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MAPPING THE TRENDS AND ROLE OF LAW ENFORCEMENT AGENCIES IN CRIME SCENE INVESTIGATIONS

ABSTRACT

The nature of process and essence of a criminal investigation can vary drastically across different jurisdictions depending upon the inherent character of the inspection. Crime analysis can be defined as a task which includes exploration and identification of crimes and their relationships with criminals where evidence recovery and interpretation becomes the first and foremost crucial step which includes people from varied educational backgrounds. In the present era, the sector of forensic science is one of the most vibrant and fastest growing segments of contemporary science which caters to deliver justice so far as the challenge of global crime is concerned¹. This research paper aims to trace the trend of innovation and technology that the law enforcement agencies are utilizing to predict, forecast, prevent and trace criminal activity. It studies the current forensic developments from a legal standpoint, thereby, bringing out the pivotal relationship of science and law in the law enforcement sector.

LITERATURE REVIEW

There have been majorly two international studies focusing on the area of crime analysis. The first was carried out in the year 1997 by the Crime Mapping Research Center (CMRC; later known as the Mapping and Analysis for Public Safety program, or MAPS) of the National Institute of Justice². A nation-wide survey was conducted to study the use of GIS technology with respect to the law enforcement community in the United States. Apart from parameters like conducting basic crime analysis to fulfill Uniform Crime Reporting guidelines and producing statistical reports of criminal activity which constituted 73% and 52% respectively, no other

¹Saumitra Basu, *Forensic Science and Scientific Measures of Criminal Identification in British India*, 54 JOUR, 189-201 (2019)

²*Resources and Data for GIS Analysis*, NACDI, <https://www.icpsr.umich.edu/icpsrweb/NACJD/gis/index.jsp> (Last visited on 20th April, 2020)

information was published for further insight on the extent and nature of the primary research. Out of the received data, it was observed that crime analysts were the ones using mapping softwares compared to law enforcement officers³.

The second set of studies too happened in the US which was done in a twofold manner of national surveys and site visits. The researchers observed that the role of a crime analyst focuses more on identifying patterns (on tactical crime analysis) in contrast with their counterparts in the law enforcement agencies to ponder and focus on examining long term trends (strategic crime analysis). The researchers concluded that there is a need of developing a more sophisticated crime analysis techniques, for which the law enforcement officers have to plan new trainings and teaching plan to go hand in hand with the enhanced innovations to help better the over - all criminal justice system⁴.

Various other studies like the following-(International Association of Crime Analysts, 1999)⁵and the status of crime analysis in mapping in Florida (Watkins Reynolds, 1999)⁶show that crime analysts or forensic personnel have not been able to get incorporated well with their peers in the law enforcement⁷.

CRITICAL ANALYSIS

Crime Scene investigation involves the recovery and analysis of forensic evidence, in addition to addressing issues such as security, prevention of contamination, locating and collecting items of evidence, interpretation of evidence, and possible reconstruction of the event⁸. This sector of investigation, examination and inquiry provides the best opportunity to determine the actual event associated with the commission of a crime. The primary duty of law enforcement officials is to serve mankind, to prevent crime, to uphold and protect human rights and to investigate and

³National Institute of Justice, The Use of Computerized Crime Mapping by Law Enforcement: Survey Results 2,3 (1999), <https://www.ncjrs.gov/pdffiles1/fs000237.pdf> (last visited Apr 27, 2020).

⁴Timothy O'Shea & Keith Nicholls, *Police crime analysis: A Survey of us police departments with 100 or more sworn personnel*, 4 *Police Practice and Research* 233-250 (2003).

⁵Eric L. Piza & Shun Q. Feng, *The Current and Potential Role of Crime Analysts in Evaluations of Police Interventions: Results From a Survey of the International Association of Crime Analysts*, 20 *Police Quarterly* 339-366 (2017)

⁶R. CORY Watkins et al., *Tracking dirty proceeds: Exploring data mining technologies as tools to investigate money laundering*, 4 *Police Practice and Research* 163-178 (2003)

⁷Bruce Taylor, Apollo Kowalyk & Rachel Boba, *The Integration of Crime Analysis Into Law Enforcement Agencies*, 10 *Police Quarterly* 154-169 (2007)

⁸Ishita Chatterjee, *Law of forensic science* 95 (1 ed. 2015)

detect and activate the prosecution of offences, to curb public disorder, to deal with major and minor crisis and help those who are in distress⁹, whereas forensic personnel are the unsung heroes carrying out the background work with the expertise in Ballistics & Explosives, Toxicology, Forensic Psychology, Serology, Computer Forensics etc.

