with the objectives of discovering the usefulness of DNA Profiling Technology inSecurity Management and fight against insecurity/terrorism in Nigeria and finding out factors militating against use of DNA profiling technology by Security Agencies in Nigeria.

## II. LITERATURE REVIEW

**DNA profiling**

DNA profiling as noted by Ugbe , Akamkpa&Arop (2012), is also called DNA testing, DNA typing, or genetic fingerprinting and it is a technique employed by forensic scientists to assist in the identification of individuals on the basis of their respective DNA profiles. DNA profiles are encrypted sets of numbers that reflect a person's DNA make up, which can also be used as the persons identifier. Fatoki (2016) states that DNA profiling) is a forensic techniques used to identify individuals by characteristics of their DNA in crime cases. DNA profiling can be use to resolve paternal and ancestral issues

Couenhoven (2015) gave a comprehensive details of the genesis of DNA profiling, according to him in 1984, Sir Alec Jeffreys, a British geneticist, discovered the technique of DNA testing to determine a genetic "fingerprint" in a laboratory in the Department of Genetics at the University of Leicester, England. According to Couenhoven (2015) Sir, Jeffreys says he had a "eureka moment" in his lab after looking at the X-ray film image of a DNA experiment which unexpectedly showed both similarities and differences between the DNA of different members of his technician's family. Within about half an hour as added Couenhoven (2015), Jeffrey realized the possible scope of DNA fingerprinting, which uses variations in the genetic code to identify individuals. Jeffreys' DNA method was first put to use in 1985 in England when he was asked to help in a disputed immigration case to confirm the family identity of a British boy whose family was originally from Ghana. A family from Ghana immigrated to the UK and became citizens. However, one of the sons went back to Ghana and was stopped from returning to the UK because he had a forged passport. The family's lawyer contacted Jeffreys and asked whether he could confirm that the boy was in fact the mother's son and not her nephew. Samples of DNA were taken from the mother and the son whose identity was disputed, and from the mother's three undisputed children. The DNA patterns confirmed the relationship between the mother and the son in question. The testing confirmed that all four children had the same father.

Couenhoven (2015) further noted that DNA fingerprinting was first used in a police forensic test in 1986 in England. Two teenagers had been raped and murdered in Narborough, Leicestershire, in 1983 and 1986 respectively. Although the attacks had occurred 3 years apart, similarities led the police to believe that one person was responsible for both the rape and the murder. A suspect in custody, Richard Buckland, confessed to the most recent murder but not the earlier one. Jeffreys was asked to do DNA profiling on a blood specimen that was collected from the suspect and on tissue specimens and semen collected from the two victims. Couenhoven (2015), added that the DNA profiling revealed that the semen from both victims was identical, proving that one person had committed both murders. However, the results also proved that Richard Buckland was not the murderer. His confession had, evidently, been false. He was released and became the first suspect to be cleared of a crime by DNA evidence. A large-scale manhunt was then launched to find the person whose DNA profile matched that of the killer's semen. All adult men who lived in the area were asked to give blood or saliva specimens for testing. More than 5000 specimens were collected and DNA profiling carried out on the 10% of men who had the same blood type as the killer, but no match was found. The police and the public were disappointed that this new and sophisticated test was unable to identify the killer. Six months after the initial investigation, a woman reported overhearing a man who claimed to have given blood on behalf of a colleague, Colin Pitchfork. Pitchfork was apprehended and his blood tested; the long-sought DNA match was made, and Pitchfork was convicted of both murder (Couenhoven , 2015)

`Different DNA profiling exist and the include Restriction Fragment Length Polymorphism *(*RFLP analysis] which according to Panneerchelvam and Norazm (2003), is a technique wherein genomic DNA is treated with one or more *restriction enzymes* whichcut the DNA whenever certain specific sequence of bases occurs (each restriction enzyme will cut in auniquerestriction site); thus generating a numberof fragments of the DNA of varying lengths. The second technique is Short Tandem Repeat Analysis. which the United State National Institute of Justice (NIJ, 2011), identified as the common type of DNA profiling today for criminal cases and other types of forensic Thirdly, Polymerase Chain Reaction (PCR) analysis which Tautz (1989) states that the process mimics the biological process of DNA replication. Fourthly Variable Number of Tandem Repeat Sequences (VNTR) (Mullis, Faloona, Scharf, Saiki, Horn and Erlich (1992)

