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Revisiting the Admissibility of Scientific Evidence in Criminal Trials in Light of Recent Legislative Developments

Dr. Runjhun

Assistant Professor, Agnel School Of Law, Vashi, Navi Mumbai

ABSTRACT

The use of contemporary forensic science has become crucial to criminal investigations and the administration of justice. In the Indian judicial system, forensic evidence is crucial because it acts as a link between the courts and law enforcement, lending scientific legitimacy to the search for the truth. In light of recent legislative changes, this essay reviews the different literature's perspectives on the admission of scientific evidence in criminal cases. The review highlights that recent legislative reforms, particularly the Bhartiya Sakshya Adhiniyam (BSA), 2023, have advanced the admissibility of electronic and scientific evidence in India, marking a shift from colonial frameworks to a more technology-driven justice system. Provisions like Section 63 strengthen reliability but raise uncertainties regarding expert certification, necessitating clearer qualification standards and judicial interpretation. While strict safeguards enhance evidentiary integrity, overly rigid requirements may limit accessibility. Forensic and electronic evidence remain pivotal in ensuring accountability, transparency, and fair trials. Continuous quality controls, technological integration, and balanced reforms are essential to reinforce trust and effectiveness in judicial processes.

Keywords: Scientific Evidence, Criminal Trials, Legislative Developments, Forensic Science, Indian Legal Framework, Forensic Evidence, Digital Forensics.

I. INTRODUCTION

A new era in India's criminal justice system is inaugurated by "the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS)", which places forensic evidence at the heart of reliable and effective criminal investigations. In lieu of "the colonial-era Code of Criminal Procedure", the BNSS introduces extensive revisions that integrate state-of-the-art forensic science and digital technology into every stage of the legal and investigative process [1]. Significant clauses mandate the collection and documentation of "forensic evidence at crime scenes", particularly in instances of severe offences, to ensure transparency and mitigate the risk of interference or procedural errors. As the role of technology in modern criminal detection and prosecution continues to grow, the law expands the definition and acceptance of digital and electronic recordings [2]. Through the formalisation of scientific procedures and the development of a robust forensic infrastructure, the BNSS seeks to enhance the reliability, integrity, and credibility of evidence produced in court. In the end, this will boost public trust in the criminal justice system and make it easier to administer fair, timely justice [3].

To properly use digital forensic evidence, law enforcement personnel must get thorough training in evidence collection and preservation, which includes protecting crime scenes, obtaining clean evidence, and preserving its integrity [4]. The Indian Evidence Act must be revised to accommodate the complexity of digital evidence, thereby guaranteeing legal compliance and "the successful integration of digital forensic evidence into criminal cases" [5]. The criminal trials laws for BSA, BNSS, and BNS were approved in 2023 and went into effect on July 1, 2024. They updated the evidence rules to include digital records and new technology. The 2023 Bhartiya Sakshya Adhiniyam integrates traditional legal principles with contemporary technical specifications to resolve both established and emergent concerns in the field of evidence law. It has been both difficult and rewarding to balance these developments [1].

A. Role of Forensic Evidence and Its Admissibility

The criminal justice system of India has experienced a significant increase in the use of forensic evidence in recent years. This is because more people are realizing how important scientific evidence is in criminal investigations, and because more forensic testing facilities are being built nationwide [6]. With regional divisions located throughout the nation, the Central Forensic Science Laboratory (CFSL) is the premier forensic laboratory in India. In Indian criminal investigations, forensic evidence is crucial. It helps in establishing facts in a case, identifying suspects, and connecting offenders at the crime scene. Forensic evidence may also be used in murder cases to establish the cause of death and to confirm or refute witness statements. To ensure that the guilty are found guilty and the innocent are exonerated in criminal trials, forensic evidence has proven essential [7].

Forensic evidence's admissibility in court is contingent upon a number of variables, such as its legitimacy, dependability, and relevancy. When a court of law considers evidence to be significant, it looks at its correctness, transparency, and validity. Using this evidence, the court of law may make better decisions [8].

B. Legal Framework and Provision

India's Legal Foundation for the Acceptance of Forensic Evidence In India, many laws, court rulings, and procedural rules regulate the admission of forensic evidence. Even though forensic science is now a crucial instrument in criminal investigations, there is no standard framework in Indian law for judging "the validity and admissibility of forensic evidence". Rather, courts use case law, expert testimony, and broad evidentiary "principles established by the Bharatiya Sakshya Adhiniyam, 2023".

1. Bharatiya Sakshya Adhiniyam, 2023

The main legal foundation for forensic evidence is provided by "the Bharatiya Sakshya Adhiniyam, 2023":

- Section 39(1) – lacks the standards for scientific credibility but acknowledges expert opinions—including those of forensic analysts—as acceptable evidence.
- Section 40 – Provides courts with the authority to approve or deny forensic reports in accordance with corroborating evidence.
- Section 72 – allows judges to compare fingerprints and handwriting, often without forensic knowledge, which might result in conflicting decisions.