CENTRAL INVESTIGATION AGENCIES

Central Bureau Of Investigation –This apex investigating agency was founded in 1963. Criminal cases taken up by the agency occurs upon the request of a state government. It also assumes responsibility upon order from any of the high courts of India or the Supreme Court of India and when any of the state government or the central government issues a notification of consent. It is a nodal agency of crime investigation and is the official Interpol unit of India. CBI incurs huge expenditure for procuring latest modern gadgets like Cyber Forensic Kits, Mobile Forensic Kits, Trap Kits, Forensic Tools etc. Further, several hard disks are purchased and supplied to the Central Forensic Science Laboratory to get their expert opinion¹⁰. Presently the CBI is trying replicate and efficient model of FBI in the US and hence is all set to bring modification to its manual which was last updated in 2005. The changes have been brought in the light of criminals using different new - age technology. These changes once enforced will focus on strengthening the coordination between law enforcement agencies for investigation procedures¹¹. The Parliamentary Standing is of the unanimous opinion that the need of the hour is to strengthen the CBI in terms of legal mandate, infrastructure and resources¹².

Other agencies which are vital for crime scene analysis are Crime Investigation Department (CID) which also includes various intelligence agencies like, Research and Analysis Wing (RAW), Intelligence Bureau (IB), Defense Intelligence Agency (DIA). Some of the other Indian strategic projections include Multi Agency Centre (MAC), National Intelligence Grid (NatGrid) and National Counter – Terrorism Council (NCTC) The working protocol and information on

⁹AbrinaYaqoob ,*A Critical Analysis of Crime Investigating System in India*, 3 IJTSRD 1, 181-184 (2019)

¹⁰*CBI: WHY THIS IS PREFERRED FOR INVESTIGATION?*,http://www.nja.nic.in/Concluded_Programmes/2018-19/P-1125_PPTs/2.CBI%20investigation.pdf (Last visited on 21st April, 2020)

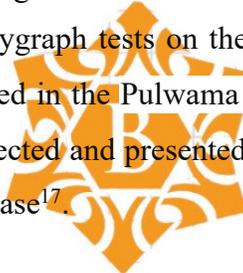
¹¹Central Bureau of Investigation (Crime) Manual, (2005)

¹²DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE ON PERSONNEL, PUBLIC GRIEVANCES, LAW AND JUSTICE, Working of Central Bureau of Investigation (2008), <http://164.100.47.5/newcommittee/reports/EnglishCommittees/Committee%20on%20Personnel,%20PublicGrievances,%20Law%20and%20Justice/24threport-Law&Justice.pdf> (Last visited on Apr 21, 2020)

cases entertained is classified and hence does not provide much scope for examination and deliberation.

National Investigation Agency- NIA is a central agency established under the Act of National Investigation Agency (NIA) Act, 2008. This authority was specifically established after the 2008 Mumbai Attacks and deals with complex organized crimes inter-State and international linkages. The NIA (Amendment) Bill, 2019 has been passed by the legislature, thereby, now expanding the sphere of crimes this special unit can deal with¹³. These cases are usually on a large level threat to the national security and sovereignty of India whereby the states' competence diminishes. The personnel of this agency have the same investigating powers as that of the police in India. Added with this, they have the power to investigate crimes committed in international borders subjecting to the domestic laws of other countries and international treaties as well¹⁴.

The Special Maharashtra Control of Organised Crime Act court granted permission to the NIA for conducting brain mapping and polygraph tests on the accused in the 2006 Malegaon blasts case¹⁵. The NIA team was also involved in the Pulwama Attack in 2019¹⁶. In a recent case, the Apex court relied on the evidence collected and presented by the NIA to not grant permission of bail to the accused in a terror funding case¹⁷.



