EXECUTION OF FORENSIC PROVISIONS UNDER THE NEW CRIMINAL LAWS: ISSUES AND CHALLENGES

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ABSTRACT

The Bharatiya Nagrik Suraksha Sanhita (BNSS) and Bharatiya Nyaya Sanhita (BNS) have introduced a transformative shift in India's criminal justice system, as forensic science playing an important role in improving the evidence-based investigations. Provisions such as Section 176(3) of Bharatiya Nagrik Suraksha Sanhita provides that mandatory integration if forensic experts for the offences punishable with seven year or more, which aims to improve conviction rates, save innocent person from unnecessary bothering and ensure justice. However, various challenges are there, such as inadequate forensic infrastructure, shortage of well qualified experts, and the absence of regulatory monitoring for private forensic laboratories. The lack of a comprehensive definition for "Forensic Expert" and inconsistencies in forensic reports eventually compromises the reliability of evidences. Historical development of forensic science and laws related to forensic science reveals a gradual but slow and uneven evolution of forensic practices in India, incorporated by infrastructural and procedural tailbacks. Drawing insights from various global standards such as the Daubert principle in the U.S. and evidentiary frameworks in the U.K. and Germany to showcase the urgent need for a centralised regulatory authority, more investments in forensic infrastructure, and significant legal reforms. Sinking the tooth into these challenges is necessary for establishing a strong forensic system that upholds accuracy, reliability, and fairness within India's criminal justice administration.

Keywords: Forensic Science, Criminal Justice System, Centralised Regulatory Authority, Forensic Infrastructure, Global Standards, Legal Reforms.

I. Introduction

The criminal justice administration in India is going through a phase of transformation with the introduction of Bharatiya Nagrik Suraksha Sanhita, Bhartiya Nyaya Sanhita and Bharatiya Sakshya Adhiniyam. These acts came into existence with the aim of replacing the very old Indian Penal Code, The Code of Criminal Procedure, and Indian Evidence Act. One of the most progressive and significant addition to these laws is the mandatory Forensic investigation in the cases punishable with more than 7 years of imprisonment. Section 176(3) of BNSS, along with section 39 of Bharatiya Sakshya Adhiniyam emphasizes on the increasing dependence on the scientific methods to strengthen the evidentiary value in criminal cases and improve the accuracy of judicial decisions. Forensic science has emerged as a critical tool in determining the conviction or acquittal in court trials.

The provision of mandatory forensic investigation provides an insight about the limitations and drawbacks of the traditional investigation methods, which had the constant threat of human errors, manipulations, fabrications and falsification etc. with the help of various forensic techniques such as DNA analysis, fingerprint analysis, toxicology reports, ballistics, and digital forensics, the newly enforced laws aims to enhance the efficiency of Indian criminal justice administration procedure.

II. Historical Context: Forensic Investigation under Code of Criminal

It has taken generations for forensic science to be incorporated into India's legal system, moving from antiquated practices to cutting-edge scientific approaches. Early forensic techniques, such poison detection and document verification, were described in ancient Indian scriptures such as the Arthashastra and Manusmriti. The development of forensic laboratories and techniques such as fingerprinting during the colonial era paved the way for the present field of forensic science. The Indian Evidence Act of 1872 and the Code of Criminal Procedure (CrPC) of 1973 strengthened the use of forensic evidence in criminal investigations, and post-independence India witnessed the growth of forensic facilities.

Criminal investigation was transformed by late 20th-century technological advances such as digital forensics, forensic psychology, and DNA profiling. The vital role of forensic evidence was highlighted by high-profile cases such as the ***Tandoor***[1] ***and Aarushi Talwar***[2] ***murders,*** and

[1] Sushil Kumar Sharma v. Union of India and Ors., (1997) 5 SCC 536.
[2] Dr. Mrs. Nupur Talwar v. State of UP & Anr 2012 (11) SCC 465

the Supreme Court reaffirmed this in rulings like ***Dharam Deo Yadav v. State of Uttar Pradesh (2014)***[3]**.** Notwithstanding notable advancements, issues including poor infrastructure, a shortage of skilled professionals, and delay in analysis continue to exist. To address these problems, recent changes have been implemented, viz. the National Forensic Sciences University and the Directorate of Forensic Science Services (DFSS)[4]. A commitment to progressively integrating forensic science into the criminal justice system is demonstrated by ongoing initiatives like the Crime and Criminal Tracking Network and Systems (CCTNS)[5] and the draft DNA Technology Regulation Bill[6], which aim to ensure accurate and scientific approach to justice.

Integration of Forensic Investigation in BNSS: Forensic science has been regarded as a very important wing in Criminal investigation, providing scientific precision that helps in evidence collection and support the legal process. In India, the introduction of **Bharatiya Nyaya Sanhita** and **Bharatiya Nagarik Suraksha Sanhita,** marks a significant shift towards integrating forensic investigation into heinous crimes. Under Section 176(3) of BNSS, it is mandatory to collect forensic evidence from the crime scenes for offences punishable with the imprisonment of seven or more years signaling a move towards more evidence based policing. New criminal laws marks a significant shift towards integrating forensic investigation into serious crimes with the goal of improving the standard of investigations and enhancing the conviction rates. However, despite various progressive steps taken by the authorities, several loopholes and challenges exist in the criminal investigation system.

Starting from the absence of a clear definition of "Forensic Expert" to the lack of a central regulatory body of forensic laboratories, the system remains vulnerable to inconsistencies and potential failure of justice. Private forensic labs, operating without accreditation or standardized procedures, imposing an additional risk to integrity of forensic evidence presented in court. Without proper supervision and regulation, the well-intended reforms may fall short of their potential, and the reliability of forensic evidence could be undermined.

