

## **Integrating Forensic Science into Criminal Justice Reform for a Safer Society: Nigeria as a Case Study**

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### **Abstract**

*This conference paper attempts to clarify that true reform of criminal justice (particularly in Nigeria) cannot be achieved without integrating forensic science at its very core. It highlights how science provides real-time courtroom evidence through various forensic methods and techniques all over the world in assisting investigations and transforming justice delivery from probability to certainty. However, in many developing countries, progress could be hindered by various inherent factors and challenges. The paper subsequently seeks to draw lessons from selected international models that showcase the value of integrating forensic science in criminal justice administration, thereby demonstrating how reform of criminal justice can move from rhetoric to reality. It challenges policymakers, scholars, and practitioners to see forensic science not as an accessory but as the very foundation of criminal justice administration for a safer and fairer society.*

**Keywords:** *Crime, Evidence, Forensic Science, Justice, Reform*

### **1. Introduction**

The words "science" and "justice" are two different concepts separated by their vast and distinct areas of study. For instance, science is the systematic study of the natural and physical world through observation, experimentation, and analysis, with the end result of discovering universal truths and explaining phenomena based on factual evidence. Justice, on the other hand, from the legal perspective, is the end result of applying a body of rules and principles created by societal government to regulate human conduct, maintain order, and promote the administration of fairness and equity.

It can be seen that while science seeks factual certainty, justice clearly often contends and juxtaposes with moral, social, and political considerations, interpreting human behavior within legal perspectives. Both disciplines unarguably pursue truth in different ways; their vast areas of study, however, indicate the divide between empirical inquiry and normative regulation. For the purpose of this paper, forensic science serves as the bridge between science and justice, thereby uniting the objectivity and accuracy of scientific inquiry with the normative demands and requirements of legal systems. Through this, raw evidence becomes more credible and verified proof that courts can rely upon than any form of speculation in an attempt to disseminate justice.<sup>1</sup>

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<sup>1</sup> Encyclopædia Britannica, 'Science', <<https://www.britannica.com/science/science>>, Accessed 11 September 2025.

## 1.1 Definition and Scope of Forensic Science

The term “forensic” is derived from the Latin word *forensis*, meaning “of or before the forum.” According to ancient terminology, it referred to matters debated before a public forum or court. Presently, forensic science covers diverse areas including the application of different scientific fields to answer questions relevant to a legal system, whether in criminal or civil cases. As a matter of fact, forensic science is closely related to the broader concept of authentication, which is interpreted as verifying whether an object, event, or artifact is genuinely what it is claimed to be. In this regard, it merges medical science with legal issues to create a common platform for scientists and legal professionals. Its primary purpose is to provide guidance during criminal investigations and to deliver accurate, reliable information to courts. Experts in forensic science, may be called or summoned by the court to provide required information that will help in corroborating evidences before the court.

## 2. Scientific Techniques and their Impact on Criminal Justice Outcomes

### 2.1 Narco-interrogation Test

Alternatively referred to as the narco-analysis test, this procedure uses chemical injections to put a subject into a drowsy or semi-conscious state, which impairs the subject's capacity for independent thought and allows investigators to question the subject and extract suppressed information. It has been used to help witnesses or suspects recall information during investigations. In a narcoanalysis test, a drug called sodium pentothal is injected into the accused's body, causing them to enter a hypnotic or sedated state that neutralizes their imagination, making them incapable of lying and expected to reveal truthful information. narco-analysis narcoanalysis. Although it is intended to aid truth detection and crime prevention, it has continued to raise serious concerns regarding its legality, ethics, and constitutionality. For instance, there has been speculation of its validity under Article 20(3) of the Indian Constitution, which protects against self-incrimination and upholds the maxim *nemo tenetur se ipsum accusare* (no one can be compelled to testify against oneself).<sup>2</sup> Indian jurisprudence has been divided regarding the subject matter; for instance, in the case of *Bombay v. Kathi Kalu Oghad*<sup>3</sup>, the Supreme Court restricted compelled testimony to self-incriminatory evidence, while in *Ramchandra Ram Reddy v. State of Maharashtra*<sup>4</sup> and *Santosh Sharman Bhai Ladeja v. State of Gujarat*,<sup>5</sup> courts upheld narco-analysis when conducted under medical supervision, provided its results are corroborative and not treated as conclusive evidence.

