

# The Rise of Scientific Investigation Under BNS, BNSS and BSA: Transforming India's Criminal Justice System

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**Abstract:** *The enactment of the Bharatiya Nyaya Sanhita, 2023 (BNS), the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS), and the Bharatiya Sakshya Adhiniyam, 2023 (BSA) marks a significant transition in India's criminal justice system from traditional investigative practices towards a more scientific and technology-oriented framework. The new criminal laws seek to modernise the processes of investigation, evidence collection, and adjudication by emphasising the use of forensic science, digital evidence, videography, cyber forensic techniques, DNA profiling, and electronic records. This shift reflects the growing recognition that conventional methods, which largely relied on oral testimony and confessional evidence, are often inadequate in addressing contemporary forms of crime, particularly cybercrime, organised crime, and offences involving sophisticated technological elements. This article critically examines the statutory provisions under BNS, BNSS, and BSA that facilitate the integration of scientific methods into criminal investigations. It further analyses the implications of these reforms for ensuring accuracy, transparency, efficiency, and fairness in the administration of criminal justice. The study also highlights the practical and constitutional challenges associated with the implementation of scientific investigation, including inadequate forensic infrastructure, shortage of trained personnel, concerns regarding privacy and surveillance, and issues relating to the reliability and admissibility of electronic evidence. The article argues that while the new legislative framework has the potential to strengthen evidence-based justice and improve public confidence in the criminal justice system, its success ultimately depends upon effective institutional capacity, judicial oversight, and adherence to constitutional safeguards.*

**Keywords:** Scientific Investigation; Bharatiya Nyaya Sanhita, 2023; Bharatiya Nagarik Suraksha Sanhita, 2023; Bharatiya Sakshya Adhiniyam, 2023; Forensic Evidence; Digital Evidence; Criminal Justice Reform.

## I. INTRODUCTION

The criminal justice system plays a crucial role in maintaining social order by ensuring the detection, prosecution, and punishment of offenders while safeguarding the rights of individuals. Traditionally, criminal investigations in India relied predominantly on witness testimonies, documentary evidence, and confessional statements. However, rapid technological advancements, the emergence of cybercrime, organised criminal activities, and increasingly sophisticated



methods of offending have exposed the limitations of conventional investigative practices. These developments have necessitated a transition towards scientific and technology-driven methods of investigation.

In response to the evolving nature of crime, the Indian Parliament enacted the Bharatiya Nyaya Sanhita, 2023 (BNS), the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS), and the Bharatiya Sakshya Adhiniyam, 2023 (BSA)<sup>1</sup>, replacing the colonial-era criminal laws. These enactments aim not only to modernise substantive, procedural, and evidentiary aspects of criminal law but also to institutionalise the use of scientific techniques in the administration of justice. The increasing reliance on forensic science, DNA profiling, electronic records, cyber forensics, videography, and digital evidence reflects a significant shift from confession-based investigations towards an evidence-oriented criminal justice framework.

Scientific investigation has the potential to enhance the accuracy, transparency, and efficiency of criminal proceedings by reducing dependence on subjective forms of evidence. At the same time, the growing use of technological tools raises important concerns relating to privacy, reliability of forensic techniques, data protection, and institutional preparedness. Against this backdrop, this article critically examines the role of scientific investigation under BNS, BNSS, and BSA, analyses the opportunities and challenges associated with these reforms, and evaluates their implications for the future of criminal justice administration in India.

## **II. UNDERSTANDING SCIENTIFIC INVESTIGATION IN CRIMINAL LAW**

Scientific investigation refers to the application of scientific principles, forensic techniques, and technological tools in the detection, investigation, and prosecution of criminal offences. Unlike traditional investigative methods that predominantly depend upon oral testimony and confessional statements, scientific investigation seeks to establish facts through objective and verifiable evidence. The use of scientific methods enhances the accuracy and reliability of criminal investigations while reducing the possibility of wrongful convictions.

The advancement of technology and the changing nature of criminal activities have significantly increased the relevance of scientific investigation in contemporary criminal justice systems. Crimes involving digital platforms, organised criminal networks, financial fraud, terrorism, and offences against women and children often require specialised forensic expertise for effective investigation. Consequently, law enforcement agencies increasingly rely upon scientific evidence to identify perpetrators, reconstruct crime scenes, and corroborate other forms of evidence.

