

# The Absence of Genetic Policing and Its Implications for Criminal Justice in Nigeria

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*Abstract- The increasing complexity of criminal activities has exposed significant weaknesses in Nigeria's criminal justice system, particularly the limited application of forensic genetics in criminal investigations. This paper examined the absence of genetic policing and its implications for criminal justice in Nigeria. The study adopted descriptive approach by reviewing relevant literature on forensic DNA technology, criminal justice administration, and modern genetic policing practices. The paper found that Nigeria's criminal justice system continues to rely predominantly on eyewitness testimony, confessional statements, and circumstantial evidence, due to the absence of a comprehensive national DNA database, inadequate forensic laboratories, insufficient funding, shortage of trained forensic experts, and weak institutional and legal frameworks. The study further established that modern technologies such as Artificial Intelligence, Facial DNA Phenotyping, Mobile DNA Collection Devices, Automated DNA Extraction Systems, and Rapid DNA Technology have significantly improved criminal investigations in countries such as the United States, the United Kingdom, Canada, and Australia by enhancing crime detection, suspect identification, evidence preservation, and prosecution. Consequently, the paper proposed a Genetic Criminal Investigative Model that integrates these technologies to strengthen evidence-based policing and improve criminal justice administration in Nigeria. The study concluded that adopting genetic policing would enhance the efficiency, transparency, and credibility of criminal investigations while reducing wrongful convictions and strengthening national security. It therefore recommended the establishment of a national DNA database, increased investment in forensic infrastructure, legislative reforms, and continuous capacity building for forensic and law enforcement personnel.*

**Keywords:** genetic policing, forensic dna, criminal justice, forensic technology, evidence-based policing, nigeria.

## I. INTRODUCTION

Genetic policing is gradually rising movement within developing nations like Nigeria where it is completely different from the established countries such as the United States where it has played an important role in investigating crimes. At an international level, the United States is one of the main authorities in the application of genetic policing through technology of forensic DNA. One interesting aspect of genetic policing in the United States is the system of CODIS developed and maintained by the FBI. The initials stand for the Combined DNA Index System is the national DNA database which contains DNA profiles collected from convictions, arrested persons (in many nations), DNA evidence, and unidentified persons. The database allows to comparison of DNA profiles and thus identification of persons who committed several crimes. CODIS generated hundreds of thousands of investigations by linking DNA from the crime scene with the information stored in the database of CODIS (Federal Bureau of Investigation, 2024).

The crime justice system in Nigeria has not been very effective due to the challenges regarding the capacity of the law enforcement agencies to detect crimes, identify offenders, convict them and bring justice to the victim. Furthermore, there are other barriers to effective functioning of the criminal justice system, among which lack of efficient forensic tools is the most significant. For example, the absence of well-equipped forensic laboratories makes it impossible to analyze DNA, fingerprints, ballistics and other pieces of evidence effectively. Indeed, modern Nigerian police prefer to rely on eye-witness accounts.

Genetic forensics has experienced significant strides in terms of methods used for the investigation of crime allowing to regard DNA evidence as one of the most

powerful means in crime investigations, (Gill et al., 2023). However, Nigeria still does not utilize the power of genetic forensics. According to Otu's (2022), it has been stated that many crimes are still investigated using traditional techniques, like witness testimonies and circumstantial evidence. Lack of such sophisticated methods has resulted in many failures of crime investigations in recent years.

#### Conceptual Clarification

##### Genetic Policing

In this modern world, the application of genetics in law enforcement is extremely significant for crime resolution. Many criminologists describe genetic policing as the heart of evidence-based policing, which is understood as the new criminal justice expanded by utilizing scientific knowledge to develop crime prevention and resolution practices. The essence of genetic policing is that it represents evidence-based policing aimed at promoting evidence-based decision-making and motivating law enforcement agencies to implement an investigative strategy that relies on concrete scientific evidence (Sherman, 2023).

Genetic policing is the use of DNA profiling and other genetic methods utilized for gathering evidence in criminal cases including locating culprits, exonerating innocent individuals, linking suspects to crime scenes, and enforcing justice. The use of DNA technology has made great strides in policing various aspects of criminal investigation such as violent crimes, missing persons cases, sexual offenses, terrorism, and murder in many countries around the world (Butler, 2023).