### 2.2 Forensic Ballistics

Forensic ballistics works on the principle that every firearm leaves unique marks on the ammunition it discharges. The inside of the barrel contains spiral grooves called rifling, and as a

<sup>2</sup> Sherin N B and Akshara B, 'Article 20(3) And Beyond: The Scope of Protection Against Self-Incrimination In India', (*IJCRT*, 2025) < <https://ijcrt.org/papers/IJCRT25A6059.pdf> > accessed 11 September 2025.

<sup>3</sup> *State of Bombay v Kathi Kalu Oghad* AIR 1961 SC 1808

<sup>4</sup> *Ramchandra Ram Reddy v State of Maharashtra* [2004] Bom CR (Cri) 657 (Bom HC)

<sup>5</sup> *Santokben Sharmanbhai Jadeja v State of Gujarat* [2008] Cri LJ 68, (2008) 1 GLR 497 (Guj HC)

bullet passes through, it picks up distinct patterns of striations. Similarly, parts of the weapon such as the firing pin, the breech face, and the extractor leave microscopic impressions on the cartridge cases. These features serve as a kind of fingerprint, allowing experts to match spent ammunition to a specific weapon. Investigators usually test-fire a suspected gun and then compare the test cartridges or bullets with the evidence using specialized comparison microscopes.

In the Nigerian case study of Kolade Johnson, ballistic experts carefully analyzed the ammunition recovered at the scene and compared it with rounds test-fired from the AK-47 rifle officially issued to Inspector Ogunyemi Olalekan. The unique microscopic marks aligned, proving that the rifle in his possession had discharged the fatal shot. Although the officer initially denied responsibility, the forensic evidence clearly established the connection between the weapon and the death. Based on this crucial finding, the Lagos High Court convicted him and sentenced him to life imprisonment.<sup>6</sup>

### 2.3 Polygraph or Lie Detector Test

The polygraph test records physiological responses such as pulse, blood pressure, and respiration. The principle is that lying causes nervousness and mental excitement, which stimulate the adrenal glands to secrete adrenaline. This results in noticeable physiological changes. These changes are recorded as a "polygraph," which examiners analyze to determine whether the suspect experienced emotional stress when answering questions. This forensic approach in crime investigation is one of the earliest efforts to apply scientific methods. It measured physiological responses such as blood pressure, breathing, and perspiration that were believed to reveal deception. Its introduction into courtrooms led to significant speculation, prompting the establishment of the Frye test in 1923<sup>7</sup>, which required that any scientific evidence presented in court must be generally accepted within its professional field. Although the polygraph became a widely known tool, questions about its accuracy persisted, as anxiety and nervousness could produce the same reactions as dishonesty.

### 2.4 Functional Neuroimaging

This is also known as brain mapping or P300 tests. It is a class of psychophysiological tests that can be used to determine whether someone remembers a particular fact. The P300 test relies on a relationship between a detectable neural signal (the P300 "brainwave") in a test subject and the recognition of those facts in the subject's mind. It belongs to a class of brain-based forensic technologies that have proved instrumental in recent years. Given the effectiveness of this forensic technology, one of the initiators and promoters of the test, known as Lawrence Farwell, who developed his own version of the test, also known as "brain fingerprinting," ensured that it became

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<sup>6</sup> The Nigerian Lawyer, 'Court Sentences Dismissed Police Officer to Life Imprisonment for Killing Kolade Johnson', *The Nigerian Lawyer*, < <https://thenigerianlawyer.com/court-sentences-dismissed-police-officer-to-life-imprisonment-for-killing-kolade-johnson/> > accessed 11 September 2025.