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MODUS OPERANDI

A crime mainly incorporates more or less, the following three stages in the mentioned order: Completing Debriefing, Perform Survey and Documentation of the crime scene. The first stage's responsibility is mainly of the investigator who determines the personnel participating in debriefing and initiates any protocol to be followed identified during the debriefing period. The

¹³The National Investigation Agency (Amendment) Bill, 2019, PRS Legislative Research, <https://www.prsindia.org/billtrack/national-investigation-agency-amendment-bill-2019> (Last visited on 21st April, 2020)

¹⁴R. Bhanu Krishna Kiran, The Role of NIA in the War on Terror: An Appraisal of National Investigation Act, 2008, 4(2) *Contemporary Voices: St Andrews Journal of International Relations* (2013)

¹⁵<http://archive.indianexpress.com/news/nia-to-conduct-brain-mapping-tests-on-nine-2006-malegaon-blasts-accused/830794/>, https://www.satp.org/satporgtp/countries/india/database/maharashtra_incidents.htm

¹⁶*Pulwama attack: Seven detained, 80 kg high-grade RDX used by Jaish terrorist*, (Feb 16, 2019, 12:20 AM), <https://www.dnaindia.com/india/report-pulwama-attack-seven-detained-80-kg-high-grade-rdx-used-by-jaish-terrorist-2720490> (Last visited on 21st April, 2020)

¹⁷*National Investigation Agency v. Zahoor Ahmad Shah Watali*, AIR 2019 SC 1734

investigator determines the evidence that requires to be collected and discusses the potential testing sequence. The investigating team establishes post inquiry responsibility like assigning tasks of briefing the persons in charge after completion of duties. The second stage includes visual inspection and removal of apparatus, if used, for investigation. The personnel need to observe jurisdictional requirements for release of the crime scene leading to the last step of removing the crime scene barriers. The last stage is inclusive of generating of crime scene case files for ready reference. The files include and anything ranging from Initial Responding Officer's Report, Photography, Sketches, search warrants and any other papers and reports material to study the case¹⁸.

However, crafting crime scene evidence collection protocols is more complicated than setting forth the reliable methods and tools used at the lab to analyze such evidence. This is because each crime scene is unique, and therefore, how a law enforcement agency approaches, the scene will differ each time¹⁹.

(A) **PROFILING** –Criminal Profiling is an investigative strategy to link facts of cases and analyze evidence in a systematic manner. The following discussed are non-exhaustive techniques that are usually used to study suspects. Other than these Time-Tracing Fingerprint Technology, Automated Fingerprint Identification, Computer-based Facial Reconstruction are utilized as well to get results.

(A-1) **BRAIN MAPPING** –Even with today's sophisticated crime scene analysis techniques, there can be times where investigators may need equipment for criminal profiling for further crime scene mapping²⁰. This technique is also called Narco –analysis and is steadily being streamlined into investigations, court hearing, and laboratories in India. This test was developed in 1995 by Dr. Lawrence and have been in use in the United States by the FBI to convict criminals. The legality has been upheld in the case of Ramchandra Reddy v. State of

¹⁸U.S. Dept. of Justice, Office of Justice Programs, Crime Scene Investigation: A Reference for Law Enforcement Training (2004), <https://www.ncjrs.gov/pdffiles1/nij/200160.pdf> (Last visited on 21st April, 2020)

¹⁹ Melanie M. Reid, *A CSI Story: The Past, Present, and Future of Crime Scene Collection and What Litigators Need to Know*, 8 JLP 211, 409-454 (2018)

²⁰S.Basak, U.B.Roychowdhury & A.K. Gupta., *Probing in the depth of criminal mind*, J Indian Acad Forensic Med, 169-171, <http://medind.nic.in/jal/t08/i3/jalt08i3p169.pdf> (Last visited on 21st April, 2020)

Maharashtra²¹. There have been various judgements debating the legality and concept of such Brain Wave Fingerprinting²². This concept also attracts the need of understanding Article 20(3) of the Indian Constitution which deals with the privilege against self-incrimination.

(A-2) POLYGRAPH—The use of polygraph examination can be traced back to the a device named “Hydrosplygmograph” by a criminologist named Lombroso to a similar device used for espionage case during World War I by psychologist William Marston. Various parameters like measurement of respiration rate and skin conductance was added to amplify results. To carry out this kind of investigation, the polygraph examiner should be well versed with the First Information Report, Medico-Legal Reports and Post Mortem Reports pertaining to the case, if any, for facts which need more clarity and for a further lead on issues of the investigation.