This article tries to dig into the strength and shortcomings of new forensic provisions under the

[3] Dharam Deo Yadav v. State of Uttar Pradesh (2014) 5 SCC 509
[4]Directorate of Forensic Science, 'About Directorate' http://dfs.nic.in/aboutDirectorate.html accessed [22 August 2023]
[5] Digital Police Portal, 'About Us' https://digitalpolice.gov.in/DigitalPolice/AboutUs accessed [22 August 2023]
[6]Lok Sabha Secreteriate, 'DNA Technology (Use and Application) Regulation Bill, 2018' https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/DNA%20Technology%20(Use%20and%20application)%20Regulation%20Bill,%202018.pdf accessed [22 August 2023]

BNS and BNSS, examining the need for infrastructural development, expert involvement and regulatory measures to ensure that Forensic science can effectively support India's criminal justice system.

1. **Legislative Approach of Forensic Science:**

i. **Section 176(3) BNSS:** Upon receiving information about the commission of an offence punishable with imprisonment of seven years or more, the officer in charge of a police station shall, from a date to be notified by the State Government within five years, ensure that a forensic expert visits the crime scene to collect forensic evidence. Additionally, the officer must ensure the process is videographed using a mobile phone or other electronic devices. Provided, if forensic facilities are unavailable for such offences within the State, the State Government shall arrange for the use of such facilities from another State until the required infrastructure is developed locally.[7]

ii. **Section 349 BNSS:** If a Judicial Magistrate of the first class is satisfied with the fact that it is essential for the conduct of any inquiry or legal proceeding under this Sanhita to obtain specimen signatures or fingerprint impressions or handwriting or voice sample, of an accused, he may make an order to that effect. The individual to whom the order pertains must be presented or must appear at the designated time and designated location as stated in the order and provide there specimen signature or fingerprint impression or handwriting or voice sample: **Provided** that such an order shall not be issued unless the individual has been arrested at some stage during the investigation or legal proceeding: **Provided further** that the Magistrate may, for the reasons recorded in writing, direct any person to provide such specimen or sample even if the person have not been arrested.[8] This was provided earlier under section 311A of Criminal Procedure Code.

iii. **Section 329 BNSS:** Any document presented as a report signed by a Government scientific expert covered in this section, regarding any matter or object submitted for examination or analysis during the proceeding under this sanhita, may be used as evidence in inquiries, trials, or other proceedings. The court has the discretion to summon and question such an expert about the contents of the report. If the expert

[7] Bharatiya Nagrik Suraksha Sanhita 2023, s 176(3)
[8] Bharatiya Nagrik Suraksha Sanhita 2023, s 349

cannot attend in person, they may, unless the court specifically requires their presence, authorize a qualified officer from their team who is well-versed in the case details to appear and testify on their behalf. Section 329 BNSS applies to the following Government scientific experts: (a) Chemical Examiners or Assistant Chemical Examiners; (b) the Chief Controller of Explosives; (c) the Director of the Finger Print Bureau; (d) the Director of Haffkine Institute, Mumbai; (e) Director, Deputy Directors, or Assistant Directors of Central or State Forensic Science Laboratories; (f) the Government Serologist; and (g) any other scientific expert notified or certified by the State or Central Government for this purpose [9]

iv. **Section 330 BNSS:** When any document is submitted to a court by the prosecution or the accused, it must be listed with full details. Both parties, or their advocates, must confirm or deny the authenticity of each document within thirty days of receiving them. If necessary, the court can extend this time limit, provided the reasons are recorded in writing. Additionally, no expert will be summoned to testify unless one of the parties disputes the expert's report. The format for listing these documents will be specified by the state government through rules, if neither party contests the authenticity of a document, it can be admitted as evidence in an inquiry, trials, or other proceeding under this Sanhita without requiring formal proof of the signature on the document. However, the court has the authority to request signature verification if it deems it necessary.[10]

v. **Section 39 Bharatiya Sakshya Adhiniyam:** This section states that when the court needs to form an opinion on matters like foreign law, science, art or identity of handwriting or fingerprints, the opinions of persons skilled in these fields are considered relevant. These individuals are called experts. Additionally, of the court needs to decide on matters related to information stored or transmitted through a computer resources or in electronic or digital form, the opinion of the Examiner of Electronic Evidence, as mentioned in Section 79A of the Information Technology Act, 2000, is also a relevant fact.[11]

[9] Bharatiya Nagrik Suraksha Sanhita 2023, s 329
[10] Bharatiya Nagrik Suraksha Sanhita 2023, s 330
[11] Bharatiya Sakshya Adhiniyam 2023, s 39

Challenges in the Execution of Provisions related to Mandatory Forensic Investigation:

i. **Section 176(3) BNSS:** There are a number of difficulties with the Bharatiya Nagarik Suraksha Sanhita (BNSS) Section 176(3), regarding mandatory forensic investigation. The lack of trained forensic experts to visit crime scenes and collect evidence is one of the main issues, leaving a gap between the availability of certified professionals and the requirements of the law. Along with that, differences in the infrastructure between states cause discrepancies in how this clause is implemented, with certain areas unable to apply the legislation consistently. The five-year period for complete implementation adds to worries about possible delays because some states would take their time complying, which would lessen the reform's immediate effects.

ii. **Section 349 BNSS:** This section empowers the magistrate to order the collection of forensic evidences, possess its own risks. This provision will lead to the increase in the workload of magistrates, leading to delays in ordering of forensic evidence collection of critical cases such as fingerprint and voice samples. Furthermore, while the law grants the vast discretion , there is no clarity about how and when this provision should be exercised. Still, the flexibility to collect forensic evidences without arrest is an affirmative step, as it may have raises concerns about the privacy and civil liberties if not properly monitored.

iii. **Section 329:** this section allows forensic experts to submit reports without oral testimony, which could limit the defense's ability to cross examination of experts on crucial evidence, compromising the principle of fair trial.

iv. **Section 330:** this section deals with admissibility of documents, aiming to require parties to admit or to deny the genuineness of documents within certain time frame. This section also imposes discretion on the courts in the relaxation of time limit, but, still it lacks clear criteria for when such discretion can be exercised and this could lead to inconsistent application.

The newly added provisions related to forensic investigation under BNSS would be facing challenges in achieving nationwide consistency, as different states possess various levels of forensic infrastructure, training, and resources. The shortage of forensic labs and experts remains a critical concern, and without focused policy efforts,

the mandatory forensic investigation may contribute to delays rather than improving conviction rates.