Scientific investigation encompasses a wide range of forensic disciplines, including DNA profiling, fingerprint examination, ballistic analysis, forensic toxicology, cyber forensics, handwriting analysis, biometric identification, and the examination of electronic records. The use of CCTV footage, mobile phone data, GPS tracking, and digital communication records has also become an integral part of modern investigative practices. These techniques enable investigators to collect evidence that is less susceptible to human error, bias, or manipulation.

The importance of scientific investigation lies in its ability to promote objectivity, transparency, and efficiency in the administration of criminal justice. It facilitates evidence-based decision-making and minimises excessive reliance on custodial confessions. Nevertheless, scientific evidence is not infallible and requires proper collection, preservation, and analysis by trained professionals. Therefore, the effectiveness of scientific investigation depends upon robust forensic infrastructure, institutional competence, and adherence to legal safeguards designed to protect individual rights.

## **III. SCIENTIFIC INVESTIGATION UNDER THE BHARATIYA NAGARIK SURAKSHA SANHITA, 2023**

The Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS) introduces significant procedural reforms aimed at integrating scientific methods into criminal investigations. By emphasising the use of forensic science and digital technology, the

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<sup>1</sup> The Bharatiya Nyaya Sanhita, 2023; The Bharatiya Nagarik Suraksha Sanhita, 2023; The Bharatiya Sakshya Adhiniyam, 2023.



BNSS seeks to enhance the efficiency, transparency, and credibility of the criminal justice process. The statute reflects a conscious departure from traditional investigative approaches towards a more evidence-based framework.

One of the most significant reforms introduced by the BNSS is contained in Section 176(3), which mandates forensic investigation in offences punishable with imprisonment of seven years or more<sup>2</sup>. This provision marks a substantial departure from the earlier discretionary approach under the Code of Criminal Procedure, 1973. The mandatory involvement of forensic experts underscores the importance of scientific evidence in serious criminal cases and seeks to minimise excessive dependence on witness testimony and confessional statements. The inclusion of forensic expertise at the investigation stage has the potential to improve the quality of evidence presented before courts and contribute to more accurate adjudication.

The BNSS further promotes transparency through Section 105, which requires the recording of search and seizure proceedings through audio-video electronic means<sup>3</sup>. Such recording enhances accountability, reduces allegations of procedural irregularities, and strengthens the evidentiary value of materials collected during investigations. Similarly, Section 185 provides that searches conducted by police officers shall, as far as practicable, be recorded through audio-video electronic means<sup>4</sup>, preferably by mobile phone. The incorporation of videography in investigative procedures safeguards individual rights and promotes public confidence in law enforcement practices.

The increasing reliance on technological tools such as CCTV footage, mobile phone records, GPS data, and cyber forensic techniques reflects the recognition that contemporary crimes frequently involve digital components. These mechanisms assist investigators in identifying offenders, reconstructing crime scenes, and corroborating other forms of evidence with greater precision.

However, the successful implementation of these reforms depends upon adequate forensic infrastructure, specialised training of investigating officers, and the establishment of uniform standards governing the collection and preservation of scientific evidence. Without such institutional support, the objectives underlying these procedural innovations may remain difficult to achieve.

#### **IV. SCIENTIFIC INVESTIGATION UNDER THE BHARATIYA SAKSHYA ADHINIYAM, 2023**

The Bharatiya Sakshya Adhiniyam, 2023 (BSA) modernises the law relating to evidence by recognising the increasing significance of scientific and electronic evidence in criminal proceedings. In an era where communication, financial transactions, and social interactions frequently occur through digital platforms, the evidentiary framework has been adapted to accommodate technological advancements and contemporary investigative needs. The Act seeks to facilitate evidence-based adjudication while ensuring the authenticity and reliability of material presented before courts.