In the United States, DNA testing is used mostly in violent crimes cases due to its expense, but its use for property crimes is also expanding (Koper and Lum, 2015). Scientists have been able to come up with DNA profiling or genetic fingerprinting for the detection of crime. This implies that by taking samples of DNA at the scene of the crime that has not been compromised or tampered with, it is possible for law enforcement agents to find out if a suspect is innocent or not DNA evidence may be collected by police in different ways. It may be used to determine whether a particular suspect can be linked to a physical evidence from a particular scene of crime, recovered DNA evidence from the scene of the crime may also be used to identify suspects. Police and other criminal justice agencies take DNA samples from convicted offenders and in some areas from arrestees to test them for matches to evidence from unsettled crimes and for use in future investigation (Ayinde and Agwu 2016)

**Security Management**

A layman definition as observed byKasali, Abisoye andAgbebaku (2010) is the protection of life and property of a person. The concept of security has undergone a transition from traditional conceptualization to a nontraditional meaning, South Africa White Paper on Defense (1996) sees security as an all-encompassing condition in which individual citizens live in freedom, peace and safety; participate fully in the process of governance; enjoy the protection of fundamental rights; have access to resources and the basic necessities of life; And inhabit an environment which is not detrimental to their health and wellbeing.Security is freedom from, or resilience against, potential harm (or other unwanted coercive change) from external forces. Beneficiaries (technically referents) of security may be persons and social groups, objects and institutions, ecosystems, and any other entity or phenomenon vulnerable to unwanted change by its environment ( Kasali, Abisoye and Agbebaku , 2010)Security Management is a management field that focuses on the safety of assets (resources) in the organization, both physical safety and digital security.Security management is a systematic, repetitive set of interconnected activities to ensure safe operation and thus reduce the likelihood of risks.It is aimed at fashioning out various methods, procedures, guidelines and standards which will help prevent or reduce identified risks in particular ( Fuller, 2016) Kasali et al. (2010) further add that traditionally, security management was the unilateral function of the state especially if we consider the intellectual view(s) of some political theorists like Thomas Hobbes who argued that the essence of a state is to provide law and order, which are attained through (effective) security management. The scholars argued that in anattempt by the stateto actualize the purpose of its creation (through social contract), it has found it necessary to acquire legitimate use of force (violence). This idea has made security issue a function of effective monopoly of violence, which the state applies to engender strict conformity and complaisance to state laws by the peoples for effective security management.The fact is that since the end of the cold war, security management has assumed a new dimension, external threat to security resulting from international hostilities and aggression that characterized the cold war era has been replaced with non- traditional security threats like information warfare, drug trafficking, nuclear pollutions, disease epidemics like HIV-AIDS, corruption, human trafficking, (internal) insurgency among others (Kasali, Abisoye and Agbebaku, 2010).

**Theoretical Framework of Analysis**

**Diffusion of Innovations Theory**

Everett Rogers, a professor of communication studies, popularized the theory in his book Diffusion of Innovations in 1962, Diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread. Rogers argues that diffusion is the process by which an innovation is communicated over time among the participants in a social system. The origins of the diffusion of innovations theory are varied and span multiple disciplines. The major assumption of the theory is that there are four main elements that influence the spread of a new idea: the innovation itself, communication channels, time, and a social system. This process relies heavily on human capital. The innovation must be widely adopted in order to self-sustain. Within the rate of adoption, there is a point at which an innovation reaches critical mass.