2. BHARATIYA NAGARIK SURAKSHA SANHITA, 2023

In order to collect, preserve, and present forensic evidence, the BNSS establishes procedural guidelines:

- Section 51 – permits accused individuals to undergo medical exams, facilitating toxicological and DNA tests.
- Section 329 – Unless contested, forensic findings from official government agencies (such Central Forensic Science Laboratories, or CFSLs) may be used as evidence without the expert's attendance in court.
- Section 184 – ensures the integrity of the evidence by requiring a forensic medical evaluation right away in rape cases.

3. S.193(2)(I)- chain of custody for forensic evidence

In incidents involving electronic devices, the chronology of possession must be included in a police report, according to "Section 193(2)(i) of the Bharatiya Nagarik Suraksha Sanhita (BNSS)". In order to guarantee that electronic evidence remains unaltered or tampered with throughout the investigation, it is imperative to establish a clear chain of custody.

4. S.176(3)- involvement of forensic experts and videograpghy

According to "Section 176(3) of the Bharatiya Nagarik Suraksha Sanhita (BNSS)", the police officer in command of a police station is obligated to ensure that a forensic expert visits the crime site to collect forensic evidence upon learning of an offence that carries a sentence of seven years or more in prison. Additionally, the evidence collecting procedure must be videotaped using a mobile phone or other technical device.

5. S.105-audio-visual documentation of search and seizure

Under this subsection or "section 185, the process of conducting a search or obtaining any property, article, or thing" must be recorded using an audio-video electronic device, preferably a mobile phone. This includes making a list of all the items seized during the search and seizure and having witnesses sign the list. The police officer is required to send the tape right away to the first-class judicial magistrate, district magistrate, or subdivisional magistrate.

6. S.329- government scientific experts

Section 329 BNSS facilitates the use of scientific evidence in court by allowing "reports from government scientific experts" to be included as evidence. It ensures the successful integration of technological and forensic studies into the legal process by providing "provisions for expert examination and delegation in the event of non-attendance".

7. S.497- disposal of property

Section 497 of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, outlines the procedure for the detention and dismissal of property brought "before a court or magistrate during an investigation, inquiry, or trial". The court is granted the authority to determine the property's management until the conclusion of the legal proceedings, which may include "directing its sale or disposal if it is in danger of decaying" rapidly or is otherwise feasible.

C. Standard of Admissibility

One important factor influencing how forensic evidence affects court rulings in India is whether or not it is admissible. There are a number of guidelines and formalities in place to guarantee that the evidence is not only pertinent but also trustworthy and legitimately gathered.

1. The Four Aspects of Admissibility in Indian Law

In India, forensic evidence has to meet four requirements in order to be accepted:

- **Relevance:** The evidence must relate directly or indirectly to an incident or person connected to the crime and be relevant to the matter at hand.
- **Legality:** Legal processes and rights, such as the prohibition on self-incrimination and the laws governing search and seizure, must be followed while gathering and presenting the evidence.
- **Reliability:** It is necessary to demonstrate the scientific validity of the procedures employed to gather and examine the data, which often calls for approval from the scientific community.
- **Credibility:** The people providing the evidence, who are usually forensic specialists, need to be reliable, qualified, and impartial.

2. Establishing the Chain of Custody

A forensic evidence chain of custody is essential. It records how the evidence is handled from the site of the crime to the trial, making sure it hasn't been tampered with, changed, or polluted. Breaks in the chain may cause the integrity of the evidence to be questioned and maybe lead to its exclusion.

3. Accuracy, Precision, and Reliability of Forensic Methods

The scientific methods must be standardized, subject to peer review, and have a known error rate. For example, DNA profiling is often accepted as trustworthy in court because to its high degree of accuracy. However, the legitimacy of more recent approaches, such as certain digital forensic techniques, may still be questioned.

D. Scientific Evidence in Criminal Trials

Evidence rules limit both the kind and the content of evidence that may be presented in criminal proceedings. Evidence standards safeguard a defendant's right to a fair trial in addition to ensuring that a criminal trial proceeds smoothly.

Forensic or scientific evidence is information gathered using the scientific approach. During a criminal trial, both sides often present scientific evidence, such as "DNA, fingerprints, ballistics, and other materials". Contrary to popular opinion, most statements made under hypnosis or other altered states of consciousness are not considered reliable enough to be entered into a criminal prosecution, nor is polygraph evidence.

Generally speaking, using the chain of custody standards may raise doubts about the reliability of an accepted piece of evidence right away. If the chain of evidence was not correctly followed, this piece of evidence may have undergone scientific testing that produced a particular outcome that might be declared inadmissible. Furthermore, disagreements about the admission of evidence are usually resolved during a minitrial, which permits the jury to depart while a decision is made regarding the admission or suppression of a particular piece of evidence. This minitrial event prevents jurors from being swayed by potentially inadmissible material.