III. Judicial Approach of Forensic Science in India

Forensic technologies have improved the judicial system by providing expert opinion that helps in uncovering the truth. Along with eyewitnesses, corroborative evidences also play an important role in ensuring accurate justice delivery. The Supreme Court of India has referred to Lord Coleridge who compared circumstantial evidence to a gossamer thread, light and as unsubstantial as the air itself which may vanish at the merest of touch.[12]

Russell defines an expert as someone with specialized skills or sufficient knowledge in a specific field. The term 'expert' is derived from the Latin maxim *Expertocrede*, which means that an expert's opinion is generally trusted.[13]

Over the time, expert opinions have achieved global recognition based on scientific doctrines, established procedures and standard protocols. The reliability of an expert opinion may be determined by courts, such as;

1. Expert's educational qualifications in the relevant field,

2. Practical experience in the subject,

3. Careful analysis in derriving at the conclusion opined, and

4. The expert's ability to clearly explain the reasoning behind the conclusion.[14]

Delhi High court have reversed the conviction of an accused in the murder of a boy, as prosecution failed to prove beyond reasonable doubt the seizure of four cigarette butts and glasses from the crime scene. These items were not collected in the presence of any independent witness. The accused claimed that police had coerced them into smoking cigarette while in police custody. The High court did not rely upon the matching DNA report. [15]

The Maharashtra High Court in ***Vijay S/o Shamu Nagfase and Atul Hatwar v. State of***

[12] Musheer Khan @ Badshah Khan v. State of Madhya Pradesh (2010) 2 SCC 748 : 2010 (2) JLJ 104 : 2010 (2) SCR 119. The quote was referred in Ajju @ Ajay v. The State of Madhya Pradesh, Crim. Ref. No. 1/2014, Madhya Pradesh High Court, 19 May 2017 (Unreported).
[13] Bhavanam Siva Reddy v. Bhavanam Hanumantha Reddy [2017] 4 ALT 682 (India)
[14] Naveen Krishna Bothireddy v. State of Telangana [2017] INDLAW HYD 582, 2017 CRLJ 3548 (India)
[15] Arvind v. State of NCT Delhi, Crl. Appeal No. 60/2017 (Delhi HC, on 9 March, 2017) (Unreported).

Maharashtra[16] held that if the DNA report is dented and it is established that there has been minimal or no quality control or quality assurance and if the sampling has been improper and that there is evidence to show tampering of the samples, it would be unsafe to make a conviction based on the said DNA test report.[17]

The DNA report could not sustain credibility to foster confidence of the court and appeal was allowed, and the accused persons were acquitted. In yet another appeal in rape case of matching DNA report, the trial court ordered acquittal since minor prosecutrix failed to identify the accused, and the accused alleged police of forcibly extracting his semen and blood after his arrest for implanting it on the clothing outfits of the prosecutrix.[18] However, no proof was flagged to challenge the chain of custody of artefacts collected by the police. The appellate court upheld the acquittal by citing the observation of the apex court that the medical officer is not a witness to the case and his role is only to aid the court, with the medical officer's testimony serving primarily as guidance and not being obligatory for the witness of fact.[19] However, Justice (Ms.) Hima Kohli of Delhi High Court had earlier observed that serological evidence is merely one element among the pieces of evidence presented, and expert medical testimony cannot override or be deemed binding over ocular evidence.[20] In ***Dayal Singh v. State of Uttaranchal***,[21] the apex court observed that there is a great acceptability of expert evidence in courts but at the same time it is also true that the court decisions are not solely based on the reports of the experts, especially if such reports are perfunctory and deliberately attempt to misdirect the prosecution.[22]

IV. Key Concerns Regarding the Mandatory Involvement of Forensic Investigation Under BNSS and BNS

i. **Lack of clarity in the Definition of Forensic Expert:** Section 176(3) of Bharatiya Nagrik Suraksha Sanhita mandates the involvement of a forensic expert in investigation for offences punishable by 7 years or more. However it does not defines who qualifies as a forensic expert .

[16] [2017] MANU/MH/2312 (India).
[17] Id. at [para 20].
[18] State of NCT Delhi v. Azam @ Rihan, [2017] 2 JCE 874, MANU/DE/0358/2017 (India).
[19] Vishnu v. State of Maharashtra [2006] AIR SC 508, [para 21].
[20] Tasleem @ Pappu v. State of NCT of Delhi [2011] I AD (Delhi)325, 2011 (2) JCC 846, [para 15].
[21] Dayal Singh v. State of Uttaranchal (2012) 7 SCALE 165 (India).
[22] Id. at para 29.

i. In bodily offences like rape or murder, law enforcement is more likely to call forensic science expert from laboratories and not forensic medical experts from medical colleges.

ii. During trials, the defence lawyer may challenge the credibility of the forensic expert involved in investigation as the absence of clear definition of forensic expert could weakens the prosecution's case.

iii. Developed countries involve forensic medical examiners in crime scene investigation which allows them to monitor the entire process, from body examination, crime scene investigation to evidence collection, and maintain the chain of evidence. In India, we do not have such procedures which eventually results into missing the crucial first hand information and increases the risk of misinterpretation.

ii. Inadequate Forensic Infrastructure to Handle New Caseloads: Section 176(3) pushes for greater Forensic involvement in the criminal justice system and India's forensic infrastructure is unprepared to handle the expected rise in cases.

i. India is not prepared to deal with the upcoming rise in cases requiring Forensic investigation. Central and State Forensic labs are already overburdened. With the increase in mandatory forensic evidence collection, labs may be burdened beyond their capacities.

ii. Private forensic labs are rapidly proliferating to fill the gap created by the lack of government laboratories. Most of these private labs operate without proper accreditation, standards or monitoring, making the reliability of their reports questionable.

iii. Without standard operating procedures and quality control measures, the reports from these private labs may be inconsistent and unreliable, leading to complication at the stage of trials, and there will be increased chances of failure of justice.