<sup>7</sup> *Frye v United States* 293 F 1013 (DC Cir 1923).

inculcated into the judicial system, with a court admitting the evidence under a so-called Daubert test.<sup>8</sup>

There are, of course, opponents of Farwell's experiment. One such objection is that the procedure relates to the judicial applications it has been assigned. In the Harrington ruling, where the findings of a P300 memory detection technique were accepted in court, the method was used to absolve a prisoner who had spent 24 years in confinement.<sup>9</sup> The outcome supposedly indicated that certain details connected to the crime were absent from the defendant's mind, but that elements tied to his alibi were present. It is doubtful that this had much influence on the court's judgment since a principal witness in the earlier case had already withdrawn his statement. As Rosenfeld notes, the evidential weight of Farwell's result in this setting was virtually insignificant. Recollections are constantly altered, reshaped, and revised over time. An individual who was genuinely at a crime scene two decades earlier may have forgotten specific elements that the P300 attempts to test, creating a negative outcome that is not truly exonerating. Likewise, someone who has repeated an alibi for many years could recognize details linked to that account, even if it were false.

## 2.5 Forensic Toxicology

This is a specialized area of forensic science that focuses on detecting and interpreting the presence of drugs, alcohol, poisons, and other toxic substances in biological samples such as blood, urine, bile, or tissue. Toxicologists use advanced laboratory techniques, including gas chromatography, mass spectrometry, and immunoassays, to measure the levels of these substances. The purpose is to establish whether exposure to a particular chemical contributed to illness, impairment, or death. In legal investigations, toxicology helps to clarify cases of suspected poisoning, drug overdose, or substance-related negligence by providing scientific evidence that links cause and effect.<sup>10</sup>

## 2.6 DNA Profiling

DNA profiling, also referred to as genetic fingerprinting, has become one of the most powerful tools in modern forensic science and an indispensable asset in the administration of criminal justice. It is built on the principle that every human being (except identical twins) possesses a unique genetic code. Since DNA is present in almost all nucleated cells of the body and is left behind in traces such as blood, saliva, semen, hair follicles, or epithelial cells, investigators can recover and analyze these samples from crime scenes. The ability to compare biological evidence collected from a crime scene with reference samples from suspects or victims makes DNA

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<sup>8</sup> Graham Richardson, 'Brain fingerprinting field studies comparing P300-MERMER and P300 brainwave responses in the detection of concealed information', *Cognitive Neurodynamics*, (2013) 7 263 <<https://link.springer.com/article/10.1007/s11571-012-9230-0>> accessed 11 September 2025

<sup>9</sup> Lawrence Farwell, Drew Richardson and Graham Richardson, 'Brain fingerprinting field studies comparing P300-MERMER and P300 brainwave responses in the detection of concealed information' *Cognitive Neurodynamics* (2013) 7 263 <<https://link.springer.com/article/10.1007/s11571-012-9230-0>> accessed 11 September 2025.

<sup>10</sup> Delphine Cappelle, Michel Yegles and Hugo Neels, 'Nail Analysis for the Detection of Drugs of Abuse and ...' *Springer*, (Lagos, 10 December 2014) <<https://link.springer.com/article/10.1007/s11419-014-0258-1>> accessed 11 September 2025.

profiling a decisive method in confirming identity and linking individuals to criminal acts. Its strength lies not only in identifying perpetrators but also in exonerating innocent persons wrongfully accused or convicted.<sup>11</sup>

Forensic scientists rely on materials like blood, semen, saliva, bone, and teeth, since they contain nucleated cells that yield DNA. However, these samples are often susceptible to degradation or contamination. This is why investigators must handle evidence with strict precautions—using protective clothing, maintaining chain of custody, and preventing cross-contamination at crime scenes. Proper storage methods are also critical; for example, blood samples may be initially refrigerated before being stored at sub-zero temperatures for longer periods. Any lapse in handling can compromise the integrity of the evidence and undermine its evidentiary value in court.