(A-3)DNA ANALYSIS—Restriction Fragment Length Polymorphism, Polymerase Chain Reaction, Short Tandem Repeat, Mitochondrial DNA Analysis, Y-Chromosome Analysis etc are the various DNA specific technologies that are used for forensic investigations. RFLP has become obsolete due to its restriction of working with large pieces of DNA and because of better developed techniques. PCR is used to amplify small quantities of DNA along with STR evaluating specific regions within these nuclear DNA. Mitochondrial DNA Analysis comes into the picture when RFLP, STR and PCR do not work. Y-Chromosome Analysis, as the name suggests is used for studying and establishing relationship among males.

Some very famous cases that have been solved by the Indian law enforcement agencies with forensic support is Tandoor Murder Case²³, which was also the first case of its kind. The suspected husband was found guilty with the help of DNA evidence and other forensic samples. Other cases are of Sister Abhaya²⁴ and Dinesh Dalmia²⁵ where scientific methods such as brain fingerprinting were used to solve the forensic mysteries. One such case that still remains a mystery is that of AarushiTalwar²⁶, where traces of tampering with the evidence and delay in investigation are said to be the cause for not been able to get hold of the guilty. Recent

²¹Ramchandra Reddy v. State of Maharashtra., Cr. W. P. No. 1924 of 2003

²²Nandini Sathpathy v. PL Dani., AIR 1978 SC 1025, State of Bombay v. Kathi Kalu Oghad., AIR 1961 SC 1808: (1962) 3 SCR 10

²³ Sushil Sharma v. State (NCT of Delhi), 2014 4 SCC 317

²⁴ Sr. Sephy v. Union of India, ILR2009(1)Kerala124

²⁵ Dinesh Dalmia v. CBI, (2007) 8 SCC 770

²⁶ Dr. Rajesh Talwar And Another v. Central Bureau Of Investigation, 2013 (82) ACC 303

developments like DNA Phenotyping can help to estimate a person's age from DNA found at the crime scene²⁷. Its legality is still a question mark in some countries especially, in India where currently present in theory and not in practice as India is still rooting for its DNA Bill which will serve as a panacea for all ills and deficiencies of its forensic investigation capabilities, let alone of its criminal justice delivery system²⁸. Hair Bacteria Assessment is also another area which with further development, will become a valuable addition to the forensic toolkit as it may provide a microbial fingerprint to augment other forensic results such as mtDNA analyses²⁹.

(B) MAPPING –Crime Mapping is the method used by investigators to visualize and compare incident patterns. Other than GIS and Spatial Recognition, Photographic documentation becomes an essential technique in reconstructing the events which took place and give investigators a clear image of the crime³⁰.

(B-1)GEOGRAPHIC INFORMATION SYSTEM- A GIS is a computerized mapping system that permits information layering to produce detailed descriptions of conditions and analyses of relationships among variables. Analysts say that such a technology if combined with GPS which is used in location identification devices can help in tracking movement in any area hence proving cost-effective for the crime analyst and also providing real-time data. GIS can be used to perform radial analysis, Identify hotspots and compare them across locations, time and crime variants. It is also useful in the event of depiction of multiple crimes or events for the same location that can be clearly accounted for in a grid cell map³¹. One of the great advantages of a GIS is the ability to perform crime analysis without any boundary constraints, With the ability to customize a modern GIS through programming languages such as Avenue (for ArcView) and MapBasic (for MapInfo) it is possible to create a robust and user-friendly interface to a crime

²⁷Peter M. Schneider, Barbara Prainsack & Manfred Kayser, *The Use of Forensic DNA Phenotyping in Predicting Appearance and Biogeographic Ancestry*, *Dtsch Arztebl Int*, 116, 873–880 (2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6976916/> (Last visited on 20th April, 2020)

²⁸JayaramanGowrishankar& Madhusudan R. Nandineni, *Why India is rooting for its DNA identification Act*, *natureasia*(18th April), <https://www.natureasia.com/en/nindia/article/10.1038/nindia.2016.47> (Last visited on 20th April, 2020)

²⁹Silvana R. Tridico et al., *Metagenomic analyses of bacteria on human hairs: a qualitative assessment for applications in forensic science*, 5 *Investigative Genetics* (2014)

³⁰Gouse Sofia, ShyamalaKarnam, H. C. Girish & Sanjay Murgod, *Forensic photography: Prospect through the lens.* 10 *JFDS* 1, (2-4) (2018)

³¹C.P. Johnson, *Crime Mapping and Analysis Using GIS*, *Geomatics 2000: Conference on Geomatics in Electronic Governance* (January, 2000) https://www.cdac.in/index.aspx?id=pdf_geom4 (Last visited on 21st April, 2020)

system which would allow police officers with no GIS experience to pursue their own lines of enquiry³².