iii. Lack of Regulation and Supervision in Private Forensic Laboratories: As of now, there is no regulatory body to set guidelines, accredit, or audit private forensic

laboratories in India.

i. Many private labs are run by individuals with limited expertise, which raises concern about the qualification of personals working in these labs. Some labs may employ fresh graduates or unqualified individuals, leading to low quality forensic reports.

ii. As there is no centralised standard operating procedure in India, these private labs operate in unregulated circumstances, raising the risk of biased analysis, contamination and mishandling of forensic evidence. As of now there is no mechanism to ensure that the labs use standardize testing equipments or follow proper procedure.

iii. The lack of regulation over private labs will result in contradictory forensic reports to be presented in courts, which consequently undermine the integrity of the forensic evidences.

iv. Risk of Contradictory Forensic Reports: There are various kind of forensic labs in India, for example Central Forensic Labs, State Forensic Labs, Regional Forensic Labs, or private forensic labs. Usually the private labs are operating under different, often non-standardized procedures, which may eventually result in contradictory forensic reports.

i. In India there occurred several high profile cases. The Jia Khan death investigation[23] and the Arushi Talwar murder[24] case are the appropriate example where the end result of the case have been hampered by contradictory forensic reports. These contradictions and inconsistencies have resulted in failure of fair justice and due legal process which eventually raised a big question mark in the authenticity and credibility of Forensic science Laboratories in India.

ii. Contradictory and inconsistent forensic reports can delay trials, diminish public

[23] SCC Online, 'Jiah Khan case: Did CBI court trial prove that suicide letter was written by Jiah's mother?' (4 May 2023) https://www.scconline.com/blog/post/2023/05/04/jiah-khan-case-did-cbi-court-trial-prove-that-suicide-letter-was-written-by-jiah-mother/ accessed 22 November 2024.

[24] IJLLR, 'IRAC Case Analysis on Central Bureau of Investigation of Delhi v. Dr. Mrs. Nupur Talwar and Dr. Rajesh Talwar' https://www.ijllr.com/post/irac-case-analysis-on-central-bureau-of-investigation-of-delhi-v-dr-mrs-nupur-talwar-and-dr-ra accessed 22 November 2024.

trust in Forensic Science Labs, and lead to conflicting opinions and judgements. In cases where multiple reports from different labs contradict other, it becomes even more difficult for courts to interpret such reports based on forensic evidence and expert opinion.

v. **Absence of a Central Regulatory Body of Forensic Laboratories:** The absence of a regulatory body means there is no Standard Operating Procedure (SOP) to adhere to, nor any mechanism to oversee testing standards, equipment quality, or the integrity of evidence. This issue becomes particularly alarming with the rapid proliferation of private forensic laboratories nationwide, increasing the likelihood of inconsistent and unreliable evidence being presented in Indian courts.

   i. In 2011, the Government proposed the Forensic Regulatory & Development Authority of India (FRDA) Bill, modelled after regulatory bodies like TRAI and IRDA. The Bill aimed to establish a forensic science regulatory authority to oversee the functioning of State and Central Forensic Science Laboratories, as well as private laboratories, and to implement common Standard Operating Procedure (SOPs) for all. However, the Bill was never enacted and was shelved for unknown reasons, leaving the objective unfulfilled.

   ii. Regulation and Accreditation of forensic laboratories is a standard practice in all the developed countries, which ensures that evidences collected and tested meets high standards of reliability and integrity. India lacking such a system, the credibility of forensic evidence remains questionable and it will eventually not only derail the criminal justice system, but also adversely undermine the usage of forensic science.[25]

While the mandatory involvement of forensic involvement of forensic investigation under the BNSS and BNS is a step forward in strengthening India's criminal justice system, the most serious concern remains unnoticed. The lack of clarity in the definition, infrastructure development, regulation of private labs, and centralized oversight is essential for ensuring that forensic science contributes effectively to criminal investigation and the delivery of justice in

[25] MSN, 'With No Regulatory Body in Place, Who Is Monitoring Private Forensic Labs?' https://www.msn.com/en-in/health/wellness/with-no-regulatory-body-in-place-who-is-monitoring-private-forZlabs/arAA1qAPYb?ocid=BingNewsVerp&apiversion=v2&noservercache=1&domshim=1&renderwebcomponents=1&wcseo=1&batchservertelemetry=1&noservertelemetry=1 accessed 22 November 2024

India.

V. Judgements Highlighting the Challenges of Expert Testimony in Forensic Investigation:

There are several instances where the supreme court have illustrated the important principles regarding the admissibility, credibility and role of expert opinion in legal proceedings, which are relevant to the challenges related to execution of forensic investigation.

i. ***State of Himachal Pradesh v. Jai Lal And Others***[26] This case highlights the need for a well-qualified expert to to provide a scientific basis for their testimony. The court rejected the District Horticulture officer's testimony as an expert because he lacked sufficient research or experience to assess the productivity of apple trees. This judgement is relevant to BNSS's Forensic provision because the failure to define "Forensic Expert" in section 176(3) raises similar issue about the qualification of those called to testify..in the absence of clear guidance on who qualifies as a forensic expert, as in this case, less qualified individuals may be called to provide critical evidence, which could lead to unreliable or suspicious conclusion.

ii. ***Ramesh Chandra Agrawal v. Regency Hospital Limited and Others***[27] this case particularly empohasized the necessity of inclusive, comprehensive and reliable expert evidence, most importantly in the fields requiring specialized or expert knowledge. In this case the Apex Court held that an expert opinion which does not have necessary supporting documents could not be relied upon. Considering the newly added provisions in Bharatiya Nagrik Suraksha Sanhita and Bharatiya Nyay Sanhita, the lack of regulation and accreditation for forensic laboratories, and poor qualification of Forensic experts, poses a risk that evidence may be incomplete or based on unqualified opinions, which may subsequently result in affecting the integrity of Forensic investigation.

iii. ***Dayal Singh and Others v. State of Uttaranchal***[28] This case illustrated that expert reports and expert opinions are not binding on the court, and must be evaluated in