## 2.7 Fingerprint Analysis

Fingerprint analysis is built on the scientifically proven principle that every individual has totally unique and permanent ridge patterns in their finger. Of course, over the years, this has continued to play a vital role in criminal justice for more than a century now. The pattern of a fingerprint analysis contains loops, whorls, and arches, which have remained unchanged and uncommon throughout a person's life, thereby making them reliable for identification even when attempts are made to alter them. The discovery of this biological technology made fingerprints one of the earliest forms of forensic evidence recognized by courts. Historically, in 1892, the conviction of Francisca Rojas in Argentina marked the first recorded use of fingerprint evidence, after a bloody print was discovered at the crime scene that irrefutably matched to her. In the same way, the Stratton brothers were also convicted based on fingerprint evidence in the year 1905. They were subsequently executed after their conviction for murder.<sup>12</sup>

In other jurisdictions, such as the United States, the trial of Thomas Jennings<sup>13</sup> in 1910 was a landmark case study as it relates to fingerprint evidence. Jennings was convicted of killing Clarence Hiller, with his fingerprint found on a freshly painted railing serving as key evidence. The judgement of this case upheld the conviction. The court formally recognized fingerprint evidence as scientifically accurate and valid as well as legally admissible. This particular case subsequently marked the genesis and establishment of fingerprint evidence in criminal investigations across America. Also, Forensic technology has emerged as a vital tool in safeguarding the integrity of electoral processes, especially in regions like Africa where electoral fraud and manipulation remain persistent threats to democratic governance. The application of forensic methods ranging from biometric verification and digital audit trails to statistical anomaly detection can significantly reduce the incidence of rigging, ballot stuffing, and voter

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<sup>11</sup> Zoyalla Kim, 'Flawed Evidence and the Role of Forensic Medicine in Miscarriages of Justice' *Journal of Forensic Research*, <<https://www.hilarispublisher.com/open-access/flawed-evidence-and-the-role-of-forensic-medicine-in-miscarriages-of-justice.pdf>> accessed 11 September 2025.

<sup>12</sup> 'DNA Fingerprinting: Techniques and Forensic Applications' *Biology Insights* <<https://biologyinsights.com/dna-fingerprinting-techniques-and-forensic-applications/>> accessed 11 September 2025.

<sup>13</sup> *People v Jennings*, 252 Ill. 534 (1911).

impersonation. In countries such as Nigeria, forensic analysis has been used to scrutinize phases of the election process including voter registration, fingerprint scanning, and result tabulation, helping to identify irregularities and hold perpetrators accountable.<sup>14</sup>

One of the most promising forensic approaches is the use of biometric systems, which verify voter identity through fingerprints or facial recognition. This minimizes duplicate registrations and ensures that only eligible voters participate. Forensic auditing tools like Benford's Law have been applied to detect statistical anomalies in vote counts, flagging suspicious patterns that may indicate manipulation. These technologies not only enhance transparency but also build public trust in electoral outcomes, which is crucial in politically volatile environments.<sup>15</sup>

### 3. Forensic Evidence in Nigerian Criminal Justice Administration

#### 3.1 Overview of the Nigerian Evidence Act 2011 (as amended)

This act applies to all judicial proceedings in or before courts established in the country, but with some exceptions. It does not apply to proceedings before an arbitrator, to proceedings before a field general court martial, or to judicial proceedings in any civil matter before a Sharia Court of Appeal, Customary Court of Appeal, Area Court, or Customary Court (Evidence Act, 2011, s. 256).

Some types of forensic evidence fall into the category of opinion evidence. Opinion evidence is a belief that is not necessarily certain but rather based on probability. The Evidence Act distinguishes between opinion and fact, with "fact" including anything that can be perceived by the senses, any state of things, or a mental condition of which a person is conscious (Evidence Act, 2011, s. 256). Generally, opinions are not admissible in court; however, there are exceptions. Section 67 of the Act makes clear that the opinion of any person as to the existence or non-existence of a fact in issue is irrelevant and inadmissible.<sup>16</sup>