` Diffusion according to him manifests itself in different ways and is highly subject to the type of adopters and innovation-decision process. The criterion for the adopter categorization is innovativeness, defined as the degree to which an individual adopts a new idea. Diffusion occurs through a five–step decision-making process. It occurs through a series of communication channels over a period of time among the members of a similar social system. Rogers five stages (steps): awareness, interest, evaluation, trial, and adoption are integral to this theory. An individual might reject an innovation at any time during or after the adoption process. Abrahamson examined this process critically by posing questions such as: How do technically inefficient innovations diffuse and what impedes technically efficient innovations from catching on? Abrahamson makes suggestions for how organizational scientists can more comprehensively evaluate the spread of innovations. In later editions of Diffusion of Innovation, Rogers changes his terminology of the five stages to: knowledge, persuasion, decision, implementation, and confirmation. However, the descriptions of the categories have remained similar throughout the editions.

` The application of the theory to this study is to show how important and beneficial adapting to new innovation such as the use of forensic technology in crime management and fight against insecurity/terrorism and the need for Nigerian government to introduce DNA profiling in the nations security management system

## III. METHODOLOGY

Data for this work were generated through secondary sources which is information which is from sources or materials which were documented in books, newspapers, magazines, journals, conference papers, institutional and official documents, internet among others. Data were analyzed using content analysis technique.

## IV. DATA ANALYSIS AND RESULT

**Usefulness of DNA Profiling Technology in Security Management**

The usefulness of DNA **Profiling** technology in security management cannot be overemphasized. This is because the technology helps to identify an actual offender after the samples of particles collected at a crime scene are matched with the suspect's fingerprints and body fluids, and that is why in developed countries of the world whenever there is security breach like terrorism, armed robbery, assassination among others there is always high level success in apprehending the actual suspect and prosecuting him or her. Furthermore where there is disasters or natural emergency situation the technology is useful in identifying those involved or affected. The importance of the technology had severally been highlighted by scholars: Wallace (2008) observes that the widespread use of DNA data to detect offenders and protect the rights of the innocent (that is, exonerating the wrongly-accused) is one of the most notable examples of such advancements and revolutionary impact of DNA technology, which makes the justice delivery system more efficient and accurate. Clarke and Reno (2007)observes that the identification of offenders and the protection of innocent suspects are two of the main goals for ensuring justice using DNA.According to US Department of Energy Genome Programs (2009), DNA samples and profiles are very useful for identification purposes, for example, in identifying victims of disasters, as well as suspects (including rapists and murderers). It is also useful for conducting parentage testing and for resolving immigration cases, where a familial relationship (or identity) is in question. In many instances, suspects who are actually innocent are relatively quickly acquitted or excluded from legal proceedings.

Tania (2006) notes that this technology is in effect, upholding the principles of 'presumption of innocence', which requires that 'guilt must be proved beyond reasonable doubt', upon which each and every criminal justice system is based. The right to fair hearing which DNA profiling seek to achieve in crime investigation and management is as enshrined in Universal Declaration of Human Rights (1948). Neeraj (2010) notes that this right to fair hearing is also adopted by many countries in their procedural law, though the form and practice of the principles of natural justice may vary from system to system on the basis of prevailing conditions of the society concerned. In another development, Hindmarsh and Prainsack (2010) noted that DNA profiling or 'fingerprinting' is increasingly used for human identification in the legal proceedings of many nations. Forensic DNA technology is used to analyses DNA profiles which normally originate from human DNA samples. These samples could be collected either from the crime scenes or from the body of suspects or victims. Then DNA profiles (that is, the analyzed results of the DNA samples collected) are compared with previously stored profiles in the DNA database to locate matches. The forensic use of DNA samples and profiles has, therefore, enhanced the success of civil as well as criminal investigations and the process has already proved to be a valuable tool for delivering a speedy trial and justice.

