



Admissibility and use of forensic evidence under the Bharatiya Sakshya Adhiniyam, 2023: A comparative study of India, the united states, and the United Kingdom

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Abstract

Forensic evidence has become an essential part of the modern criminal justice system. With the advancement of science and technology, methods such as DNA profiling, fingerprint examination, digital forensics, toxicology, ballistics, forensic pathology, and cyber forensics are widely used to investigate crimes and identify offenders. Unlike traditional evidence, which mainly depends on the statements of witnesses, forensic evidence is based on scientific examination and objective analysis. This makes it a more reliable and accurate form of evidence. However, scientific evidence can only help the court if it is legally admissible and properly evaluated by judges.

Different countries have different rules for admitting and using forensic evidence in criminal trials. In India, the law is now governed by the Bharatiya Sakshya Adhiniyam, 2023 ^[1], which has replaced the Indian Evidence Act, 1872, and gives greater importance to scientific and electronic evidence. In the United States, courts follow legal standards such as the Frye Test and the Daubert Test to determine whether expert scientific evidence is reliable and can be accepted in court. In the United Kingdom, the admissibility of forensic evidence is guided by common law principles, statutory provisions, and criminal procedure rules that focus on the reliability of expert witnesses and scientific methods.

This research makes a comparative study of the laws relating to the admissibility and use of forensic evidence in India, the United States, and the United Kingdom. It examines the legal provisions, important judicial decisions, and procedural safeguards followed in these countries. The study also highlights the challenges faced in the use of forensic evidence, such as issues of reliability, expert opinion, digital evidence, and scientific standards. Finally, it suggests measures to strengthen the legal framework in India under the Bharatiya Sakshya Adhiniyam, 2023 ^[1], so that forensic evidence can be used more effectively, fairly, and accurately in criminal trials.

Keywords: Evidence, Bharatiya Sakshya Adhiniyam, 2023 ^[1], criminal justice system, admissibility of evidence, scientific evidence, digital forensics, expert opinion, comparative study

Introduction

Forensic evidence has become one of the most significant forms of evidence in modern criminal justice systems. Scientific advancements in disciplines such as DNA profiling, fingerprint examination, digital forensics, toxicology, ballistics, forensic pathology, and cyber forensics have transformed the process of criminal investigation and prosecution. Distinct traditional testimonial evidence, forensic evidence is based on scientific principles and objective analysis, thereby enhancing the reliability of judicial decisions. Though, the value of forensic evidence ultimately depends upon its legal admissibility and the manner in which courts evaluate its relevance, authenticity, and reliability.

Different jurisdictions have adopted distinct legal standards governing the admissibility of forensic evidence. While all legal systems recognize the importance of scientific evidence, they differ significantly in their evidentiary rules, standards of expert testimony, judicial scrutiny, and procedural safeguards. India primarily follows statutory provisions under the Bharatiya Sakshya Adhiniyam, 2023 ^[1] (formerly the Indian Evidence Act, 1872), whereas the United States has developed extensive judicial standards such as the Frye and Daubert tests. The United Kingdom has evolved through common law principles, statutory reforms, and criminal procedure rules emphasizing expert witness reliability and judicial gatekeeping.

A comparative examination of these jurisdictions provides valuable insights into the strengths and limitations of different legal approaches toward forensic evidence. Such a study is particularly relevant in light of increasing technological advancements, growing reliance on digital evidence, and the need to ensure fairness, scientific accuracy, and protection of the rights of the accused.

Concept of Forensic Evidence

Forensic evidence refers to scientific evidence collected, preserved, analyzed, and presented during legal proceedings to establish facts relevant to civil or criminal litigation. It encompasses various scientific disciplines, including:

- DNA analysis
- Fingerprint identification
- Ballistics
- Toxicology
- Forensic medicine
- Digital and cyber forensics
- Handwriting examination
- Voice analysis
- Forensic anthropology
- Forensic psychology

Its scientific nature often provides greater evidentiary value than oral testimony, although courts continue to examine its reliability before admitting it into evidence.