[26] State of Himachal Pradesh v. Jai Lal & Ors. [1999] AIR SC 3318, (India).
[27] Ramesh Chandra Agrawal v. Regency Hospital Ltd. [2010] AIR SC 806.
[28] Dayal singh & Ors vs State of Uttarachal [2012] AIR SC 3046, 3046, (2012) 8 SCC 263.

corroboration with other evidences such as eye witnesses. The court in this case held that incorrect or unreliable expert reports should not be allowed to hamper the judicial decisions. This case is relevant to BNSS because it underscores the potential dangers of relying on flawed forensic reports, when there is no standard regulation to control the quality and reliability of such reports.

iv. ***Machindra v. Sajjan Galfa Rankhamb and Others***[29] this case put emphasis that expert opinion must be corroborated by detailed readoning. If the expert's opinion is cryptic or lacks a thorough explanation, the court should not rely on it. While talking sabout BNSS, this case put light on the potential for forensic reports to be dismissed if they are not adequately prepared or explained, which may occur more frequently if forensic experts and laboratories are not subject to proper regulation and accreditation.

v. ***Arvind v. State of NCT Delhi***[30] High Court of Delhi reversed the conviction order against the accused for killing a boy because prosecution failed to establish seizure of four cigarette butts and glasses from scene of crime beyond reasonable doubt as these exhibits were not collected in presence of any independent witness. The accused also alleged before trial court under section 313 of Cr. PC that police forced them to smoke cigarettes while they were in police custody. The high court did not rely upon the matching DNA report by observing.[31]

vi. ***Ram Kumar Kalyan v. State of Haryana***[32] High Court of Punjab and Haryana in an appeal against conviction order for murder dealt with several issues on criminal investigation. In this case DNA obtained from the blood stain found on the clothes of the accused was matched with the deceased as reported by investigator for filing charge-sheet. High Court strangely observed that the DNA tests are of little value unless there is a connection between the blood group on the clothes and the blood group of the accused. Consequently, the petitioner accused was acquitted.

[29] Machindra v. Sajjan Galpha rankhamb [2017] SC 443; SCC Online, 'Vague or Inadequate Expert Opinion Might Result in Acquittal of the Accused' (19 April 2017) https://www.scconline.com/blog/post/2017/04/19/vague-or-inadequate-expert-opinion-might-result-in-acquittal-of-the-accused/ accessed 22 November 2024

[30] Arvind v. State of NCT Delhi, Crl. Appeal No. 60/2017 (Delhi HC, on 9 March, 2017) (Unreported).

[31] Id. at [para 74].

[32] Ram Kumar Kalyan v. State of Haryana MANU/PH/0235/2017 (India)

vii. ***Dhanaj Singh v. State of Punjab***[33] Indeed DNA profiling is forensically far superior than serology as far as evidentiary value for matching biological samples is concerned. As far as perfunctory investigation is concerned, the apex court had observed that even if investigation turns out to be defective, the court must exercise circumspection in evaluating the evidence but at the same time it would not be right to acquit the accused solely on account of the said defect. However, at the same time the apex court also noted that minor discrepancies pointed out by the accused do not vitiate the prosecution case.[34]

viii. ***Mukesh v. State of NCT Delhi*,**[35] (Nirbhya gang rape case) the apex court relied upon battery of forensic evidence like DNA test, fingerprints, footprints, bite-mark analysis, CCTV footage etc. to identify six assailants who displayed bestial proclivity and inconceivable self-obsession in a gang rape and subsequent death case involving a 23 years old para medical student. The bite mark analysis, known as odontology report also assisted to identify two accused persons.[36]

These cases highlight the importance of having clearly defined and qualified forensic experts, reliable procedures, well equipped laboratories, and well supported expert opinions in criminal investigations. The lack of regulation and specificity in the BNSS regarding the definition of forensic experts and the absence of a regulatory framework for forensic laboratories could lead to unreliable forensic evidence, which will eventually impact the effectiveness of the new provisions.

Further an inter-disciplinary approach to learn fine nuances of forensic sciences by law practitioners and judiciary on one hand and legal knowledge to forensic experts on the other hand must be facilitated by way of suitably designing the academic course curricula in addition to conducting in-service training on periodical basis. Periodical training on scientific skills for investigators is long awaited. Public awareness on maintaining sanctity of crime scene etc must be promoted to advance greater use of forensics in justice system. The government must prioritise for strengthening forensic facilities, and the annual budget for police modernisation must be apportioned for technological up-gradation of

[33] Dhanaj Singh v. State of Punjab (2004) 3 SCC 654, 2004 SCC (Cri) 851 [para 5].
[34] State of Himachal Pradesh v. Sanjay Kumar alias Sunny (2017) 2 SCC 51; State represented by Inspector of Police v. Saravanan and Another (2008) 17 SCC 587.
[35] Mukesh v. State of NCT Delhi (2017) 6 SCC 1.
[36] Mukesh v. State of NCT Delhi (2017) 6 SCC 1, [para 233 – 242] (J. Deepak Mishra).

investigation standards. In deed there is need to strength forensic jurisprudence for enabling scientific aids to investigation in Indian judicial system.[37]

VI. Global Perspectives Regarding Forensic Investigation Practices

i. **Principles of Scientific Evidences Admitted by United States (US) Courts:** The principles of admitting scientific evidence in U.S. courts, especially under the *Daubert* standard, offer valuable insights for India's forensic science framework under the Bharatiya Nagarik Suraksha Sanhita (BNSS). In ***Frye v. United States***[38], the court initially set the "general acceptance" test, which required scientific techniques to be broadly accepted in the scientific community. However, this was later replaced by the *Daubert* guidelines, which emphasized a more rigorous approach. These guidelines require forensic methods to be scientifically valid, peer-reviewed, have established error rates, and generally accepted protocols. Judges serve as gatekeepers, ensuring that only reliable expert testimony is admitted in court.