In the same manner, Parven (2012) noted that DNA profiling and database provide law enforcement agencies with an effective tool that may revolutionize the justice delivery system around the world. In another development a study by Lodhi, et al. showed that DNA collected from the cell phones can be used as reliable physical evidence in forensic investigations. In that study which was carried out to investigate if sufficient amount of human DNA can be obtained from a mobile phone and if the identity of the single or multiple users can be ascertained by generating genetic profiles. The result was very impressive as it showed that cell phones were used to collect human DNA and that Y chromosome was detected from the DNA profiles generated from two females' cell phones identifying unknown male contributors. The Y, chromosome traverses more than 59 million building blocks of DNA (base pairs) and represents about 2 percent of the aggregate DNA in cells.As shown by their findings, individual DNA profiling can help in identifying person(s) involvement in an act of terrorism. Therefore, one could aver that if people's DNA database can be integrated into national security management it will improve security and there will be adequate protection of lives and properties in the society.

**Table 1** showing empirical data of DNA profiling and the results/outcome in some parts of the world

| Date | Country | Incident | Outcome |
|---|---|---|---|
| 1986 | Leicester England | rape and murder of a teenager near Leicester | Richard Buckland was released after the actual culprit Colin Pitchfork was arrested and found culpable |
| 1987 | | Used in criminal court for the trial of a man accused of unlawful intercourse with a mentally handicapped 14-year-old female who gave birth to a baby | |
| 1987 | Florida USA | Rape of a woman during a burglary | The culprit Tommie Lee Andrews convicted and sentenced to 22 years imprisonment |
| 1988 | Richmond, Virginia | Case of several rape and murder charges | Timothy Wilson Spencer sentenced to death through DNA testing and was executed on April 27, 1994. David Vasquez, initially convicted of one of Spencer's crimes, became the first man in America exonerated based on DNA evidence |
| 1989 | Chicago USA | Gary Dotson accused of aggravated kidnapping and rape sentenced to not less than twenty-five and not more than fifty years. | Gary Dotson conviction was overturned using DNA evidence after 10 years in jail |
| 1991 | Canadian | Allan Legere tried four murders he had committed while an escaped prisoner in 1989. | He was the first Canadian to be convicted as a result of DNA evidence, |
| 1992 | Brazil | DNA evidence. | It was used to prove that Nazi doctor Josef Mengele was buried in Brazil under the name Wolfgang Gerhard |
| 1992 | Arizona USA | DNA from a paloverde tree was | Used to convict Mark Alan Bogan of murder. DNA from seed pods of a tree at the crime scene was found to match that of seed pods found in Bogan's truck. This is the first instance of plant DNA admitted in a criminal case |
| 1993 | Maryland USA | Kirk Bloodsworth was the first person to have been convicted of murder and sentenced to death, | Conviction was overturned using DNA evidence |
| 1993 | Florida USA | Rape and murder of Mia Zapata, lead singer for the Seattle Punk Band | The killer's DNA was collected when Jesus Mezquia, the culprit was arrested in Florida for burglary and domestic abuse in 2002 |
| 1994 | USA | DNA evidence allegedly linking O. J. Simpson accused of double murder and the most publicized criminal trial in history. | Accused discharges and acquitted |
| 1994 | Canada | Royal Canadian Mounted Police detectives successfully tested hairs from a cat known as Snowball, | The test was used to link a man to the murder of his wife, thus marking for the first time in forensic history the use of non-human animal DNA to identify a criminal |
| 1994 | Russia | The claim that Anna Anderson was Grand Duchess | The tissue was tested using DNA fingerprinting, and showed that she |