(B-2) SPATIAL RECOGNITION—This particular approach is also known as Hotspot Mapping. The distribution of spatial crime depends on socio-economic and other crime factors. A new crime hotspot tool was developed –Hotspot Optimization Tool (HOT) and the main module of HOT is the Geospatial Discriminative Patterns (GDP)-3-D Photography Technology. The purpose is to provide supplemental statistical tools to aid law enforcement agencies and criminal justice researchers in their crime mapping efforts. The program inputs incident locations (e.g., robbery locations) in 'dbf', 'shp' or ASCII formats using either spherical or projected coordinates. It calculates various spatial statistics and writes graphical objects to ArcView (R), MapInfo (R), Atlas*GIS (TM), Surfer (R) for Windows, and ArcView Spatial Analyst (C)³³. A study suggests that, for property crime at least, network-based methods of crime forecasting are likely to outperform grid-based alternatives, and hence should be used in operational policing³⁴. More sophisticated variations of the model tested are possible and should be developed and tested in future research. The researcher is also of the opinion that in the last decade, research on the spatial (and temporal) distribution of crime has begun to move from the task of description to that of prediction. This study examines concepts like spatial crime concentration, Space-Time clustering, Prospective Mapping and other complex scientific predictive approaches. The predictive accuracy of these techniques depend on the degree of sophistication implemented and high- end programs used.

(B-3) DRONE TECHNOLOGY—Given the ever-expanding application of drone technology, it's not surprising that many law enforcement agencies today view drones as a desirable and highly

³²Jerry H. Ratcliffe, *Integrated Intelligence and Crime Analysis: Enhanced Information Management for Law Enforcement Leaders* 20-25 (2 ed. 2007).

³³Resources and Data for GIS Analysis, [Icpsr.umich.edu](https://www.icpsr.umich.edu) (2020), <https://www.icpsr.umich.edu/icpsrweb/NACJD/gis/index.jsp> (last visited Apr 27, 2020)

³⁴Rosser G, Davies T, Bowers KJ, Johnson SD & Cheng T, *Predictive Crime Mapping: Arbitrary Grids or Street Networks?* 33 *J Quant Criminol*, 569–594 (2017), <https://www.ncbi.nlm.nih.gov/pubmed/32025086> (Last visited on 21st April, 2020)

effective tool for their crime-fighting arsenal³⁵. Researchers are even working to create drone models that deliver defibrillator equipment to the scene of a life-threatening emergency.

(C) SURVEILLANCE – Various surveillance systems can be used by the law enforcement agencies for a continuous monitoring of the public for preventing incidents from happening³⁶. This becomes more of a defensive approach in the investigation scenario. The perpetrator(s) can even be identified and tracked down from the surveillance footage. Surveillance is not unregulated in India. However, none of the existing laws appear to regulate the various types of security solutions, but vaguely require law enforcement agencies to carry out the interception of communications in certain instances – as stated in Section 69 of the Information Technology (Amendment) Act, 2008, for example. Central Monitoring System³⁷ is a software through which Indian law enforcement agencies are equipped with the necessary technology to analyse individuals' data³⁸. Crime and Criminal Tracking Network & Systems help to enable a Pan-India search on complete National Crime and Criminal database that is accessible to the Investigating Officers throughout the country³⁹.