The ongoing shift in the direction of more scrutinised forensic evidences is the need of the time as the Forensic provisions introduced by the Bharatiya Nagrik Suraksha Sanhita. While the BNSS tends to promote the increased use of forensic science in criminal investigations, India faces various challenges such as lot of vacancies in forensic labs, old and outdated infrastructure, and inconsistent implementation of forensic standards. These issues showcases the concerns addressed in U.S. courts through *Daubert v. Merrell Dow Pharmaceuticals Inc*[39] *which transformed the scenario of expert testimony by placing the responsibility on trial court judges to act as "gatekeeper" of scientific evidences. In this case the court held that the focus should be placed on ensuring the reliability of expert testimony. In order to ensure the effective functioning of India's forensic system as provided in BNSS, it may need to adopt stricter standards like Daubert Standard. This must also include that forensic techniques are reliable, peer-reviewed, and conducted by trained professionals, and along with that, also empowering the trial judges to evaluate the admissibility of forensic evidences carefully. By carefully considering the U.S. and U.K. systems of regulations of forensic labs, where expert testimony must fulfill certain standards of impartiality, reliability,*

[37] Forensic Law Report 2017
[38] Frye v. the United States 293 F.1013 (D.C. Cir. 1923).
[39] Daubert v. Merrell Dow Pharmaceuticals Inc., 509 U.S. 579 (1993),

and relevancy, India's forensic framework could enhance the credibility and fairness of criminal investigation and trials, synchronizing with the purpose of the BNSS for speedy and fair justice delivery.[40]

ii. **Principles of Scientific Evidences Admitted in UK:** The principles governing the admissibility of scientific evidence in the United Kingdom provide a valuable comparative framework when assessing the role of forensic science in India's legal system, especially under the Bharatiya Nagarik Suraksha Sanhita (BNSS). Understanding the UK approach can shed light on how India might improve its forensic science standards and their integration into the criminal justice system.

Key Principles in the UK:

Assistance (Turner Test): As established in ***R v Turner***,[41] expert evidence is only admissible if it offers assistance to the courts on matters beyond the knowledge of the judge or jury. This principle ensures that forensic experts contribute meaningful insight, preventing superfluous or misleading testimony. In respect of India, the question occurs whether forensic experts are adequately trained, and whether their testimony genuinely aids positively in judicial decisions under the bharatiya Nagrik Suraksha Sanhita framework.[42]

Relevant Expertise: The person providing the testimony must have adequate knowledge or experience in the relevant field, as explained in ***R (Doughty) v Ely Magistrates Court***[43]. This principle parallels the BNSS's aim to emphasize the role of forensic experts in investigations. With respect to India, this highlights the need of the time to ensure that the experts providing forensic testimony are properly qualified and that there expertise and competence is rigorously evaluated.

Impartiality: the evidence provided by an expert should be objective and unbiased. Lord Woolf, the Master of the Rolls, stated in the ***Field v Leeds City Council***[44] and Rule 33.2 of the Criminal Procedure Rules 2010 that to be deemed "qualified to provide

[40] Ridita Dey , *Law of Forensic Evidence in India and Abroad: A Comparative Study*, (2021) 4 (2) IJLMH 2879 - 2894 http://doi.one/10.1732/IJLMH.26627 accessed on 25 November 2024.
[41] R v. Turner [1971] 1 WLR 901; [1971] 2 All ER 441.
[42] R v. Mohan [1994] 2 SCR 9, 10f (Canadian Supreme Court).
[43] R (Doughty) v Ely Magistrates Court [2008] EWHC 522.
[44] Field v Leeds City Council [2000] 1 EGLR 54.

evidence as an expert," an individual must possess an independent and impartial perspective on the issues their evidence addresses.[45] In the case of India, where forensic evidence is day by day becoming mandatory in certain kind of criminal cases under the BNSS, it have become more crucial to ensure that the forensic experts remain impartial and that their testimony is not influenced by any external pressures or personal biases, either being it from law enforcement or political entities.

Evidentiary Reliability: Expert opinion evidence must also satisfy the standard of acceptable reliability. Additionally, the court of Appeal (Criminal Division) has referenced various common law admissibility principles in its decisions. In the cases of ***Dallagher***[46] ***and Bonython***[47]. This principle is extremely vital for India as well, where forensic infrastructure is often criticized for being outdated in terms of techniques and overburdened laboratories. In order to execute the provisions of BNSS effectevely, the courts must ensure that forensic evidence is derived from reliable and authentic methods and that forensic laboratories are equipped with the latest technology, best practices and qualified practitioners.

iii. **Principles of Admitting Scientific Evidence by German courts:** In Germany, the process for admitting forensic evidence, particularly expert testimony, offers an organized framework that could provide useful insights for implementing the Bharatiya Nagarik Suraksha Sanhita, 2023 and Bharatiya Nyaya Sanhita, 2023 in India.

Expert Selection Process:

German courts generally select experts approved by a public-law agency known as "Kammern," which keeps a registry of qualified professionals. However, courts can opt for experts outside this registry based on the case's needs, similar to how Indian courts may involve various forensic experts depending on expertise availability.[48] A screening process ensures that these experts maintain high standards of competence and impartiality, which India could adopt to address the issues of underqualified experts and improve forensic practices under BNSS.

[45] The Proceeds of Crime Act 2002 (Designated Non-Financial Business or Profession) (Amendment) Order 2010, SI 2010/60 https://www.legislation.gov.uk/uksi/2010/60/contents/made accessed on 22 November 2024
[46] R vs Dallagher [2002] EWCA Crim 1903, [2003] 1 Cr App R 12 at [29].
[47] R v Bonython (1984) S.A.S.R. 45.
[48] Section 73 **Strafprozessordnung (StPO) (Germany).**

Court and Expert Dynamics: In Germany, the complainant can challenge the selection of an expert or propose a more qualified one, ensuring the quality of expert testimony in criminal trials. This approach could enhance fairness in India by allowing greater scrutiny over expert selection, ensuring that only the most qualified forensic specialists provide testimony.[49]

Free Assessment of Evidence: Germany's principles of free assessment of proof allow the judge to determine the admissibility and reliability of evidence. This flexibility in German courts, where even hearsay and secondary documents may be admissible, contrasts with stricter evidentiary laws in other jurisdictions. For India, while applying mandatory forensic investigation under BNSS, it's crucial to maintain a balance between flexibility and adherence to scientific rigor in expert testimonies.