II. LITERATURE REVIEW

(P. S. Chauhan & Patel, 2024) [9] This research looks at the legal system, operational dynamics, and historical evolution of forensic science in India to provide light on "the significance of forensic science in criminal investigations and trials". This research further examines the legislative framework governing forensic evidence, paying special emphasis to the provisions of "the Indian Evidence Act and the Code of Criminal Procedure", as well as judicial interpretations that have impacted the admissibility and dependability of forensic evidence. In order to boost the forensic science ecosystem in India, the report ends by pointing out areas for change and arguing for improved infrastructure, training, and strong legislative requirements. By providing policymakers, lawyers, and forensic experts with useful information, the project aims to address contemporary problems and optimise "the potential of forensic science" in ensuring accountability and justice within the Indian court system.

(MITTAL, 2025) [1] "The Bharatiya Nagarik Suraksha Sanhita (BNSS) 2023" is a significant advancement in India's criminal justice system that places forensic evidence at the heart of reliable and open investigations. This abstract demonstrates the manner in which the BNSS enhances "the scientific rigour, reliability, and admissibility of forensic evidence in criminal cases". Some of the major changes include the extension of sample authority, the streamlining of expert testimony processes, the official acknowledgement of digital and electronic evidence, and the necessity to collect "forensic evidence and video footage at the site of important crimes". From evidence collection to court presentation, the BNSS mandates the use of authorised forensic laboratories and strict chain of custody procedures to ensure the authenticity and integrity of the evidence.

(Bhan et al., 2025) [10] In order to ascertain how such differences impact the credibility of the evidence and the results of cases, particularly in light of emerging forensic techniques like digital forensics, this article examines admissibility requirements in the US, Canada, the UK, Australia, and Germany. The criteria in Germany and the United Kingdom are more lenient and allow for more proof, but they are also less trustworthy. The data suggests that standardizing fundamental components, such as expert credentials and scientific credibility, might enhance international judicial trustworthiness. Policy makers and practitioners who are interested in enhancing the judicial system globally and making it more accurate and fair while taking the system's practicality into account may find such studies useful.

(Angadi & C, 2024) [11] This essay offers a thorough analysis of the evolution of forensic science and how it has affected Indian criminal prosecution. Although "the Indian forensic environment" has made significant strides, the report also emphasises the challenges it faces, such as procedural

impediments, technical gaps, and resource constraints. The results demonstrate that the transition from crude forensic procedures to the use of cutting-edge technology has unquestionably improved law enforcement organizations' capacity for investigation. But these advancements come with difficulties that call for careful consideration and calculated action. The seamless operation of forensic laboratories is impeded by resource constraints, "infrastructural deficiencies, and a backlog of forensic inspections". In order to guarantee the reliability and admissibility of forensic evidence in court, it is essential to maintain "the need for defined standards, quality assurance methods, and multidisciplinary collaboration".

(Malik, 2024) [2] The admission of electronic evidence is one among the complete evidentiary criteria for fair trials established by "the Bharatiya Sakshya Adhiniyam, 2023". The terms Document, Primary Electronic Evidence, and pertinent BSA, 2023 requirements related to "the Information Technology Act, 2000" have recently been clarified. The Supreme Court of India has addressed the admissibility of electronic records and electronic data manipulation, "while the Central Government Home Affairs Standing Committee" has emphasised the need of protecting the integrity of digital data. The article examines recent judicial advancements as well as new rules regarding "the admission and mutual admissibility of electronic evidence".

(K. Chauhan, 2023) [12] This article addresses the admissibility and evidential value of scientific evidence, as well as the legislative and judicial framework around the acceptance of reports and “views from forensic specialists and other experts in Indian courts". References to certain significant rulings on the topic have been made. The pertinent topic concerns the applicability and evidential validity of the expert reports and views in relation to the applicable legislation. It emphasizes how urgently independent witness protection procedures must be developed. In order to solve the case, more specialists should be acknowledged for consistently offering pertinent information and supporting evidence. By advancing our forensic science, the nation may see more progress. presented the many ways in which eyewitnesses may have fabricated information and presented a skewed account of the actual event, scientific evidence must be given more weight than eyewitness accounts.

(Parveer & Verma, 2021) [13] Even if justice is the goal of all criminal laws, there are several issues with them since the administration of the law constantly aims to get a just resolution in criminal cases. These kinds of institutional issues in the area of forensic evidence admissibility are examined in this article. It draws attention to the pressing and widespread need for forensic science to be used in the criminal justice system. India's current state of crime investigation and criminal prosecution is pretty bleak. Even in cases involving felonies, a significant portion of trials end in acquittals.