(D) COLLABORATIONS - Police departments have begun to use data to fight and control crime. Organizations like the National Crime Records Bureau (NCRB), a Government of India organisation and firms like Delhi based ForensicsGuru (whose clients include the governments of Delhi, Orissa and Uttarakhand, the NIA and CBI) actively engage in crime analysis solution, together with most big consulting companies like KPMG, Ernst and Young and KPMG. It seems the science fiction stories of a few decades back will come true in real life in the not-too-distant future in addition to corroborations with private high tech firms. The trend of collaborations can

³⁵ Mary Mara, *A Look at the Fourth Amendment Implications for Drone Surveillance by Law Enforcement Today*, 9 ConLawNOW 1 (2017), <https://ideaexchange.uakron.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1047&context=conlawnow> (Last visited on 21st April, 2020)

³⁶ Nick Hopkins & Matthew Taylor, *Private firms selling mass surveillance systems around world, documents show*, The Guardian, (18th Nov, 2013, 21.42 P.M) , <http://www.theguardian.com/world/2013/nov/18/private-firms-mass-surveillance-technologies> (Last visited on 21st April, 2020)

³⁷ Jaideep Reddy, *THE CENTRAL MONITORING SYSTEM AND PRIVACY: ANALYSING WHAT WE KNOW SO FAR*, 10 Indian Journal of Law and Technology 50-55 (2014)

³⁸ Maria Xynou, *India's 'Big Brother': The Central Monitoring System (CMS)*, The centre for internet & society (8th April, 2013), <https://cis-india.org/internet-governance/blog/indias-big-brother-the-central-monitoring-system> (Last visited on 21st April, 2020)

³⁹ PIB, *Cabinet approves extension of implementation of Crime and Criminal Tracking Network and Systems Project by one year*, CCEA (5th April, 2017, 20:07 P.M., <https://pib.gov.in/newsite/printrelease.aspx?relid=160547> (Last visited on 21st April, 2020)

be seen in the sector of data mining⁴⁰. Currently, a CDCI (Crime Detection and Criminal Identification) technique is used to fasten the process of detecting the crimes in our Indian cities⁴¹.

CONCLUSION AND SUGGESTIONS

The Indian system is yet to come with par with that of the sophisticated systems of countries like USA or UK. The criminal investigation scenario will change in India when it strongly starts replicating modern techniques used by other nations but also tailor is specifically for Indian parameters and code of working. Some systems that can be referred to and learn from it CODIS⁴² used by FBI for DNA Profiling⁴³, FBI's IAFIS system⁴⁴ and its virtual training mechanism⁴⁵. There is a need of the hour to change the research agenda by focusing more on innovative methods that combine the use of different traces, rather than concentrating solely on finding ways to develop similar systems as AFIS or DNAdatabases for other forms of trace evidence⁴⁶. Cybercrime conventions like the Budapest convention⁴⁷, facilitate faster investigation and help prosecute cyber criminals within the member nations. Presently Indian is not a signatory, therefore, it is suggested that being a member would help in solving crimes at a more faster rate as it promotes cooperation among nations by harmonizing national laws and improving investigative techniques⁴⁸.

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⁴⁰Devendra Kumar Tayal , Arti Jain, Surbhi Arora, Surbhi Agarwal, Tushar Gupta & Nikhil Tyagi, *Crime detection and criminal identification in India using data mining techniques*, AI & Soc (1st April, 2014),

<http://tarjomefa.com/wp-content/uploads/2015/10/4163-english.pdf> (Last visited on 21st April, 2020)

⁴¹Deepika K K& Smitha Vinod, *Crime analysis in India using data mining techniques*, 7 International Journal of Engineering & Technology 253 (2018)

⁴²*Combined DNA Index System (CODIS)*, FBI, <https://www.fbi.gov/services/laboratory/biometric-analysis/codis> (Last visited on 23rd April, 2020)

⁴³Federal Bureau of Investigation, 2(3) Quality assurance standards for dna databasing laboratories and 3-10 (2000)

⁴⁴Privacy Impact Assessment Integrated Automated Fingerprint Identification System National Security Enhancements, FBI, <https://www.fbi.gov/services/information-management/foipa/privacy-impact-assessments/iafis>, (Last visited on 23rd April, 2020)

⁴⁵FBI Virtual Academy (FBIVA), Federal Virtual Training Environment (FedVTE) - Live, <https://www.cyber.nj.gov/online-training>

⁴⁶Ribaux, Simon J. Walsh & Pierre Margot, *The contribution of forensic science to crime analysis and investigation: Forensic intelligence*, 156 Forensic Science International 171-181 (2006)

⁴⁷*Budapest Convention and Related Standards*, Council of Europe, <https://www.coe.int/en/web/cybercrime/the-budapest-convention> (Last visited on 23rd April, 2020)