Gill, Bleka and Benschop (2024) claim that recent developments in forensic genetics, particularly the appearance of new DNA typing and statistical methods for interpreting the genetic material, have revolutionized the criminal investigation process, allowing law enforcement organizations to retrieve proper DNA profiles even from degraded materials. All the breakthroughs in genetics have enabled police departments to conduct successful investigations in complex cases which could not be solved before.

The authors Kling, Phillips, and Kennett (2024) stated that genetic forensic genealogy has made genetic policing more effective. The combination of DNA forensic science with genealogical databases enables

the police to trace previously unknown criminals through biological relatives. Similarly, this has significantly advanced the investigation of long-closed cases, serial killing cases, cases of murder, and cases with unidentified bodies in many countries.

#### Criminal Justice in Nigeria

The criminal justice system in Nigeria draws its power from the Constitution of Nigeria 1999 (as amended), the Administration of Criminal Justice Act (2015), the Criminal Code Act, the Penal Code, the Evidence Act of 2011, and other statutory laws governing the investigation and prosecution of criminal cases. The Administration of Criminal Justice Act 2015 has introduced meaningful reforms aimed at enhancing the effectiveness, transparency, and fairness of the administration of criminal justice by eliminating delays in criminal trial proceedings and guaranteeing speedy trials while protecting the rights of the suspects (Federal Republic of Nigeria, 2015).

According to Siegel and Worrall (2022), criminal justice refers to the array of government agencies responsible for enforcing criminal law, resolving criminal controversies, and imposing punishments while ensuring fairness and justice to both victims and offenders. The criminal justice system in Nigeria plays an important role in ensuring law and order, protecting rights, and ensuring accountability for criminal actions.

The criminal justice system is currently seen as a series of institutions of formal social control that delineates how actions of the state in response to crime should be administered. The definition also presumes that the criminal justice system is equipped with technologies for its operations and work to be successful, effective, and legitimate in conducting investigation and trials, for instance use of DNA in forensic sciences (Loader & Sparks, 2022). In the last several years, the Nigerian government has implemented reforms aimed at enhancing the performance of the criminal justice system through modernization of the judicial system, improvement of the efficiency of policing measures, digitalization of the judicial processes, and the use of forensics. Nevertheless, researchers point out that it is necessary to make major investments in forensic infrastructure and establish closer collaboration among institutions, ensure sufficient funding, conduct

continuous professional education, and create a national database of DNA (UNODC, 2023).

**Prevalent Problems with Genetic Policing in Nigeria**  
According to an Interpol report (2024), lack of genetic policing poses enormous challenges to the administration of justice in Nigeria. Law enforcement officials lack effective forensic DNA technique to investigate, link perpetrators to addresses related to the commission of crimes, and solve complex cases, meaning that investigations drag on for months, prosecution and conviction rates are low, and motivates false or wrongful arrests.

Similarly, the United Nations Office on Drugs (2023) has argued that failure to utilize DNA evidence contributes to less public trust in the criminal justice system and limits Nigeria's ability to deal with various security issues, such as terrorism, kidnapping, armed robbery, human trafficking, and sexual violence. Crime-related problems have been on the rise in various parts of the country as the police depend predominantly on eyewitness evidence, which is not scientifically supported.

**Modern Technology used in Genetic Policing and Its Impact**

The modern technology for crime investigation has become useful in detecting crime and has helped in courts in crime related issues. Although, there are many modern technologies in use, but these few have been adopted.

**Artificial Intelligence:** Artificial Intelligence (AI) has become one of the most impactful technologies in the field of forensic genetics and genetic policing, making the collection, analysis, interpretation, and processing of DNA evidence easier and less time-consuming than before. AI means that computer systems and machine learning algorithms are used for performing tasks that usually require human intelligence, including identifying patterns, prediction, data classification, decision support, and automated reasoning. In forensic genetics, specialists can use AI for interpreting complex mixtures of DNA, understanding genetic relationships, working with large DNA databases, predicting investigative leads, and conducting crime investigations based on evidence. In connection with the increase in numbers of forensic DNA databases

around the world, AI has turned into an essential tool for processing big amounts of information in a faster, steadier, and more precise way compared to the traditional methods of doing so.