Nevertheless, the Act allows the opinions of experts in certain specialized areas such as science, art, handwriting, or fingerprint analysis when the court must form an opinion on such matters (Evidence Act, 2011, s. 68(1)). Those who are considered experts are individuals especially skilled in these areas (s. 68(2)). The Supreme Court, in *Omisore & Anor v. Aregbesola & Ors* (2015)<sup>17</sup>,

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<sup>14</sup> Deniz Yurdasen, 'How Biometrics Is Becoming a Norm of Elections in Africa' (*Aratek Biometrics*, 30 September 2022) <<https://www.aratek.co/news/how-biometrics-is-becoming-a-norm-of-elections-in-africa>> accessed 11 September 2025.

<sup>15</sup> Zwelithini Edward Vilakazi, 'Benford's Law and Electoral Integrity: A Forensic Analysis of African Elections' *MBA research project, Gordon Institute of Business Science, University of Pretoria*, <<https://repository.up.ac.za/bitstreams/af6aef21-6142-4eab-ab3b-865779e06baf/download>> accessed 11 September 2025.

<sup>16</sup> Taribowei Ibori, 'A Critical Appraisal of the Relevance and Admissibility of Electronically Generated Evidence', *Academia* <[https://www.academia.edu/49239896/A\\_CRITICAL\\_APPRAISAL\\_OF\\_THE\\_RELEVANCE\\_AND\\_ADMISSIBILITY\\_OF\\_ELECTRONICALLY\\_GENERATED\\_EVIDENCE](https://www.academia.edu/49239896/A_CRITICAL_APPRAISAL_OF_THE_RELEVANCE_AND_ADMISSIBILITY_OF_ELECTRONICALLY_GENERATED_EVIDENCE)> accessed 11 September 2025.

<sup>17</sup> LawCare Nigeria, 'Senator Iyiola Omisore & Anor v Ogbeni Rauf Adesoji Aregbesola & Ors', (2015) <<https://lawcarenigeria.com/senator-iyiola-omisore-anor-v-ogbeni-rauf-adesoji-aregbesola-ors2015/>> accessed 11 September 2025.

explained that an expert witness is one who has made a subject a matter of particular study, practice, or observation, and who possesses specialized knowledge of that subject. In this light, forensic experts are often called upon to help the court form its judgment, particularly where evidence gathered through forensic science is technical and beyond the ordinary knowledge of judges.<sup>18</sup>

### 3.2 Challenges and Limitations of Forensic Science in Nigeria

- a. In Nigeria, lack of proper funding has been a major issue inhibiting the development of forensic laboratories that will meet the required international standard.
- b. Sometimes, the provided facilities for forensic analysis are usually outdated or not properly maintained.
- c. Also, due to the brain drain of forensic professionals from the country, little or no experts are available to promote research development in forensics analysis
- d. Due to the lack of proper investment in the academic system, there has been a lack of adequate training and equipping of students who are passionate for forensic development.
- e. There are no sufficient forensic laboratory branches in the country. As a matter of fact, in 2022, there was just only one DNA laboratory branch in Lagos<sup>19</sup> until the move by the legislator to establish more DNA centers.<sup>20</sup>
- f. Due to poor ways of handling evidence and maintaining proper conduct on crime scene, what should have been regarded as forensic evidence might have been altered as there is no adequate training for preventing such alterations.
- g. With the development of Forensic science, some fraudulent technologies have also evolved (for instance, the manipulation of the metadata of digital files), thereby rendering the effectiveness of forensic evidences unreliable and lacking credibility. It only takes the expertise of a forensic analyst to unveil the truth.<sup>21</sup>
- h. Overall, the end result of all these accumulated challenges is that there will be a lot of backlog cases as there is no proper funding as well as sufficient numbers of personnel dedicated to forensic analysis in the country.

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<sup>18</sup> AO Enofe and AO Odigie, 'Expert Witness and the Court System'

<<https://www.iiste.org/Journals/index.php/DCS/article/viewFile/23159/23778>> accessed 11 September 2025.