DNA Evidence in Germany: Germany's legal stance on DNA evidence evolved with amendments to the Code of Criminal Procedure (StPO), allowing for the collection of DNA samples, particularly for criminal investigations. This could inform India's approach under BNSS, particularly in standardizing protocols for the collection and analysis of DNA evidence. Given the advances in DNA research at Germany's Federal Criminal Service, India could draw from their experience to enhance the reliability of forensic evidence.[50]

VII. Condition of Forensic Labs in India;

The bharatiya Nagrik suraksha Sanhita 2023 emphasizes the crucial role of forensic science in enhancing the quality of criminal investigation. Despite this legal shift, significanmt challenges remain within India's forensic science infrastructure. A recent *forensic science India* report by project 39A, in a collaboration with the Ministry of Home Affairs, highlights these issues, including a 40% vacancy rate across forensic science laboratories and chronic underfunding.[51]

The survey includes 61 Forensic Science Laboratories (FSLs), including all eight Central Forensic Science Laboratories (CFSLs), 31 State FSLs and at least one Regional FSL, totalling 22, from each state, and uses data from 2013 to 2017. Of the 30 laboratories that responded to

[49]Ridita Dey , *Law of Forensic Evidence in India and Abroad: A Comparative Study*, (2021) 4 (2) IJLMH Page 2879 – 2894 http://doi.one/10.1732/IJLMH.26627 accessed 23 November 2024

[50] Jyotirmoy Adhikary, DNA Technology in Administration of Justice (LexisNexis Butterworths, New Delhi, 2007).

[51]The Wire, 'India's Forensic Science Shortcomings' https://science.thewire.in/politics/government/india-forensic-science-shortcomings/ accessed 20 september 2024.

Project 39 A's request for information, three were CFSLs, 17 SFSLs and 10 RFSLs.[52]

In October 2021, *IndiaSpend* reported on numerous cases closed by police due to the 'lack of evidence'. One of the problems was the inadequate forensics infrastructure in India, which poses problems in timely investigation and completion of cases.[53]

Of the 3,211 sanctioned posts for 26 forensic science laboratories for which this information was available, 40% were vacant. Of the 1,294 vacant posts, more than two in three were scientific posts, that include personnel involved in any part of a forensic examination, such as the director, scientific officer, laboratory assistant or digital analyst.[54]

According to the Bureau of Police Research and Development's 2013 compendium of National Police Mission projects, "it is pertinent that forensic investigations are not left to the field officers but officers with background of forensic sciences are made available in the Police Stations to take up this job exclusively."[55]

Forensic science lab facilities remained "highly inadequate" in Uttar Pradesh, said a 2017 Comptroller and Auditor General of India (CAG) audit report on Modernisation and Strengthening of Police Forces in Uttar Pradesh. More than 6,617 samples were pending for examination at Lucknow, Agra and Varanasi FSLs as of January 2011 which had more than doubled to 15,033 by March 2016, said the CAG's report.[56]

Between 2013 and 2017, forensic science laboratories (FSLs) across India faced significant case backlogs, particularly in divisions like excise (38.6%), toxicology (15.4%), and biology (14.7%), which received the highest number of cases annually. Despite high examination rates in toxicology (116.7%), excise (106%), and explosives (105%), driven by historical backlogs, divisions such as cyber forensics, DNA profiling, and ballistics continue to experience high pendency rates. This highlights the need to expand these departments to meet the rising

[52] ibid
[53] Indiaspend, 'whu 750,000 Police Cases Are Closed Every Year for Lack Of Evidence' https://www.indiaspend.com/investigations/why-750000-police-cases-are-closed-every-year-for-lack-of-evidence-783389 accessed 20 September 2024.
[54] The Wire, 'India's Forensic Science Shortcomings' https://science.thewire.in/politics/government/india-forensic-science-shortcomings/ accessed 20 September 2024.
[55] Bureau of Police Research and Development, https://bprd.nic.in/ accessed 22 November 2024.
[56]Comptroller and Auditor General of India, 'Perfprmance Audit of Modernisation of Police Forces, Government of Uttar Pradesh' (2017) https://cag.gov.in/uploads/download_audit_report/2017/Report_No.3_of_2017_Performance_Audit_of_Modernisation_of_Police_Forces_Government_of_Uttar_Pradesh.pdf accessed 22 November 2024

demand, especially under the Bharatiya Nagarik Suraksha Sanhita 2023, which mandates more robust forensic involvement in investigations. Without addressing these capacity issues, delays in forensic analysis could hinder the law's effectiveness in ensuring timely justice.[57]

VIII. Recommendations for Strengthening Forensic Investigation in India

The existing criminal justice administration in India is undergoing critical changes with the implementation of the Bharatiya Nagarik Suraksha Sanhita and other related legal frameworks. A key aspect of these reforms is the use of forensic science in criminal investigations, which is capable of redefining the evidence-gathering process. However, the ongoing state of forensic investigation in India faces numerous challenges, such as lack of standardization, inadequate infrastructure, undertrained personnel, and the absence of a central regulatory framework. This article proposes several recommendations to address these issues and strengthen forensic investigation in India, making it a more reliable and efficient tool for justice.

1. Need for a Central Regulatory Authority

One of the most pressing requirements for improving forensic investigation in Indian criminal justice system is the establishment of a **central regulatory authority** which can oversee the standardization and accreditation of forensic laboratories across the nation. Currently, the forensic landscape in the country is fragmented, with various labs operating under different standards and lacking consistent quality control measures. The absence of a regulatory body leads to discrepancies in the quality and reliability of forensic reports, which often results in the dismissal of crucial evidence in courts due to questions of credibility.

Functions of the Regulatory Body

- **Standardization of Protocols**: A central regulatory body could ensure that all forensic laboratories adhere to uniform protocols for evidence collection, analysis, and reporting. This standardization would prevent variation in forensic practices across states, thereby ensuring that evidence presented in court is consistent and trustworthy.