Gill, Bleka, and Benschop (2024) observed that criminal DNA analysis has been revolutionized by using AI-assisted probabilistic genotyping. In traditional DNA analysis, biological samples that contain DNA from more than one individual or samples that have been degraded due to environmental conditions presented significant difficulties to the forensic analysis. AI-based probabilistic software systems like STRmix™, TrueAllele®, and EuroForMix deploy sophisticated statistical algorithms to compute the likelihood that a particular DNA match came from a specific person. As a result, the systems are able to minimize the amount of subjective interpretation made by forensic analysts and provide scientifically sound statistical estimates that increase reliability of forensic findings.

As per the Federal Bureau of Investigation (2024), AI assisted database administration helps in the fast comparing of DNA from the crime scene and stored profile of criminals in a matter of minutes instead of weeks. The Combined DNA Index System (CODIS) has provided law enforcement with numerous tips and leads through automated DNA matching within the federal, state, and local police organizations.

**Facial DNA Phenotyping:** This particular form of genetic testing assists law enforcement agencies in projecting an unknown person's attributes like eye colour, hair colour, complexion, ethnicity and sometimes even facial features based on biological traces that can be collected from the crime scene. According to Kayser&de Knijff (2011), these techniques provide useful investigative leads when there is no suspect to ascertain. The Facial DNA phenotyping helps investigators employ a more targeted approach to the suspects by recognizing the remains of unidentified individuals.

**Mobile DNA Collection Devices:** In this modern age, the Nigeria Police have successfully implemented use of portable DNA collection kits, advanced digital evidence management techniques, and modern electronic chain-of-custody systems to accurately

collect evidence of forensic significance, keep it protected, and maintain proper documentation. Such innovations ensure that the evidence remains pure, and there is no contamination, thereby increasing accountability and enabling efficient prosecution of suspects. Gill et al. (2024) showed that the incorporation of mobile devices for DNA collection within the digital evidence management approach has provided the possibility to electronically record the crime scene and the location of the DNA sample through GPS techniques, as well as to attach images of the scene of crime and other relevant documents. Thus, it minimizes the chances of transcription errors and provides better quality of documentation.

Based on the report of the United Nations Office on Drugs and Crime in 2023, evidence management technology is expected to increase accountability in the criminal justice system through the secure storage, electronic monitoring, and easy retrieval of forensic evidence. The organization states that nowadays, numerous countries utilize tools like barcode scanning, radio frequency identification (RFID), and cloud computing for controlling biological evidence from the crime scene to the court.

**Automated DNA Extraction Systems:** The use of robotic technology has made it possible for this group of technologies to extract DNA from biological samples without requiring much human interaction. Robotic extraction is known for its ability to limit contamination, increase accuracy, and ensure efficiency in the laboratories. Automated DNA extraction has been able to improve the efficiency and accuracy of laboratory processes, all while minimizing errors on the part of the human operator. According to the Federal Bureau of Investigation (2024), robotic systems used in automated DNA extraction are used in the accredited forensic laboratories across America to facilitate the work of the Combined DNA Index System (CODIS). This means that the DNA profiles in these national databases have been extracted using robotic systems and are very accurate.

In the same vein, the European Network of Forensic Science Institutes has also advocated for the use of automated forensic laboratory technologies in order to enhance the consistency and quality assurance in DNA testing. Laboratory tests in the UK, Germany, The

Netherlands, and France among other countries have incorporated robotic DNA extraction techniques in their forensic processes, hence improving efficiency and forensic cooperation within the borders.

**Rapid DNA Technology:** With this technology, forensic DNA profiles can be prepared in a matter of hours without going through complex laboratory analysis. As mentioned by Butler (2023), the use of Rapid DNA in criminal investigation processes leads to faster DNA results because it provides near real-time DNA results. The use of Rapid DNA in investigations ensures faster identification of suspects, helps with border security operations, and makes the decision-making process for law enforcement agencies easier.