Admissibility of Forensic Evidence in India

The admissibility of forensic evidence in India is mainly governed by the Bharatiya Sakshya Adhiniyam, 2023 ^[1] (BSA), which replaced the Indian Evidence Act, 1872. Today, courts increasingly rely on forensic evidence because it is based on scientific methods and helps in finding the truth.

Forensic evidence includes DNA reports, fingerprint examination, ballistics, toxicology, handwriting analysis, post-mortem reports, digital evidence, and other reports prepared by forensic experts. This type of evidence is admissible in court if it is relevant to the case, collected in a lawful manner, and presented according to the legal procedure. The opinion of a forensic expert helps the court understand technical and scientific issues that are beyond the knowledge of ordinary people.

Still, the court does not rely only on the expert's opinion. It considers the forensic report along with other evidence such as witness statements, documents, and surrounding facts before reaching a decision. Courts also check whether the evidence is genuine, reliable, and properly preserved from the time it is collected until it is produced before the court. This process, known as the chain of custody, helps ensure that the evidence has not been altered or tampered with. The Bharatiya Sakshya Adhiniyam, 2023 ^[1] has also given greater importance to electronic and digital evidence, making forensic science an important part of modern criminal investigations and trials. As a result, forensic evidence plays a significant role in ensuring fair, accurate, and effective delivery of justice in India.

Constitutional Framework

The admissibility of forensic evidence in India must conform to constitutional guarantees provided under Articles 20 and 21 of the Constitution of India.

Article 20(3) protects individuals against self-incrimination. Courts have consistently distinguished between testimonial compulsion and the collection of physical evidence such as fingerprints, blood samples, and DNA.

Article 21 guarantees the right to life and personal liberty, requiring forensic investigations to follow fair procedures established by law.

Statutory Framework

The principal legislation governing admissibility is the Bharatiya Sakshya Adhiniyam, 2023 ^[1], which replaced the Indian Evidence Act, 1872.

Important provisions include

Science: A science expert helps the court understand scientific matters that are difficult for ordinary people. They examine evidence using scientific methods and explain their findings in simple terms. Their opinion helps the court make the right decision.

Medicine: A medical expert gives opinions on injuries, the cause of death, age, or a person's health condition. Doctors and forensic medical experts help the court understand medical facts related to the case. Their opinion is important in both criminal and civil cases.

Fingerprint Examination: A fingerprint expert compares fingerprints found at the crime scene with those of a suspect. Since all person's fingerprints are unique, this helps identify

whether a person was present at the scene or touched a particular object.

DNA Analysis: A DNA expert examines samples such as blood, hair, saliva, or other body tissues to identify a person. DNA evidence is widely used in cases like murder, rape, and paternity disputes because it is highly accurate and reliable.

Foreign Law: When a case involves the law of another country, the court may take the opinion of an expert in foreign law. The expert explains the rules and legal system of that country so that the court can understand them correctly.

Digital Evidence: A digital expert examines electronic evidence such as mobile phones, computers, emails, CCTV recordings, and social media data. Their opinion helps the court decide whether the digital evidence is genuine and can be trusted.

Handwriting: A handwriting expert compares a disputed signature or handwriting with genuine samples. This helps the court decide whether a document or signature is real or forged. Such evidence is commonly used in cases involving wills, cheques, and contracts.

Ballistics: A ballistics expert studies guns, bullets, and other firearm evidence. The expert can tell whether a particular gun was used in a crime, the direction of firing, and other important details. This helps the court understand how the crime was committed.

Expert testimony is considered relevant whenever courts require scientific assistance beyond ordinary knowledge.

Electronic Evidence

With increasing cybercrime, electronic evidence occupies a central position. Electronic evidence under the Bharatiya Sakshya Adhiniyam, 2023 ^[1] includes emails, CCTV footage, mobile phone records, computer files, cloud storage data, GPS records, and social media communications. These digital records are now commonly used in courts to help prove facts in both criminal and civil cases. For example, emails can show communication between people, CCTV footage can record what happened at a place, mobile phone records and GPS data can help trace a person's location, computer files and cloud storage can contain important documents, and social media messages or posts can provide useful information about a case. However, before the court accepts such evidence, it must be shown that the electronic records are genuine, reliable, and have not been altered or tampered with.