- **Accreditation of Forensic Labs**: This authority would be responsible for accrediting forensic labs based on rigorous standards of scientific reliability and ethical conduct.

[57]The Wire, 'India's Forensic Science Shortcomings' https://science.thewire.in/politics/government/india-forensic-science-shortcomings/ accessed 22 November 2024

Such accreditation would not only enhance the credibility of forensic reports but also ensure accountability.

- **Oversight and Auditing**: Regular audits of forensic labs could be conducted to maintain quality control, ensuring that labs operate at peak efficiency and scientific rigor.

The central regulatory body could also work in cooperation with international bodies such as the **International Organization for Standardization (ISO)** to ascertain that Indian forensic practices are in line with global best practices.

2. Training and Certification of Forensic Experts

The efficacy of forensic investigations hinges largely on the skills and expertise of forensic scientists and medical professionals. Therefore, it is crucial to institute a comprehensive **training and certification program** for forensic experts in India. Currently, the certification of forensic experts is not uniformly regulated, leading to disparities in qualifications and competence.

Policy Recommendations for Certification

- **National Certification Program**: A national-level certification process should be established under the proposed regulatory authority. This process should include rigorous training programs, practical assessments, and periodic recertification to ensure that experts remain updated on the latest advancements in forensic science.

- **Collaboration with Academic Institutions**: There should be an increased collaboration between forensic science laboratories and forensic medicine departments at universities and medical colleges. This partnership would ensure that academic knowledge is integrated into practical training, fostering a new generation of forensic experts who are both scientifically competent and experienced.

- **Interdisciplinary Training**: along with the scientific skills, forensic experts should be trained in legal aspects, including courtroom testimony, the chain of custody for evidence, and the ethical challenges of forensic work. This holistic approach will prepare forensic experts to effectively communicate their findings in court and

withstand rigorous cross-examination.

3. Investments in Infrastructure and Personnel

The forensic infrastructure in India is currently underfunded and overwhelmed by the sheer volume of cases. Many forensic labs are understaffed and overburdened, which compromises the accuracy and timeliness of forensic reports. To address this, the government must make significant **budgetary investments** in both forensic science labs and personnel.

Suggested Investments

- **Expansion of Forensic Laboratories**: There is a pressing need to establish more forensic laboratories across the country, especially in underrepresented regions. This would reduce the workload on existing labs and ensure faster processing of forensic evidence.

- **Upgrading Technology**: Existing forensic labs must be equipped with the latest technology in DNA analysis, toxicology, and ballistics to ensure high-quality results. Investing in cutting-edge technologies such as **Next-Generation Sequencing (NGS)** for DNA analysis could significantly improve the precision and reliability of forensic findings.

- **Recruitment and Training**: There should be an increase in the recruitment of forensic personnel, including both scientists and administrative staff. This workforce expansion should be accompanied by structured training programs to ensure that new recruits are proficient in the latest forensic techniques and technologies.

4. Legal Reforms

While infrastructural and procedural improvements are crucial, legal reforms are also necessary to ensure the proper integration of forensic science into the criminal justice system.

Amendments to Section 176(3) of the BNSS

Section 176(3) of the BNSS deals with mandatory forensic investigation in certain cases, but it lacks a clear definition of who qualifies as a forensic expert. This ambiguity can lead to delays or disputes during investigations and trials. Therefore, it is recommended that Section

176(3) be amended to include a clear definition of **forensic experts**, outlining the qualifications and certifications required to serve in this capacity.

IX. Conclusion

The implementation of newly introduced forensic provisions under the Bharatiya Nagrik Suraksha Sanhita (BNSS) and Bharatiya Nyaya Sanhita (BNS) has offered a significant shift in India's Criminal Justice Delivery Infrastructure. As these reforms are focused towards improving the precision and reliability of evidence collection processes, there are various challenges which needs to be addressed to ensure fair procedure and fare end results. The challenges which India faces regarding this ranges from inadequate forensic infrastructure and shortage of trained personnel to regulatory gaps and legal complications. However, if these issues are properly tackled, India has all the potential to establish a more effective, science-driven criminal justice administration.

The forensic provisions under the Bharatiya Nagarik Suraksha Sanhita and Bharatiya Nyaya Sanhita represent a major step forward in India's criminal justice administration, bringing a more science driven approach to the way evidence is collected and investigations are carried out. These new criminal laws aim to improve accuracy, speed, and fairness in how justice is delivered. However, to fully achieve these goals, it is crucial to address several ongoing challenges within the system.

India is currently grappling with issues like a lack of proper forensic facilities, gaps in regulation, and not enough trained forensic experts. If these problems are not tackled promptly, they could undermine the benefits these reforms promise. Setting up a central authority to oversee forensic practices and ensuring proper training and certification for experts are vital steps to make the system more reliable and consistent across the country. At the same time, investing in modern technology, increasing the number of forensic labs, and learning from international best practices can help bridge existing gaps in infrastructure.

By addressing these challenges thoughtfully and urgently, India can make the most of these forensic reforms and move closer to a justice system that is efficient, reliable, and trusted by all.

X. Optimistic Future

The effective implementation of these reforms would significantly strengthen forensic investigation in India, leading to more reliable and timely evidence collection in criminal cases. This, in turn, would bolster the entire criminal justice system, ensuring that convictions are based on solid, scientific evidence rather than circumstantial proof or unreliable testimony.

A well equiped forensic system would also serve as a deterrent to crime, as potential offenders would be more aware that forensic science could link them to criminal activities with high accuracy. Moreover, innocent individuals who have been wrongfully accused would benefit from the availability of reliable forensic evidence that could prove their innocence.

In conclusion, while the road ahead presents several challenges, the outlook for forensic science in India is promising. By addressing these challenges through strategic investments, legal reforms, and the establishment of a central regulatory authority, India can develop a world-class forensic system that supports a fair and efficient criminal justice process. This evolution would not only enhance public trust in the legal system but also ensure that justice is delivered swiftly and accurately.

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