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|---|---|---|---|
| | | Anastasia Nikolaevna of Russia was tested after her death using samples of her tissue that had been stored at a Charlottesville, Virginia hospital following a medical procedure | bore no relation to the Romanovs. |
| 1994 | Virginia USA | Earl Washington, Jr. | His death sentence commuted to life imprisonment a week before his scheduled execution date based on DNA evidence. He received a full pardon in 2000 based on more advanced testing |
| 1995 | Britain | investigation of the Naomi Smith murder case | British Forensic Science Service carried out its first mass intelligence DNA screening |
| 1998 | Louisiana USA | The first time viral DNA fingerprinting was used as evidence in a criminal trial. | Richard J. Schmidt was convicted of attempted second-degree murder when it was shown that there was a link between the viral DNA of the human immunodeficiency virus (HIV) he had been accused of injecting in his girlfriend and viral DNA from one of his patients with AIDS. |
| 2000 | Florida USA | Frank Lee Smith was proved innocent by DNA profiling of the murder of an eight-year-old girl after spending 14 years on death row in Florida, USA. However he had died of cancer just before his innocence was proven. | In view of this the Florida state governor ordered that in future any death row inmate claiming innocence should have DNA testing. |
| 2000 | Lisburn Northern Ireland. | Gordon Graham murdered Paul Gault at his home | Graham was convicted of the murder when his DNA was found on a sports bag left in the house. It was the first time Low Copy Number DNA was used in Northern Ireland. |
| 2001 | Australia | Wayne Butler was convicted for the murder of Celia Douty. | It was the first murder in Australia to be solved using DNA profiling. |
| 2002 | Bedford England | The body of James Hanratty, hanged in 1962 for the "A6 murder", was exhumed and DNA samples from the body and members of his family were analyzed. | The results convinced Court of Appeal judges that Hanratty's guilt, which had been strenuously disputed by campaigners, was proved "beyond doubt". |
| 2002 | Georgia | Douglas Echols was wrongfully convicted in a 1986 rape case. | DNA testing was used to exonerate Douglas Echols who was the 114th person to be exonerated through post-conviction DNA testing |
| 2002 | London | Annalisa Vincenzi was shot dead in Tuscany. Bartender Peter Hamkin, 23, was arrested, in Merseyside in March 2003 on an extradition warrant heard at Bow Street Magistrates' Court in London to establish whether he should be taken to Italy to face a murder charge. | DNA "proved" he shot her, but he was cleared on other evidence. |
| 2003 | Wales | Jeffrey Gafoor was convicted of the 1988 murder of Lynette White 12 years earlier when DNA wasre-examined using STR techniques, | This was the first known example of the DNA of an innocent yet related individual being used to identify the actual criminal, via "familial searching". |
| 2003 | New York | Because of new DNA evidence, | Their convictions were struck down |

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|---|---|---|---|
| | | Dennis Halstead, John Kogut and John Restivo won a re-trial on their murder conviction. | and they were released after eighteen years of their thirty-plus-year sentences |
| 2004 | Louisiana USA | In 2004, DNA testing shed new light into the mysterious 1912 disappearance of Bobby Dunbar, a four-year-old boy who vanished during a fishing trip. | He was allegedly found alive eight months later in the custody of William Cantwell Walters, |
| 2005 | Michigan | Gary Leiterman was convicted of the 1969 murder of Jane Mixer, a law student at the University of Michigan | DNA found on Mixer's pantyhose was matched to Leiterman. |
| 2005 | Atlanta USA | Evan Simmons wasincarcerated for a 1981 attack on an Atlanta woman. | Evans was proven innocent after serving twenty-four years in prison |
| 2008 | USA | Anthony Curcio was arrested for masterminding one of the most elaborately planned armored car heists in history. | DNA evidence linked Curcio to the crime. |
| 2009 | Southampton England | Sean Hodgson convicted of 1979 killing of Teresa De Simone. | He was released after tests proved DNA from the scene was not his. It was later matched to DNA retrieved from the exhumed body of David Lace. Lace had previously confessed to the crime but was not believed by the detectives |
| 2012 | USA | Family DNA profiling on Alice Collins Plebuch | It led to discovery that her ancestral bloodline was not purely Irish but European Jewish which resulted in her uncovering the genetic family of her adopted father. |
| 2016 | County Mayo USA | In 2016 Anthea Ring, abandoned as baby. A DNA profiling was conducted | DNA sample and DNA matching database was used to discover her deceased mother's identity and roots |
| 2018 | Ohio | The Buckskin Girl (a body found in 1981 in Ohio). | She was identified as Marcia King from Arkansas using DNA genealogical techniques |
| 2018 | USA | DNA and genealogy techniques was used | Joseph James DeAngelo was arrested as the main suspect for the Golden State Killer |