The Bharatiya Sakshya Adhiniyam simplifies admissibility of electronic evidence while emphasizing authenticity and integrity

Dna Evidence

Although India lacks a comprehensive DNA Evidence Act, courts routinely admit DNA evidence through expert testimony.

DNA evidence is one of the most reliable forms of forensic evidence used in criminal and civil cases. It helps investigators identify offenders in murder cases by matching

DNA found at the crime scene with a suspect. In cases of sexual offences, DNA can link the accused to the victim and provide strong scientific proof. It is also widely used in paternity disputes to determine the biological relationship between a child and a parent. In addition, DNA testing helps identify missing persons by comparing their DNA with that of family members. During natural disasters, accidents, or other mass casualty incidents, DNA evidence is used to identify victims when their bodies cannot be recognized by other means. Thus, DNA evidence plays an important role in ensuring accurate identification and supporting the delivery of justice.

Indian courts increasingly regard DNA profiling as highly reliable when proper chain of custody is maintained.

Literature Review

Forensic evidence has become an important part of the modern criminal justice system because it helps courts make fair and accurate decisions based on scientific methods. Evidence such as DNA reports, fingerprints, post-mortem reports, digital records, CCTV footage, and mobile phone data is now commonly used during criminal investigations and trials. With the enforcement of the Bharatiya Sakshya Adhiniyam, 2023^[1] (BSA), the importance of forensic and electronic evidence has increased further. Many researchers have studied forensic evidence in India and other countries. However, only a few studies have compared the new provisions of the BSA with the legal systems of the United States and the United Kingdom.

Sanjeev Kumar and Deeksha (2020)^[14] explained that forensic science has greatly improved criminal investigations. Their study discussed the use of DNA testing, fingerprint examination, ballistics, and toxicology in solving crimes. They pointed out that India still faces several problems, such as a shortage of forensic experts, delays in laboratory reports, and inadequate forensic facilities.

Ridita (2021)^[15] examined the value of forensic evidence in criminal cases. The study found that scientific evidence is generally more reliable than eyewitness testimony because it is based on scientific examination. However, the author also noted that forensic evidence loses its value if it is not collected, preserved, or presented properly before the court. Sahu Sadhna and her co-authors (2024)^[16] studied the practical problems in the use of forensic evidence in India. They found that proper collection of evidence, maintaining the chain of custody, and accurate laboratory testing are essential for making forensic evidence reliable. The authors also recommended better training for police officers, forensic experts, prosecutors, and judges.

Gaurav Chandra and Dr. Ranjana Sharma (2023)^[17] compared the rules relating to forensic evidence in India, the United States, and the United Kingdom. Their study showed that the United States and the United Kingdom have well-developed standards for testing the reliability of scientific evidence. In comparison, India still needs stronger procedures and better forensic infrastructure to ensure that scientific evidence is used effectively in courts.

Indhumathi D. and Sugithkumar R. G. (2026)^[18] examined the provisions of the Bharatiya Sakshya Adhiniyam, 2023^[1]. They observed that the new law gives greater importance to forensic and electronic evidence. At the same time, they emphasised that courts should carefully examine the quality

and reliability of forensic reports before accepting them as evidence.

Jeevan Shekar (2025)^[19] studied the admissibility of scientific evidence under the Bharatiya Sakshya Adhiniyam, 2023^[1]. The author compared the Indian legal position with the Daubert Standard followed in the United States. The study suggested that India should also adopt a clear legal test to examine whether scientific evidence is reliable before it is accepted by the courts.

Prithviraj D. Chavan (2026)^[20] compared the forensic evidence laws of India and the United States. The study found that the recent criminal law reforms in India have strengthened the role of forensic science. However, India still needs better forensic laboratories, uniform standards, and stronger quality control to match international practices. Overall, the existing literature shows that forensic evidence plays an important role in ensuring justice and reducing wrongful convictions. Most researchers agree that scientific evidence is more reliable than oral evidence when it is collected, examined, and presented correctly. They also point out that India needs better forensic laboratories, trained experts, proper handling of evidence, and clear legal standards for the effective use of forensic science.