<sup>19</sup> 'NDLEA establishes forensic labs in Abuja, Enugu' (Abuja, 12 May 2025) <<https://www.thecable.ng/ndlea-establishes-forensic-labs-in-abuja-enugu/>> accessed 11 September 2025.

<sup>20</sup> 'Lagos Assembly passes bill on DNA, forensic centre' (Lagos, 5 September 2022) *Daily Post* <<https://dailypost.ng/2022/09/05/lagos-assembly-passes-bill-on-dna-forensic-centre/>> accessed 11 September 2025.

<sup>21</sup> 'When Metadata Lies: Exposing Data Manipulation in Digital Files' (Lagos, 16 April 2025) Eclipse Forensics <<https://eclipseforensics.com/when-metadata-lies-exposing-data-manipulation-in-digital-files/>> accessed 11 September 2025.

## 4. Comparative Impact of Forensic Evidence in Selected Jurisdictions

### 4.1 South Africa

Over the years, forensic science in South Africa has evolved from small beginnings into a more defined and structured field within criminal justice. The South African Police Service established its Forensic Science Laboratory in 1971 with biology chemistry and electronics units forming the core of work done in crime scene analysis and examination. In the late 1890s the Natal Police were pioneers on the African continent in using fingerprinting for crime solving after Sub Inspector W. J. Clarke introduced the system inspired by its use in Calcutta in 1897.<sup>22</sup> Since then, South Africa has developed a more structured and defined approach to the use of forensic evidence in criminal investigations compared to other African countries. As a matter of fact, Forensic evidence in South Africa is considered crucial in the administration of justice and has been formally integrated into legal processes through established procedures and case law precedents. The admissibility of forensic evidence in South Africa depends on relevance, reliability, and probative value. Although reliability is not a strict prerequisite for admissibility, it influences the weight attached to forensic evidence by courts.<sup>23</sup> Judges assess whether the evidence contributes materially to the establishment of facts in dispute, balancing its probative value against possible prejudice to the accused. Further ahead, South Africa has also established forensic laboratories that are nationally recognized for handling DNA, toxicology, ballistics, and fingerprint analysis. The South African Police Service Forensic Science Laboratory plays a central role in criminal investigations. When it comes to using forensic evidence in criminal trials, judges in South Africa admit expert forensic testimony so long as it is relevant to a disputed issue. Electronic evidence such as computer-generated or digital records gains admissibility only when authenticity, chain of custody, and reliability are established. Statutory frameworks like the Electronic Communications and Transactions Act and the Law of Evidence Amendment Act guide how such evidence must be gathered, stored, and presented. Investigators must prevent tampering and must make sure the court can understand the technology, for example, by explaining how evidence was preserved so judges who are not computer experts can follow.

In other forensic development, DNA evidence also plays a significant role in advancing investigation in South Africa. As a result, the DNA Act passed in 2013 led to the establishment of the National Forensic DNA Database of South Africa, which is used to store and compare DNA profiles as part of criminal investigations.<sup>24</sup> This has contributed in no small way by creating an

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<sup>22</sup> Sorumatik, 'South African Police Service Forensic Science Laboratory Overview', *Sorumatik* <<https://en.sorumatik.co/t/south-african-police-service-forensic-science-laboratory/238074>> accessed 11 September 2025.

<sup>23</sup> Anyasi D and Fatoki Y, 'A Legal Prognosis of the Significance of Forensic Evidence in Criminal Investigation in Nigeria and South Africa', *Agora International Journal*, <<https://www.semanticscholar.org/paper/da3d1d2ae0c8cee45f5329264c3131d50e26abb8>> accessed 11 September 2025.

<sup>24</sup> Criminal Law (Forensic Procedures) Amendment Act 37 of 2013 (South Africa) <<https://www.gov.za/documents/criminal-law-forensic-procedures-amendment-act-0>> accessed 11 September 2025.

effective record and database, which provides vital information and can help to resolve crime puzzles. In other words, the South African government provides an accessible forensic storehouse (database) where investigators can always reach out for proper and effective crime solving.