The Federal Bureau of Investigation (2024) indicated that Rapid DNA technology is becoming a vital addition to the Combined DNA Index System (CODIS). After the passage of Rapid DNA Act in the US, accredited booking stations and forensic laboratories have started using Rapid DNA instrumentation in order to analyze qualifying DNA samples and submit eligible profiles to national DNA databases. With this advancement, it has become easier to identify suspects, gather criminal intelligence, and make evidence-based policing easier. As per the United States Department of Defense, Rapid DNA technology has also turned out to be highly useful in military and humanitarian operations. The portable DNA system is used for identifying military personnel, victims of disasters, and unidentified human remains. Examples of such applications show that there is flexibility in the use of Rapid DNA beyond just regular criminal investigations. Additionally, the United Nations Office on Drugs and Crime (2023) highlighted the fact that Rapid DNA technology assists in border security and counter-terrorism efforts as it allows for the verification of identity, investigation of human trafficking organizations, and identification of suspected terrorists. The organization also added that there is a significant role played by forensic identification in the fight against organized crime.

In Europe, various countries such as the United Kingdom, Netherlands, Germany, and France have implemented Rapid DNA technology in their policing

and forensic processes. Various European forensic organizations have successfully used Rapid DNA equipment in situations of mass fatalities, missing persons cases, and major criminal cases. Research has proven that use of Rapid DNA devices has led to decreased processing time but at the same time maintaining high levels of accuracy similar to those achieved through laboratory techniques.

Even though Nigeria is developing its forensic science capacity, the implementation of Rapid DNA technology has not been adequately facilitated because

of poor forensic facilities, lack of enough funding, lack of accredited forensic laboratories and lack of specialized staff. However, application of Rapid DNA technology in the Nigeria Police Force, border agencies, and forensic laboratories would improve criminal investigations and provide numerous benefits to the criminal justice process.

Genetic Criminal Investigative Model for Effective Criminal Justice System in Nigeria

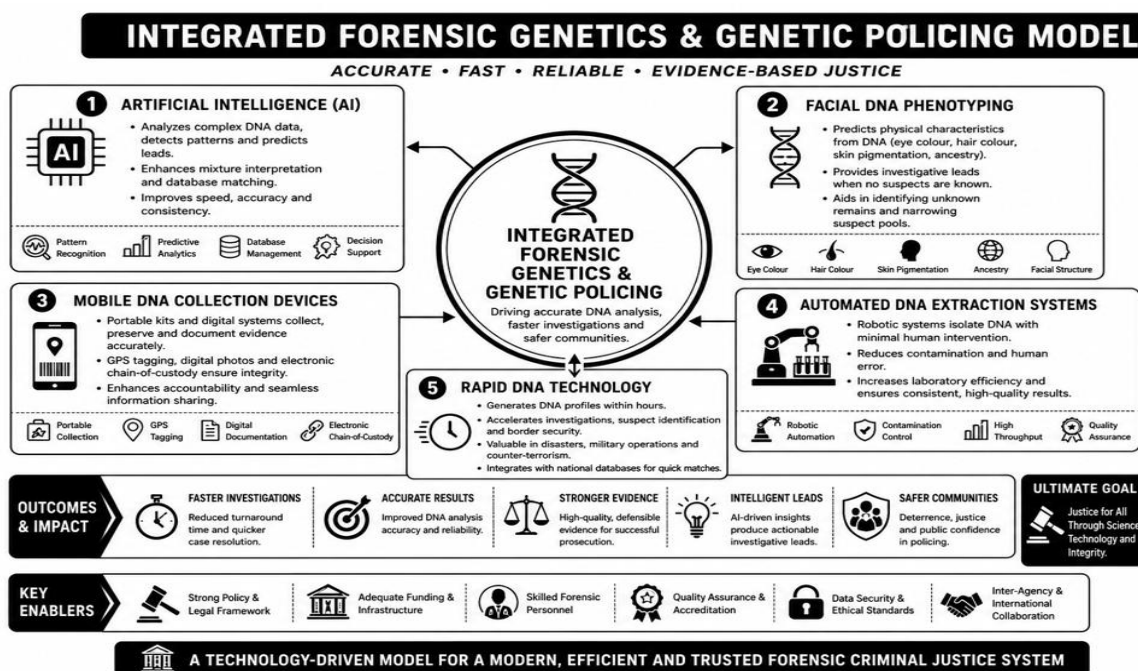


Fig.1. Model: Genetic Policing for Criminal Justice System

Source: *Researcher's Conceptualization (2026). Inferences were drawn from Butler 2023; Gill et al. (2024); Federal Bureau of Investigation (2024); United Nations Office on Drugs and Crime (2023).*

The above model, as presented in figure 1, shows how the modern forensic technologies could be employed through the conceptual model to enhance genetic policing and facilitate the investigation process in Nigeria.