A significant reform under the BSA is the recognition of electronic and digital records as admissible forms of evidence. Section 2(1)(d) defines "evidence" to include electronic and digital records produced for the inspection of the court<sup>5</sup>. Consequently, emails, text messages, audio and video recordings, digital photographs, computer-generated documents, CCTV footage, and data stored in electronic devices assume considerable evidentiary importance in criminal trials.

Further, Section 63 provides for the admissibility of electronic records<sup>6</sup> and lays down the conditions under which such records may be admitted as evidence. The provision seeks to ensure the authenticity and integrity of electronic evidence before it is relied upon by courts. Given the ease with which digital information can be manipulated or altered, compliance with statutory safeguards becomes essential.

<sup>2</sup> The Bharatiya Nagarik Suraksha Sanhita, 2023, s. 176(3).

<sup>3</sup> The Bharatiya Nagarik Suraksha Sanhita, 2023, s. 105.

<sup>4</sup> The Bharatiya Nagarik Suraksha Sanhita, 2023, s. 185.

<sup>5</sup> The Bharatiya Sakshya Adhiniyam, 2023, s. 2(1)(d).

<sup>6</sup> The Bharatiya Sakshya Adhiniyam, 2023, s. 63.



The BSA also recognises the importance of expert testimony in matters involving specialised knowledge. Section 39 makes the opinions of experts relevant<sup>7</sup> in areas such as science, forensic analysis, handwriting examination, and fingerprint identification. Consequently, forensic reports relating to DNA profiling, cyber forensic investigations, ballistic examinations, and fingerprint analysis may play a decisive role in establishing facts in issue.

The incorporation of these provisions reflects a shift towards a more scientific and evidence-based system of adjudication. However, the effective utilisation of electronic and forensic evidence requires proper collection, preservation, and analysis by trained professionals, along with judicial scrutiny to ensure fairness and reliability in criminal proceedings.

## **V. SCIENTIFIC INVESTIGATION UNDER THE BHARATIYA NYAYA**

### **SANHITA, 2023**

The Bharatiya Nyaya Sanhita, 2023 (BNS) reflects the changing nature of criminality in contemporary society. The emergence of cyber-enabled offences, organised criminal activities, and technologically sophisticated methods of offending has necessitated greater reliance on scientific and forensic techniques during criminal investigations. Although the BNS primarily deals with substantive criminal law, the offences recognised under the statute often require the support of forensic expertise for effective detection and prosecution.

The investigation of complex offences increasingly depends upon objective and technology-driven evidence rather than solely on oral testimony or confessional statements. Scientific methods assist investigating agencies in identifying offenders, establishing links between accused persons and criminal acts, and corroborating other forms of evidence. Consequently, the effectiveness of the substantive provisions under the BNS is closely connected with the efficient functioning of forensic institutions and the proper utilisation of scientific tools.

The growing emphasis on scientific investigation represents an important shift towards evidence-based justice. It enhances the accuracy and reliability of criminal proceedings while reducing the risk of wrongful convictions arising from inadequate investigative practices. However, the successful implementation of this approach requires continuous investment in forensic infrastructure, specialised training for investigating officers, and adherence to constitutional safeguards protecting individual rights.

## **VI. JUDICIAL APPROACH TOWARDS SCIENTIFIC INVESTIGATION**

The judiciary has played a crucial role in shaping the use and admissibility of scientific evidence in criminal proceedings. Courts have consistently emphasised that while scientific techniques can enhance the effectiveness of investigations, their use must conform to constitutional safeguards and principles of fair trial.

In *Selvi v. State of Karnataka (2010)*<sup>8</sup>, the Supreme Court held that the involuntary administration of techniques such as narco-analysis, polygraph tests, and Brain Electrical Activation Profile (BEAP) tests violates the protection against self-incrimination guaranteed under Article 20(3) of the Constitution. The Court observed that scientific methods cannot be employed in a manner that compromises individual autonomy and due process.

Similarly, in *Anvar P.V. v. P.K. Basheer (2014)*, the Supreme Court clarified the requirements relating to the admissibility of electronic evidence<sup>9</sup> and highlighted the importance of ensuring the authenticity and reliability of digital records. The decision underscored the necessity of complying with statutory safeguards governing electronic evidence.

<sup>7</sup> The Bharatiya Sakshya Adhiniyam, 2023, s. 39.