## 4.2 England and Wales

Forensic science in England and Wales has experienced a period of profound difficulty, particularly following the closure of the Forensic Science Service (FSS) in 2012. The decision was intended to reduce public expenditure, yet it created significant instability. Private providers entered the space, but competition often revolved around cost rather than quality. This fostered a fragmented market, weakened research and development, and eroded public confidence in forensic practices. In many respects, the system became vulnerable to underfunding, skill shortages, and inconsistencies that affected the reliability of evidence in court.<sup>25</sup> By 2019, the House of Lords issued a report that described forensic science as being in a state of crisis. It highlighted chronic delays in processing evidence, rising digital backlogs, and gaps in quality assurance. Contamination scandals in DNA profiling further revealed the fragility of the system, while the lack of adequate legal aid for defense experts raised questions about fairness in adversarial proceedings. Reform efforts began to gather momentum with the Forensic Science Regulator Act of 2021, which placed the regulator on a statutory footing for the first time. This development was significant, as it gave the regulator powers to enforce compliance with codes of practice, thereby addressing long-standing concerns about accountability. In 2023, the first statutory Code of Practice was introduced, followed by a streamlined 2025 update, which aimed to strengthen consistency in crime scene examination while reducing unnecessary administrative burdens.<sup>26</sup>

The key lessons from this trajectory are clear. First, an over-reliance on market competition undermines forensic quality and weakens scientific independence. Second, digital forensics requires substantial investment and coordination, given the growing complexity of electronic evidence.<sup>27</sup> Third, impartiality must remain at the heart of forensic science, which means shielding it from exclusive police control and ensuring defense access to expertise.<sup>28</sup> While challenges remain, the introduction of statutory regulation, renewed policy discussions, and targeted innovation reflect meaningful steps towards stabilizing and rebuilding forensic science in England

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<sup>25</sup> Home Office, Government Response to the Seventh Report from the House of Commons Science and Technology Committee: The Forensic Science Service (Cm 8215, October 2011) <[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228958/8215.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228958/8215.pdf)> accessed 11 September 2025.

<sup>26</sup> Forensic Science Regulator and Home Office, 'Forensic Science Activities: Statutory Code of Practice – Version 2' (Lagos, 5 June 2025) <<https://www.gov.uk/government/publications/forensic-science-activities-statutory-code-of-practice-version-2>> accessed 11 September 2025.

<sup>27</sup> Staff Writer, 'Exploring the Latest Innovations in Digital Forensics Tools' *ConsumerSearch* <<https://www.consumersearch.com/technology/exploring-latest-innovations-digital-forensics-tools>> accessed 11 September 2025.

<sup>28</sup> Faster Capital, 'Expertise: The Power of Expertise: How Specialization Drives Success' (2 April 2025) *FasterCapital* <<https://fastercapital.com/content/Expertise--The-Power-of-Expertise--How-Specialization-Drives-Success.html>> accessed 11 September 2025.

and Wales. For instance, the Forensic Science Regulator (FSR), created in 2007, was strengthened by the Forensic Science Regulator Act of 2021. The Act granted statutory powers to investigate malpractices, enforce compliance with quality standards, and demand documentation where required.