Case Laws

1. Anvar P.V. v. P.K. Basheer, (2014)^[21] 10 SCC 473

The Supreme Court held that electronic evidence is admissible only if it satisfies the legal requirements for authentication. This judgment strengthened the importance of reliable electronic and digital evidence in criminal and civil proceedings.

2. Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal & Ors., (2020)^[22] 7 SCC 1

The Supreme Court clarified the law relating to electronic evidence and confirmed that a certificate under Section 65B of the Indian Evidence Act (now reflected under the Bharatiya Sakshya Adhiniyam, 2023)^[1] is generally necessary for admitting electronic records in evidence.

3. Selvi v. State of Karnataka, (2010)^[23] 7 SCC 263

The Supreme Court ruled that narco-analysis, polygraph tests, and brain-mapping tests cannot be conducted without the consent of the accused. The Court emphasised that scientific investigation must respect constitutional rights and personal liberty.

4. Krishan Kumar Malik v. State of Haryana, (2011)^[24] 7 SCC 130

The Supreme Court highlighted the importance of DNA evidence in rape cases and observed that DNA profiling is one of the most reliable forms of scientific evidence for establishing guilt or innocence.

5. Mukesh & Anr. v. State (NCT of Delhi), (2017)^[25] 6 SCC 1

In the Nirbhaya case, the Supreme Court relied heavily on DNA reports, medical evidence, and other forensic evidence to uphold the conviction of the accused. The case demonstrated the crucial role of forensic science in serious criminal cases.

6. Dharam Deo Yadav v. State of Uttar Pradesh, (2014) ^[26] 5 SCC 509

The Supreme Court held that scientific and forensic evidence, when properly collected and examined, can strongly support the prosecution's case and help establish guilt.

7. Nandlal Wasudeo Badwaik v. Lata Nandlal Badwaik, (2014) ^[27] 2 SCC 576

The Supreme Court recognised the high reliability of DNA evidence and held that when there is a conflict between scientific DNA evidence and oral evidence, DNA evidence should generally be given greater weight.

Important Case Laws on Forensic Evidence (United States and United Kingdom)

United States

1. Frye v. United States, 293 F. 1013 (D.C. Cir. 1923)

This landmark case introduced the Frye Test, which states that scientific evidence is admissible only if it is generally accepted by the relevant scientific community. This case laid the foundation for the admissibility of forensic and expert evidence in the United States.

2. Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993)

The U.S. Supreme Court replaced the Frye Test with the Daubert Standard. The Court held that judges must act as "gatekeepers" and admit only scientific evidence that is reliable, relevant, and based on valid scientific methods. This is the leading case on the admissibility of expert and forensic evidence in U.S. federal courts.

3. General Electric Co. v. Joiner, 522 U.S. 136 (1997)

The Supreme Court held that trial judges have the authority to exclude expert evidence if the expert's conclusions are not supported by reliable scientific methods. This case strengthened the judge's role in evaluating forensic evidence.

4. Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999)

The Supreme Court extended the Daubert Standard to all forms of expert testimony, including technical and forensic experts, not only scientific experts.

United Kingdom

1. R v. Reed and Reed, [2009] EWCA Crim 2698

The Court of Appeal recognised DNA evidence as highly reliable but emphasised that courts must carefully examine the scientific quality and reliability of forensic methods before relying on such evidence.

2. R v. Doheny and Adams, [1997] 1 Cr App R 369

This landmark decision laid down important principles for presenting DNA evidence in criminal trials. The Court stressed that DNA evidence should be explained carefully and supported by expert testimony so that judges and juries can properly understand its significance.

3. R v. Bonython, (1984) 38 SASR 45

Although decided in Australia, this case has been widely followed and cited by courts in the United Kingdom. It established that expert evidence is admissible only when it

concerns matters beyond ordinary knowledge and is given by a suitably qualified expert.