(Airen, 2022) [14] According to the Hon. Supreme Court's interpretation of Article 21 of the Constitution, everyone in India has the right to a decent life. As such, "the Commission's statute and the Constitution both support this goal". The more power one has, the more responsibility one has to provide and carry out this mandate. The nexus between science and law is known as forensic science. In both criminal and civil matters, it is crucial. Forensic evidence is the tangible evidence found at the site of the crime. The pursuit of a just conclusion heavily relies on the fragments of evidence found at the crime scene. The papers are the primary source of information, and they are considered secondary evidence. Both main and secondary evidence are presented in a court of law to help the judge comprehend the facts and reach a decision. DNA testing and its use in factual findings are handled cautiously by courts. Courts are reluctant to employ this test because they believe it may violate a basic human rights principle since it may restrict an individual's personal liberty, which is permitted under "Article 21 of the constitution".

(Nuna & Gupta, 2024) [15] This study examines how forensic evidence, DNA testing, and narco-analysis have changed in the Indian court system. These instruments are now essential for guaranteeing more precise and impartial court decisions, especially in criminal cases, thanks to developments in forensic science. To provide insights into optimal practices for incorporating forensic science into judicial procedures while protecting human rights, a comparison study with foreign legal systems is carried out. In order to provide a more efficient and moral framework for forensic evidence in India, the research ends by outlining possible legislative changes. In situations involving biological evidence, DNA testing in particular has emerged as the gold standard, providing unmistakable evidence of guilt or innocence. Even if forensic technology has increased the precision and dependability of evidence, problems still exist, especially with relation to infrastructure, evidence processing, and the moral implications of narco-analysis.

III. RESEARCH OBJECTIVE

- To study the role of Forensic Evidence and Its Admissibility.
- To study the Legal Framework and Standard of Admissibility.
- To study the various literature’s perspective on the Admissibility of Scientific Evidence in Criminal Trials.

IV. RESEARCH GAP

Significant research gaps still exist in light of recent legislative changes, despite the fact that forensic science and its use in criminal proceedings have been extensively studied. Most studies focus on the reliability of scientific techniques or judicial interpretations but neglect the broader impact of new laws on admissibility standards, trial outcomes, and judicial consistency across jurisdictions. Limited attention has been paid to comparative perspectives, ethical challenges, and the integration of emerging technologies like AI and digital forensics. Furthermore, the gap between policy formulation and practical implementation remains underexplored. Addressing these gaps is essential to strengthen justice and ensure credible adjudication.

V. RESEARCH METHODOLOGY

The research methodology of this review paper is qualitative, relying on secondary data analysis to examine the admissibility of scientific evidence in criminal trials in light of recent legislative developments. A systematic literature review was conducted, drawing on peer-reviewed journals, scholarly articles, legal commentaries, case law, government reports, and policy documents published between 2020 and 2025. Relevant sources were identified using academic databases and legal repositories to ensure credibility and comprehensiveness. The collected materials were critically analyzed to trace historical standards, evaluate legislative reforms, identify challenges in admissibility, and highlight emerging trends shaping the intersection of forensic science and criminal justice.

VI. FINDINGS AND CONCLUSION

The review establishes that the admissibility of scientific and electronic evidence in India has undergone significant transformation following recent legislative developments, particularly through the Bhartiya Sakshya Adhiniyam (BSA), 2023. The law underscores India's commitment to digitization by strengthening the framework for electronic data acceptance. Section 63's certificate requirement for electronic records is a crucial safeguard; however, ambiguities remain, especially regarding the role of an "expert" in certifying certain record components. These uncertainties raise questions about qualifications, accessibility, and practicality. Strict requirements may limit individuals or small businesses from presenting valid evidence, while excessive flexibility risks compromising evidentiary reliability. A balanced approach is needed, achieved through expert qualification guidelines, judicial interpretation, and collaboration among lawmakers, judges, lawyers, and technologists.

Furthermore, the BSA represents a departure from colonial evidentiary practices, prioritizing individual rights, fair trial standards, and proportional sentencing. Alongside the Bharatiya Nyaya Sanhita (BNSS), its emphasis on preventive measures and rapid response mechanisms reinforces homeland security within constitutional boundaries. By explicitly accommodating electronic records and expert testimony, the statute promotes advanced truth-seeking in judicial proceedings while embedding safeguards against manipulation.

Forensic evidence, meanwhile, remains central to India's criminal justice system, offering an unbiased scientific basis for determining guilt or innocence. While acknowledging error margins, its use enhances accountability, transparency, and confidence in legal outcomes. The findings highlight the need for continuous quality controls, standardized forensic practices, and the integration of technological advancements to ensure accuracy. Ultimately, these reforms, if effectively implemented, strengthen evidentiary integrity and uphold justice in an evolving digital era.

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