### 4.3 The United States of America

The development of forensic science in the United States has continued to shape the admissibility and reliability of scientific evidence in court. The Federal Rules of Evidence of 1975, and in particular Rule 702, remain central to this process.<sup>29</sup> From its inception, Rule 702 required that expert witnesses be qualified by knowledge, skill, experience, training, or education and that their testimony assist the trier of fact in understanding evidence or determining facts at issue, thereby setting a departure from the older Frye general acceptance test, which admitted scientific evidence only if it had achieved broad acceptance within its field. The Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, in 1993<sup>30</sup> further clarified the standard, assigning trial judges a gatekeeping role to ensure that expert testimony rests on a reliable foundation and is relevant to the case. Subsequent Supreme Court decisions refined the Daubert judgement and expanded the gatekeeping obligation. For instance, in *General Electric v. Joiner* in 1997,<sup>31</sup> the Court held that appellate courts should apply an abuse of discretion standard when reviewing a trial court's decision to admit or exclude expert testimony, which strengthened trial judges' authority by discouraging routine appellate reversals. Also, in *Kumho Tire v. Carmichael* in 1999<sup>32</sup>, the Court extended Daubert beyond strictly scientific testimony to include technical and other specialized expert evidence. Taken together these cases form what is often called the Daubert Trilogy, and they significantly broadened judicial responsibility for evaluating the reliability of expert evidence even where judges lack domain expertise. In response to continuing uncertainty about how to apply these principles, the Judicial Conference amended Rule 702 in 2000 to require that expert testimony be based on sufficient facts, employ reliable methods, and apply those methods reliably to the facts of the case. Despite that clarification, courts continued to diverge in practice. Some circuits treated challenges to an expert's factual basis or methodology as questions of weight for the jury rather than threshold admissibility questions for the judge. Criticism followed that judges were abdicating their gatekeeping role by allowing contested science to reach juries without rigorous preliminary review.

The 2023 amendments to Rule 702 sought to address persistent inconsistency by clarifying that expert testimony is admissible only if the court determines by a preponderance of the evidence that the requirements of the rule are met. The amendments emphasize that courts must ensure an expert's conclusions do not go beyond what the underlying data and methods can reliably support.

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<sup>29</sup> Federal Rules of Evidence, Rule 702 (enacted 2 January 1975, amended 1 December 2023) <[https://www.law.cornell.edu/rules/fre/rule\\_702](https://www.law.cornell.edu/rules/fre/rule_702)> accessed 11 September 2025.

<sup>30</sup> *Daubert v Merrell Dow Pharmaceuticals Inc*, 509 US 579 (1993)

<sup>31</sup> *General Electric Co v Joiner*, 522 US 136 (1997)

<sup>32</sup> *Kumho Tire Co Ltd v Carmichael*, 526 US 137 (1999)

Early case law after the amendments, however, indicates variation across circuits. Some courts have continued more deferential approaches while others have embraced the stricter preponderance standard.<sup>33</sup>

## 5. Recommendations and Conclusion

### 5.1 Recommendations

- a. The independent operation of forensics analyst is very key in ensuring the prevention of bias. In other words, forensic analyst should be established in such a way that there is no external interference from the government or enforcement agency such as the Police.
- b. For the purpose of drastically reducing the extent of backlog cases, government should ensure to create a good investment structure when it comes to forensic science.
- c. Furthermore, proper accreditation benchmark should be introduced. Hence, all laboratories in such a country should conform to the benchmark in a way that meets the standard of global best practices.
- d. Forensic research should be entrenched into the university system to allow young students passionate for the field of study express their abilities in the area. Based on this, students can become equipped on diverse areas of technology and thereby preparing them for the future ahead.
- e. Also, there should be proper and adequate training of legal personnel on how to see forensic science as a tool necessary to obtain evidence. The judges must always take into consideration the available of expert opinion in science related field once the accuracy of their claim has been proved.

### 5.2 Conclusion

In conclusion, integrating forensic science into the administration of criminal justice is essential for building a system rooted in accuracy, accountability, and fairness. By transforming raw evidence into scientifically validated proof, forensic methods reduce reliance on speculation and enhance the credibility of courtroom proceedings. In Nigeria and other developing nations, this integration can help curb wrongful convictions, improve investigative efficiency, and restore public trust in legal institutions. Drawing from global best practices, forensic science should be viewed not as a supplementary tool but as a foundational pillar of justice reform, capable of turning aspirational legal ideals into measurable, reliable outcomes.

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<sup>33</sup> Assad Rajani and Anna Thompson, 'Amended Federal Rule of Evidence 702: What You Need To Know About the Admissibility of Expert Testimony' *Arnold & Porter* <<https://www.arnoldporter.com/en/perspectives/advisories/2023/12/amended-federal-rule-of-evidence-702>> accessed 11 September 2025.