⁴⁸FICCI, *Confronting the new-age cybercriminal Disrupting the web of crime* 16-20 (2017), <http://ficci.in/spdocument/22982/FICCI%20-%20EY%20Report%20-%20Confronting%20the%20New%20Age%20Cyber%20Criminal.pdf> (Last visited Apr 27, 2020)

Invocation of the 'Forensics Act' as proposed by a panel of esteemed consultants proficient in forensics sector. The suggested act will be responsible for regulating the forensics profession and constituting the 'Forensic Council of India'⁴⁹. Implementation of amendments to the act proposed, if invoked, can prove to be beneficial for the investigating agencies⁵⁰. The idea of starting a new venture called "Crazy Ideas Grant" (CRAIG) can be implemented. The same is to be introduced with a Selection Committee of young science leaders from National Centre for Antarctic and Ocean Research, Indian Space Research Organization and Defence R & D Organization etc. Fund Raising for the Research and Development Wing can be encouraged from sources like the following for example, New Idea Fund of CSIR, and Kite – flying special grants at National Chemical Laboratory⁵¹.

Specifically for DNA analysis there should be a push from the legislative community to enact DNA legislation in India. NATGRID is still not operational which calls for an immediate activation of the system as once fully operationalised, will connect data providing organisations and users, besides developing a legal structure through which information can be accessed by law enforcement agencies⁵².

Parliamentary Standing Committee on Personnel, Public Grievances, Law and Justice in eighth report on 'Combating Terrorism' in 2008, the second Administrative Reform Commission reiterated its earlier recommendation to establish a specialised wing of the CBI to deal with major offences such as terrorism⁵³. The ARC in its Fifth Report on Public Order also recommended the setting up of a federal agency to deal with offences that often impinge upon national security⁵⁴. CBI must be made an impartial department not needing the

⁴⁹Gopal Ji Misra & C. Damodaran, PERSPECTIVE PLAN for INDIAN FORENSICS 276-281 (2010), https://www.mha.gov.in/sites/default/files/IFS%282010%29-FinalRpt_0.pdf (last visited Apr 27, 2020).

⁵⁰Amendments to Indian Evidence Act, 45 (1872), Code of Criminal Procedure Code, 293(1973), Information Technology Act, 79 (2000)

⁵¹Rishikesh T. Krishnan, *National Chemical Laboratory: Transformation into a Global R&D Platform*, (August, 1998), <http://missioncsir.nclinnovations.org/wp-content/uploads/2014/10/NCLcase-Rishi.pdf> (Last visited on 23rd April, 2020)