4. R v. Clark, [2003] EWCA Crim 1020

The Court of Appeal overturned the conviction because unreliable expert medical evidence had been presented during the trial. The case highlighted the need for accuracy, transparency, and reliability in expert forensic evidence.

5. R v. Ward, [1993] 1 WLR 619

The Court of Appeal criticised the improper handling and disclosure of forensic scientific evidence by the prosecution. The case led to significant reforms in forensic science practices and expert evidence in the United Kingdom.

Challenges in India

Major challenges include:

- Shortage of forensic laboratories
- Delay in forensic reports
- Lack of trained experts
- Weak chain-of-custody procedures
- Limited judicial understanding of scientific evidence
- Inadequate accreditation of forensic laboratories

Admissibility of Forensic Evidence in the United States

The United States possesses one of the most developed legal frameworks governing forensic evidence.

Its approach has evolved primarily through judicial precedent rather than legislation.

Frye Standard (1923)

The Frye Test originated in Frye v. United States.

The Court held that scientific evidence is admissible only if the underlying scientific principle has achieved general acceptance within the relevant scientific community.

Advantages

- Prevents admission of speculative science
- Relatively simple test

Limitations

- Restrictive
- Prevents introduction of emerging technologies

Federal Rules of Evidence

Rule 702 governs expert testimony.

An expert may testify if:

- Knowledge assists the trier of fact.
- Testimony is based upon sufficient facts.
- Reliable principles and methods are used.
- Methods are reliably applied to the facts.

Daubert Standard (1993)

In Daubert v. Merrell Dow Pharmaceuticals, the U.S. Supreme Court replaced Frye for federal courts.

Judges became "gatekeepers" responsible for evaluating scientific reliability.

Factors include

- Testability
- Peer review
- Error rate
- Standards controlling methodology

- General acceptance

This standard significantly strengthened judicial scrutiny of forensic evidence.

Kumho Tire Co. v. Carmichael (1999)

The Supreme Court extended the Daubert standard to technical and specialized expert testimony beyond scientific evidence.

Admissibility of Forensic Evidence in the United Kingdom

The UK follows common law principles supplemented by statutory provisions and Criminal Procedure Rules.

Criminal Procedure Rules

Experts owe their primary duty to the court rather than the parties.

Experts must:

- Remain independent
- Explain methodology
- State limitations
- Reveal uncertainty
- Disclose assumptions

Criminal Practice Directions

Courts evaluate:

- Reliability
- Scientific validity
- Qualifications
- Accuracy
- Margin of error
- Acceptance within scientific community

Police and Criminal Evidence Act (PACE) 1984

PACE regulates:

- Collection of forensic samples
- DNA databases
- Fingerprints
- Search procedures
- Arrest powers
- Chain of custody

Expert Evidence

UK courts carefully scrutinize:

- DNA reports
- Fingerprint comparisons
- Medical evidence
- Digital evidence
- Ballistic analysis

Judges may exclude unreliable expert testimony where prejudice outweighs probative value.

Judicial Decisions

R v. Turner (1975)

Expert evidence is admissible only where the subject matter is outside ordinary human experience.

R v. Reed (2009)

The Court accepted DNA evidence while emphasizing scientific reliability and statistical interpretation.

R v. Henderson (2010)

The Court highlighted weaknesses in eyewitness identification and reinforced the importance of reliable forensic evidence.

Comparative Analysis

Aspect	India	United States	United Kingdom
Legal System	Statutory with common law influence	Common law	Common law
Primary Law	Bharatiya Sakshya Adhiniyam, 2023 ^[1]	Federal Rules of Evidence	Criminal Procedure Rules & PACE
Standard	Relevance and expert opinion	Daubert/Frye	Reliability and judicial discretion
Judicial Role	Evaluates expert opinion	Strong gatekeeping role	Reliability assessment
DNA Evidence	Widely accepted	Highly developed	Highly developed
Digital Evidence	Increasing recognition	Extensive jurisprudence	Well-established
Expert Duty	Assists court	Assists court	Duty primarily to court

India, the United States, and the United Kingdom all use forensic evidence in criminal cases, but their laws are slightly different. India follows the Bharatiya Sakshya Adhiniyam, 2023 ^[1], while the United States follows the Federal Rules of Evidence, and the United Kingdom uses the Criminal Procedure Rules and PACE. In India, courts mainly check whether the evidence is relevant and supported by expert opinion.