In the above conceptual model, the core element is Integrated Forensic Genetics and Genetic Policing, which acts as the central point that facilitates the interaction between various technologies and creates scientific evidence to be used in the law enforcement process. In place of using only eyewitness evidence,

confessions and circumstantial evidence, this model helps in creating scientifically sound evidence based on DNA technologies.

The model revealed that Artificial Intelligence (AI) acts as one of the major components in the conceptual model by facilitating speedy and accurate DNA analysis process. AI technology can analyze the DNA databases, match genetic profiles, interpret the complex mixtures of DNA and generate leads for criminal investigation. In countries like Nigeria, where criminal investigations take a lot of time due to lack of

forensic facilities, the use of AI can help in speedy processing of cases.

The model indicated that facial DNA Phenotyping allows for the determination of certain physical traits of a suspect from the biological evidence obtained at the crime scene. Skin color, eye color, hair, ancestry, and other information can help law enforcement in narrowing the list of suspects, especially when there are no witnesses or videos of the crime scene. This forensic tool is beneficial in tackling kidnappings, terrorism, murders, and unidentified human remains in Nigeria.

The Mobile DNA Collection Devices assist the police in ensuring proper collection, storage, documentation, and transmission of the biological evidence found at the crime scene with minimum contamination. The documentation, GPS tags, barcodes, and electronic chain of custody help in maintaining the security of the evidence from crime scene to court.

In the model Automated DNA Extraction Systems makes the laboratory work more efficient through the use of robotic systems to extract DNA from the samples without much human interference. Automation ensures no contamination of the samples, lessens human errors, and allows forensic laboratories to test many biological samples simultaneously. In Nigeria, where the forensic laboratories have backlogs of cases, automation of DNA extraction greatly increase laboratory productivity and make DNA profiling more reliable.

In the model, in the last segment, Rapid DNA Technology makes it possible for forensic DNA profiles to be obtained within a few hours rather than taking days or even weeks. Through rapid DNA, the Nigeria Police Force, the security agencies at the borders, and disaster management teams can fast-track the process of suspect identification, identity verification, human trafficking investigations, handling of terrorist attacks, and the identification of disaster victims.

In addition to this, the framework identifies the enabling factors necessary for the success of the implementation process. The enabling factors include legal and policy frameworks, adequate funding, state-

of-the-art forensic facilities, skilled forensic personnel, quality assurance mechanisms, data security measures, ethical considerations, and cooperation among police forces, forensic laboratories, and the judiciary. Such factors guarantee that the forensic technologies are implemented in line with international best practices and at the same time respect the rights of the citizens and integrity of DNA evidence.

Consequently, the desired results to be achieved as a result of implementing the technology will include the faster process of criminal investigation, accurate forensic results, scientific evidence, intelligence, conviction of the guilty individuals, protection of the innocent from false convictions, and increased public trust in the criminal justice system.

Finally, the conceptual model clearly highlights that incorporation of Artificial Intelligence, Facial DNA Phenotyping, Mobile DNA Collection Devices, Automated DNA Extraction Systems and Rapid DNA Technology will form an integrated model for modern day genetic policing in Nigeria. If this conceptual model is appropriately legislated and resourced, then it has a potential of completely revolutionizing criminal investigations through increasing efficiency, accuracy, accountability and delivery of justice.

In terms of practical significance, the significance of genetic policing can be observed in the cases of countries like the United States, the United Kingdom, Canada and Australia, which make use of national DNA databases as an essential element in their criminal investigations. In the United States, the Combined DNA Index System (CODIS), and in the United Kingdom, the National DNA Database (NDNAD) are used by the law enforcement authorities to compare DNA profiles of the crime scene with the offenders profile for identification of suspects, linking serial offences, locating missing persons and exonerating wrongly accused people (Interpol, 2024).