<sup>8</sup> *Selvi v. State of Karnataka*, (2010) 7 SCC 263.

<sup>9</sup> *Anvar P.V. v. P.K. Basheer*, (2014) 10 SCC 473.



The position was reaffirmed in *Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal (2020)*, wherein the Court emphasised that procedural requirements concerning electronic evidence<sup>10</sup> are mandatory and essential to maintain the integrity of the evidentiary process.

Further, in *K.S. Puttaswamy v. Union of India (2017)*, the Supreme Court recognised the right to privacy as a fundamental right under Article 21<sup>11</sup>. The judgment has significant implications for scientific investigation, particularly concerning surveillance technologies, collection of biometric information, and access to personal digital data during criminal investigations.

These judicial pronouncements demonstrate that while courts acknowledge the value of scientific investigation in improving the administration of criminal justice, they simultaneously insist upon the protection of constitutional rights. The integration of scientific techniques within the criminal justice system must therefore be guided by principles of legality, necessity, proportionality, and procedural fairness.

## **VII. ROLE OF FORENSIC SCIENCE LABORATORIES IN INDIA**

The success of scientific investigation under the BNS, BNSS, and BSA depends largely upon the efficiency and accessibility of forensic science laboratories (FSLs). Despite the increasing emphasis on forensic evidence, India continues to face significant infrastructural and human resource constraints in the forensic sector. Delays in obtaining forensic reports frequently affect the timely completion of investigations and criminal trials.

According to the National Crime Records Bureau (NCRB), Crime in India Report 2022, more than 65,000 cybercrime cases were registered across the country, reflecting the growing complexity of criminal investigations<sup>12</sup>. The increasing incidence of technology-driven offences has intensified the demand for forensic expertise, particularly in the areas of cyber forensics and digital evidence analysis.

However, reports of the Parliamentary Standing Committee on Home Affairs have highlighted concerns regarding the shortage of forensic laboratories and trained personnel<sup>13</sup>. The backlog of pending forensic examinations in several States has resulted in substantial delays in the submission of expert reports, thereby undermining the objective of speedy justice.

Recognising these challenges, the Government of India has undertaken initiatives to strengthen forensic infrastructure through the expansion of forensic facilities and specialised training programmes. Nevertheless, sustained investment in modern laboratories, capacity building, and recruitment of skilled professionals remains essential for the effective implementation of the scientific investigation framework envisaged under the new criminal laws.

## **VIII. CONSTITUTIONAL AND ETHICAL CONCERNS**

The increasing reliance on scientific methods in criminal investigations necessitates a careful balance between effective law enforcement and the protection of constitutional values. The deployment of forensic technologies, electronic surveillance, and digital investigative techniques must operate within the framework of the Constitution of India.

Article 20(3) guarantees protection against self-incrimination and ensures that no person accused of an offence shall be compelled to be a witness against himself<sup>14</sup>. This constitutional safeguard assumes significance in the context of involuntary scientific techniques and emphasises the need for respecting individual autonomy during criminal investigations.

<sup>10</sup> Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal, (2020) 7 SCC 1.

<sup>11</sup> K.S. Puttaswamy v. Union of India, (2017) 10 SCC 1.

<sup>12</sup> National Crime Records Bureau, Crime in India 2022 (Ministry of Home Affairs, Government of India, 2023).

<sup>13</sup> Department-related Parliamentary Standing Committee on Home Affairs, Reports on Police and Forensic Reforms.

<sup>14</sup> INDIA CONST. art. 20(3).



Further, Article 21, which guarantees the right to life and personal liberty, encompasses the rights to privacy, dignity, and fair procedure<sup>15</sup>. The collection and use of DNA samples, biometric information, and electronic data during investigations must therefore be undertaken in accordance with legally established procedures that are just, fair, and reasonable.

Additionally, Article 14 mandates equality before the law<sup>16</sup> and prohibits arbitrary state action. The application of scientific techniques in criminal investigations must be guided by transparent standards and must not result in discriminatory or selective enforcement practices.