In the United States, judges carefully examine whether scientific evidence is reliable before allowing it in court. In the United Kingdom, judges also focus on the reliability of the evidence. DNA evidence is accepted and commonly used in all three countries. Digital evidence, such as emails, CCTV footage, and mobile phone records, is also becoming more important, especially in the United States and the United Kingdom. In every country, forensic experts help the court by giving honest, independent, and scientific opinions so that judges can make fair decisions.

Applicability of Forensic Evidence

Forensic evidence is used in many types of cases to help investigators find the truth and support fair decisions in court. It plays an important role in solving murder cases, sexual offences, cybercrime, financial fraud, terrorism, organized crime, drug trafficking, environmental crimes, paternity disputes, and identifying victims of disasters.

With the rapid growth of technology, forensic science has become even more effective. Modern tools such as Artificial Intelligence (AI), Machine Learning, facial recognition, blockchain analysis, mobile phone forensics, and cloud forensics help investigators collect, examine, and analyse digital evidence more accurately and quickly. These advancements have made forensic evidence more reliable and useful in the modern criminal justice system. These technologies raise new legal issues concerning privacy, admissibility, and reliability.

Suggestions

To improve the use of forensic evidence, India should strengthen forensic laboratories, provide regular training to police and experts, ensure proper handling of evidence, reduce delays in forensic reports, effectively implement the Bharatiya Sakshya Adhiniyam, 2023 ^[1], and adopt best practices followed in the United States and the United Kingdom. Improve forensic laboratories: More modern forensic laboratories should be established, and existing laboratories should be upgraded so that reports are prepared quickly and accurately.

1. **Provide proper training:** Police officers, forensic experts, prosecutors, and judges should receive regular training on how to collect, examine, and present forensic evidence.
2. **Handle evidence carefully:** Forensic evidence should be collected, stored, and transported properly to ensure that it remains reliable and can be accepted by the courts.
3. **Use modern technology:** Advanced technologies such as DNA testing, digital forensics, and cyber forensics should be used more effectively during criminal investigations.
4. **Reduce delays:** The government should appoint more forensic experts and increase laboratory facilities so that forensic reports are submitted on time.
5. **Implement the Bharatiya Sakshya Adhiniyam, 2023 ^[1] effectively:** The provisions relating to forensic and electronic evidence should be properly implemented through clear guidelines and awareness programmes.
6. **Learn from other countries:** India can adopt good practices followed in the United States and the United Kingdom to make the use of forensic evidence more reliable and effective.
7. **Protect the rights of individuals:** While using forensic evidence, the privacy and legal rights of every individual should always be respected.

Conclusion

The admissibility of forensic evidence represents a critical intersection between science and law. India, the United States, and the United Kingdom all recognize the indispensable role of forensic science in modern criminal justice, yet each jurisdiction employs distinct legal mechanisms to regulate its admission. The United States emphasizes rigorous judicial gatekeeping through the Daubert standard, ensuring that expert testimony is scientifically reliable. The United Kingdom prioritizes the independence and reliability of expert witnesses through procedural rules and judicial oversight. India, while increasingly embracing scientific evidence through the Bharatiya Sakshya Adhiniyam, 2023 ^[1], continues to face institutional challenges such as inadequate forensic infrastructure, delays in laboratory analysis, and inconsistent investigative practices.

A comparative analysis reveals that strengthening forensic laboratory accreditation, improving expert training, maintaining an unbroken chain of custody, and enhancing

judicial understanding of scientific evidence are essential for ensuring fair and accurate administration of justice. As forensic technologies continue to evolve, legal systems must adapt their evidentiary frameworks to balance scientific innovation with constitutional safeguards, procedural fairness, and the protection of individual rights. Such reforms will enhance public confidence in the criminal justice system and contribute to more reliable and equitable outcomes.

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