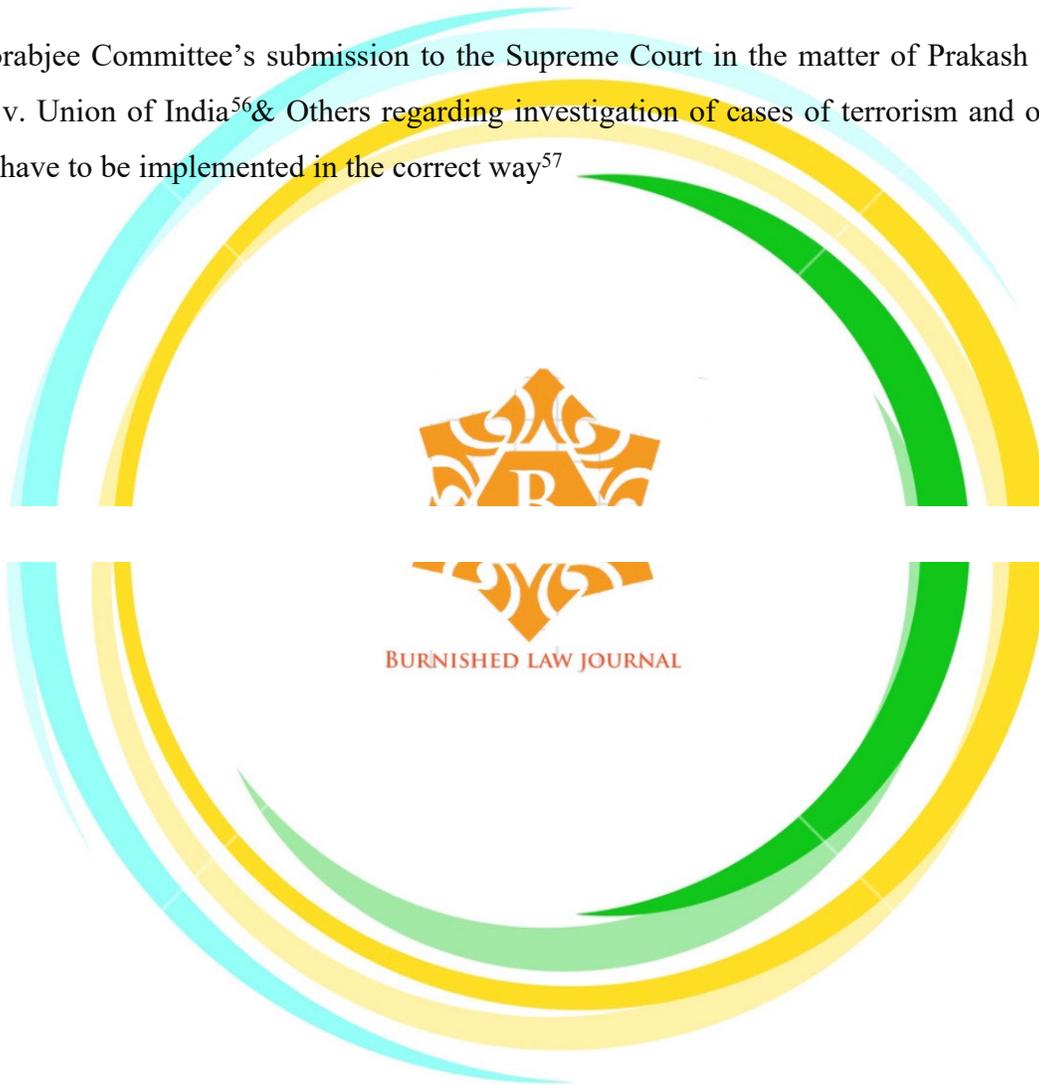
⁵²Press India, Chidambaram asks why BJP-led govt "sitting on" NCTC, NATGRID, making India vulnerable Business-standard.com (2020), https://www.business-standard.com/article/pti-stories/chidambaram-asks-why-bjp-led-govt-sitting-on-nctc-natgrid-making-india-vulnerable-119040300545_1.html (last visited Apr 27, 2020).

⁵³Government of India, COMBATTING TERRORISM PROTECTING BY RIGHTEOUSNESS (2007), https://darpg.gov.in/sites/default/files/combating_terrorism8.pdf (Last visited Jun 23, 2020).

⁵⁴DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE ON PERSONNEL, PUBLIC GRIEVANCES, LAW AND JUSTICE, Working of Central Bureau of Investigation (2008),

central government's permission for investigations⁵⁵. Also as mentioned in the paper, the CBI has not published the latest upgraded manual which if done will bring hope for newer and efficient standard procedures of dealing with the crime scenes. One structural reform that has been debated by having faced constant scrutiny, especially when compared with America's Federal Bureau of Investigation, is the establishment of a Lok Sabha CBI oversight committee to appoint the director and look into the CBI's administration and budget.

Soli Sorabjee Committee's submission to the Supreme Court in the matter of Prakash Singh & Others v. Union of India⁵⁶ & Others regarding investigation of cases of terrorism and organised crimes have to be implemented in the correct way⁵⁷



<http://164.100.47.5/newcommittee/reports/EnglishCommittees/Committee%20on%20Personnel,%20PublicGrievances,%20Law%20and%20Justice/24threport-Law&Justice.pdf> (Last visited Apr 23, 2020)

⁵⁵Central Bureau of Investigation, ALLGOV, allgov.com/india/departments/ministry-of-personnel-public-grievances-and-pensions/central-bureau-of-investigation?agencyid=7556 (Last visited on 23rd April, 2020)

⁵⁶Prakash Singh & Others v. Union of India, 2006 (3) ACR 3061 (SC)

⁵⁷Anviti Chaturvedi, Police Reforms in India 10-15 (2017),

https://www.prsindia.org/sites/default/files/parliament_or_policy_pdfs/Police%20Reforms%20in%20India.pdf (last visited Apr 27, 2020).