From an ethical perspective, concerns arise regarding the potential misuse of personal data, overreliance on forensic evidence, and the possibility of errors in forensic analysis. Improper handling of biological samples, contamination of evidence, or deficiencies in forensic examination may compromise the integrity of the criminal justice process. Therefore, scientific evidence should be subjected to careful judicial scrutiny rather than being treated as infallible.

The effective integration of scientific investigation into the criminal justice system requires robust legal safeguards, professional accountability, and ethical oversight. Technological advancements should strengthen the administration of justice while remaining consistent with constitutional principles and respect for human rights.

### **IX. SUGGESTIONS AND RECOMMENDATION**

The successful implementation of scientific investigation under the Bharatiya Nyaya Sanhita, 2023, Bharatiya Nagarik Suraksha Sanhita, 2023, and Bharatiya Sakshya Adhiniyam, 2023 requires comprehensive institutional reforms. Merely incorporating scientific techniques within the statutory framework is insufficient unless supported by adequate infrastructure, trained personnel, and effective regulatory mechanisms.

*First*, there is an urgent need to strengthen forensic infrastructure by establishing additional Forensic Science Laboratories (FSLs) and upgrading existing facilities with modern equipment. This would help reduce delays in forensic examinations and improve the efficiency of criminal investigations.

*Secondly*, specialised training programmes should be conducted for investigating officers, prosecutors, and judicial officers regarding the collection, preservation, appreciation, and presentation of scientific evidence. Continuous capacity-building initiatives are essential to ensure the effective utilisation of forensic techniques.

*Thirdly*, uniform standard operating procedures (SOPs) should be developed for handling scientific evidence, particularly electronic and digital records. Clear guidelines relating to the chain of custody, preservation of evidence, and forensic documentation would enhance the reliability and admissibility of such evidence.

Further, there is a need to establish independent oversight mechanisms to monitor forensic practices and maintain professional accountability. Periodic audits and accreditation of forensic laboratories may contribute to improving the quality and credibility of forensic services.

The Government should also encourage interdisciplinary collaboration among law enforcement agencies, forensic experts, academic institutions, and research organisations to promote innovation and best practices in criminal investigations.

Finally, while promoting scientific investigation, adequate safeguards must be maintained to protect constitutional rights and ensure that technological advancements do not compromise the principles of fairness, dignity, and due process. A balanced approach that integrates efficiency with accountability is indispensable for achieving the objectives underlying the new criminal laws.

### **X. CONCLUSION**

The introduction of the Bharatiya Nyaya Sanhita, 2023, the Bharatiya Nagarik Suraksha Sanhita, 2023, and the Bharatiya Sakshya Adhiniyam, 2023 marks a significant transformation in India's criminal justice system. The

<sup>15</sup> INDIA CONST. art. 21.

<sup>16</sup> INDIA CONST. art. 14.



increasing emphasis on forensic science, electronic records, videography, and other scientific techniques reflects a conscious move towards a more objective and evidence-based model of investigation and adjudication. These reforms seek to address the limitations associated with traditional investigative methods and improve the accuracy, transparency, and efficiency of the criminal process.

The incorporation of scientific investigation under the new criminal laws has the potential to strengthen the administration of justice by enhancing the quality of evidence and reducing dependence on subjective forms of proof. The mandatory involvement of forensic experts in serious offences and the recognition of electronic evidence signify important steps towards modernising criminal investigations in India. At the same time, the effective implementation of these reforms requires adequate forensic infrastructure, trained personnel, technological resources, and institutional preparedness.

The study also highlights that scientific advancements in criminal investigations must operate within constitutional boundaries. Concerns relating to privacy, fairness, reliability of forensic evidence, and professional accountability necessitate the development of robust legal and ethical safeguards. Judicial oversight and adherence to due process remain indispensable in ensuring that the use of scientific techniques does not compromise individual rights.

Therefore, the success of the new criminal laws should not be measured merely by the extent to which technology is incorporated into the investigative process. Rather, their effectiveness depends upon the ability of institutions to utilise scientific methods responsibly, efficiently, and in accordance with constitutional principles. If implemented with adequate safeguards and sustained institutional support, scientific investigation has the potential to transform India's criminal justice system by promoting accuracy, accountability, and public confidence in the administration of justice.

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