## 2.2 Theoretical Framework

### 2.2.1 Deterrence Theory

Deterrence Theory was introduced by Cesare Beccaria, an Italian criminologist and philosopher of law, in 1764 in the book titled 'On Crimes and Punishments'. This theory was further developed by

Jeremy Bentham, an English philosopher, in 1789, where he explained that humans are rational people and consider the cost and gains from the act before committing any crime. Beccaria suggested that punishment is not meant for vengeance but as a tool to prevent future crimes. As per this theory, criminal activity may be prevented when punishment is sure, prompt, and adequate. Out of the three, the certainty of detection and punishment has been seen as the most effective deterrent because criminals are unlikely to commit crimes when they think that it will lead to their detection, arrest, prosecution, and conviction.

The fundamental premise behind Deterrence Theory is the rationality of humans when it comes to making decisions. People will not engage in any form of criminal activity when they realize that the law enforcement agency has efficient mechanisms in place to help detect criminals. This theory also operates under the assumption that the efficiency of a criminal justice system can be guaranteed through efficient investigative methods, evidence collection, and effective application of the law. The fact that law enforcement agencies cannot recognize the offenders will lead to the failure of deterrence through punishment.

The theory of deterrence is pertinent to the current study since genetic policing contributes immensely to making sure that criminals are apprehended by way of forensic DNA. In technologically advanced nations, technological innovations like Artificial Intelligence-assisted DNA analysis, DNA databases, Rapid DNA technology, automated DNA extraction tools, and portable DNA collection tools have helped to make it easier for the police to identify offenders even in situations where no eye witnesses or confession is available.

These technologies have led to an increase in conviction rates and have decreased wrong conviction rates in many nations around the globe. Nevertheless, in the absence of genetic policing in Nigeria, law enforcement agencies in the country lack the ability to detect offenders using scientific means, which lead to inefficient criminal investigations, unsolved criminal offenses, and erosion of public trust in the criminal justice system. Hence, the application of genetic policing will promote certainty in punishment, which

will discourage criminal behaviors such as kidnapping, terrorism, armed robbery, homicide, sexual offenses, and human trafficking.

### Conclusion

The absence of genetic policing has remained one of the major obstacles to effective criminal justice administration in Nigeria. Although the country has introduced several criminal justice reforms, crime investigations continue to depend largely on conventional investigative methods that are often inadequate for addressing contemporary crimes. The experiences of developed countries demonstrate that forensic DNA technologies, Artificial Intelligence, Rapid DNA systems, automated DNA extraction, facial DNA phenotyping, and mobile DNA collection devices have significantly improved the accuracy, speed, and credibility of criminal investigations. Therefore, integrating these modern forensic technologies into Nigeria's criminal justice system would strengthen evidence-based policing, improve crime detection, reduce wrongful convictions, enhance public confidence in law enforcement, and promote a more efficient, transparent, and accountable criminal justice system capable of addressing emerging security challenges.

### Recommendations

- i) A National DNA Database needs to be set up by the Federal Government of Nigeria through legislation to ensure that science can be used to identify suspects, missing individuals, unknown human remains, and recidivist criminals.
- ii) There should be significant government investment in the development of forensic infrastructure by creating highly equipped forensic DNA labs all over the nation and supplying advanced technology like Artificial Intelligence, Rapid DNA, Automated DNA Extraction, Facial DNA Phenotyping, and Mobile DNA collection devices to police departments.
- iii) It is important to provide constant training and capacity building for investigators, forensic scientists, prosecutors, judges, and other criminal justice professionals so that they gain more competence in conducting forensic DNA profiling, managing crime scenes, dealing with digital evidence, and utilizing the modern genetic technologies in criminal investigations.

- iv) The Nigeria Police Force, forensic laboratories, the judiciary, correctional facilities, and all other criminal justice agencies need to build institutional cooperation and information flow to assist in evidence-based investigation, better prosecution, minimize criminal trial delays, and ensure effective criminal justice administration in Nigeria.

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