***Source: Compiled by the researcher from online resources.***

**Forensic Technology, Deoxyribonucleic Acid (DNA) profiling and Security Management in Nigeria**

Nigeria inspite of its population which keep increasing both arithmetically and geometrically, could not boast of a forensic lab equipment for DNA profiling. This prompted Mbamalu (2014) to contend that in line with global trends and the peculiarity of Nigeria's security needs, there have been persistent calls on the Federal Government to do more investments in crime investigation because the country is in dire need of infrastructure to support evidence-led policing, as opposed to confession-led techniques in crime convictions. Mbamalu (2014) lamented that a nation of over 170 million people with a high crime rate has no functional forensic lab, and to worsen the matter, the Federal Government is yet to design a clear-cut strategy on 'acquiring' 'functional' labs, much less train forensic experts. Furthermore as noted by Odili-Idiagbor (2013), fighting crime by merely just arresting anyone found at the crime scene is not enough, since in most cases, those who committed the crime may have left the scene long before the Police arrive, if they do at all. Making a case for DNA profiling in crime management and fight against insecurity in the country Mbamalu argued that with such a huge population of Nigeria, there is no way crime can be managed and controlled without a working national, criminal and biometric databases. The biometric must contain fingerprints and DNA databases, and in buttressing the importance of DNA Profiling in Nigeria, Mbamalu (2014) further observes that Deoxyribonucleic Acid isolated from blood, hair, skin cells, or other genetic evidence left at the scene of crime has helped in apprehending criminals when matched with databases in other clime and that days are gone when individuals are identified by just names and photo ID without biometric.

` The challenges militating against the introduction of DNA profiling insecurity management in Nigeria are many but Ladapo (2011) observes that the low crime reporting culture of the public, paucity of police funding, corruption, inadequate training of police officers in criminal investigations, delayed duplication of investigation case files, missing investigation case files, lack of forensic science facilities and experts; and poor public records keeping are the major challenges. Another challenge is that Nigeria was hobbled by corruption. Other barriers to the adoption of these technologies include cost of procurement, training of security personnel on how to use the technologies, knowledge about how and why certain innovations are adopted and their consequences, and to the opinion of the public about the technology. As a way out, one of the leading Newspaper in Nigeria in Punch Newspaper( 2016) reported that for the nation to really keep crimes such as armed robbery, kidnapping, murder, rape, arson, bomb attacks, terrorism among others in check, there is need to adopt the use of technological base equipment such as Closed-Circuit Television (CCTV) Deoxyribonucleic Acid (DNA) adequate data base, surveillance system among others in order to prevent, reduce, analyze and most importantly control criminal activities.

## V. CONCLUSION

It is incontrovertible that there have been revolution brought about by the use of forensic technology in crime management and insecurity around the world, however the introduction of these technologies such as DNA profiling technology has remained elusive in Nigeria to the extent that whenever there are security breach, it is always a practice to arrest and prosecute innocent ones due to the fact that during investigation, forensic technology is not used. The most worrisome is that instead of investigation to arrest, what the nation's security agencies do is to arrest to investigate because of lack of forensic data bank. The effect of it is that those who commit crime go undetected and unpunished. It is the case in the current fight against Boko Haram Terrorist, armed banditry in the North, Militancy in Niger Delta as well as other insecurity in the country. This paper found that DNA profiling play important roles in security management as it detects offenders and protect the rights of the innocent, DNA samples and profiles are very useful for identification purposes and right for fair trial is enhanced with the DNA Profiling. DNA profiling also helps in speedy administration of justice and give credibility to evidence**.** However, the technology is not used by security agencies in the country to fight crime and insecurity. The paper therefore argues that for Nigeria to extricate itself from the web of insecurity across the country, the use of technology must be introduced to fight all forms of criminalities. Consequently, this study recommends that following:

1. That Nigeria Government should through a legal framework make use of forensic technology mandatory by all security agencies in the country especially this period of high rate of insecurity bin the country.
2. That all security agencies should establish a special unit to be equipped with forensic technology such as Deoxyribonucleic Acid profiling to fight insecurity and maintain peace in the country.

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