Claiming the Social: Beyond 'Law as Technology'

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This special issue is the first of its kind in seeking to connect the conceptual categories of Law, Technology and Society in India, and this by itself makes it an important moment in the intellectual trajectories of the attention on technology within the legal academy. The task here moves beyond a perfunctory introduction of the remarkable contributions in this issue to the reader. An introduction of such a *special* issue also requires a survey of the terrain that constitutes law and technology scholarship in India, including an overview of the field's dominant trajectories and foci. Hence this introduction identifies the tropes through which law and technology scholarship has emerged in India; however cursory, economies of space and time will constrain it to be in this introduction.

Law and Technology as a discipline is very nascent within the traditional academy in India, notwithstanding the distinct recognition of the importance of technology in shaping, developing and understanding law by the seventies.[1] The general lack of regular courses around the theme of technology in the undergraduate programs, as well as a scant focus in the Masters and M. Phil/ Ph.D. programs even among the autonomous law schools is a remarkable omission.[2]

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1 Justice H. R. Khanna, J., Inaugural Note, at the Interdisciplinary Symposium on the Interaction of Science, Technology and Law in India, Banaras Law School, *in* 1 SCC-J 17 (1980). A number of contributions that explore technology and science in law were published in Allahabad Law Journal by as early as the 1930s. *See, Science and Crime Detection: Single Finger-Prints System*, 32 Allahabad Law Journal 86 (1934); *The Film as Evidence*, 33 Allahabad Law Journal 95 (1935); Unlawful Games -Automatic Machines, 35 Allahabad Law Journal 92 (1937); *Identification by Photograph*, 31 Allahabad Law Journal 45 (1933).

2 A number of optional/specialized courses are offered as advanced seminars in undergraduate programs at various autonomous law schools viz., Society, Science & Law; Law, Technology & Globalisation; Law relating to Biodiversity, Biotechnology & Breeders' Rights; Law & Medicine; Law, Science & Technology; Space, Science & Communication Technology; Biotechnology Law; and Medical Law & Ethics. While Intellectual Property Rights (IPR) and Information and Communication Technology (ICT) laws have been staple fare in most LL.M. and LL.B. programs, space law and nuclear law are purportedly offered as P.G. Diplomas in many autonomous law

Within this milieu, it is commendable that law journals have led and fostered this (inter-)discipline in India, a trend that this special issue is part of. Such engagement is apparent, in an initial phase, through the publication of articles on various important technologies and its legal implications in a plethora of general law journals. More recently, specialist journals like the Indian Journal of Law and Technology, as well as special issues in general law journals that concentrate on specific areas of Technology Law (like Space law and Cyber law) and on general legal areas like Intellectual Property law, have continued to deepen this engagement; albeit in these very specific trajectories.[3] I seek to argue later that these trajectories of law and technology scholarship have had an explicit preoccupation with technology law, and that both substantial focus and methodologies employed in the attention on technological in much of the legal scholarship in India has been extremely limited. An appropriate treatment of technology within a law and society tradition, it is argued here, requires academics to transcend thinking of their task as of identifying gaps in the law and suggesting ways to plug them. Law and society scholarship in India and elsewhere has demonstrated that the law could be thought of as a site to understand society, including the dominant values that embody legal systems. Further, it is argued that legal attention on technology within a law and society framework needs to recognise technology as a social and political process that needs attention as an explicit sociological category beyond an implicit assumption that technical change is merely an organic application of scientific knowledge. This is in contradistinction to much of the contemporary law and technology literature that is steeped in instrumentalist thought. As argued later, much of contemporary law and technology scholarship in India assumes technology as a reified category that merely requires legal implementation, and limits itself to the fields of Information and Communications Technologies (ICT) and Intellectual Property Rights (IPR) of new technologies. As opposed to a mere law reform project, a law, technology and society sphere, it is argued, requires

schools. Some B.Sc. LLB programmes include courses titled Physics, Chemistry, Life-Sciences, Microbiology & Genetics, Information Technology, Forensic Sciences, Pharmaceutical Sciences, and Biotechnology. Further information and attention is necessary to understand the substance and methodology of these courses.

3 *See, e.g.* the special issue on 'Space Law and International Economic Law' *in* 3 (2) IND. J. OF. INT. ECO. L. (2010).The Annual Survey of the Indian Law Institute has had a separate section on cyber law for more than a decade.

one to grapple with competing imaginations and values about technology and recognise technical change as a political and social process, of which law itself is an integral part. There are fundamental values involved in the development and deployment of technologies in democratic societies, and a law, technology and society sphere requires us to engage with the fundamental differences in these values. As demonstrated later, much of the contemporary literature has implicitly imagined law as technology - either as an instrument to enable and maximize the potential of a technology, or as something that is needed to ban or discourage a technology, towards optimizing stated goals like effectiveness, efficiency or even institutional legitimacy. This has only impoverished possibilities of understanding law and its embedded values through the domain of law and technology. An elaboration of this reflection is deferred to the latter part of this essay.

An Emaciated Characterisation of Law and Technology

Attempting a sketchy map of the existing literature that constitutes law and technology in India, the themes of (financial) regulation of ICTs and Intellectual Property regimes of new technologies have been quick to emerge as the prominent domains of engagement.[4] The first of the tropes of explicit engagement with technology in most law journals is a preoccupation with making ICTs more (economically) viable and reliable (for the user) towards socially broad-basing these technologies. One can see that contributions in specialist journals like the Indian Journal of Law and Technology are dominated by regulatory issues about telecom, spectrum, cyber privacy, data protection, and security of cyber identity.[5] Such specialist spaces continue the preoccupations from earlier conversations in general legal journals about cyber law from the turn of the century;[6] while these

4 *See, e.g.,* Yochai Benkler, *Technology, Law, Freedom and Development,* 1 IND. J. OF L. & TECH 1(2005). ICTs are generally used in academic parlance to signify the integration of telecommunications including telephone and wireless systems with computer networks including software, storage, audio visual systems enabling users to generate, access, store, transmit and manipulate information.

5 This is notwithstanding an insightful essay in the same journal by Justice Kirby elucidating important reasons to have a more general, systematic and sustained academic engagement with law and technology: Michael Kirby, *The Fundamental Problem of Regulating Technology*, 5 IND. J. OF L. & TECH. 1 (2009).

6 *See,e.g.,* Madhavi Divan, *The Right to Privacy in the Age of Information and Communications*, 4 SCC (J) 12, 23 (2002); Devashish Bharuka, *Piercing the Privacy*

concerns also continue to dominate discussions about technology in general law journals.[7] The attendant concerns here can be broadly categorised as the domain of ICT law.

The second dominant trope in this sketchy account of law and technology in India regards anxieties about protection of intellectual property in new technology (and often even of older technology). While the preoccupation with ICTs carries on to the IPR discourse,[8] these debates also brought into focus the proprietorial protection of other technologies like biotechnologies and health

Veil: A Renewed Threat, 1 SCC (J) 24, 26 (2003); Atul Kumar Tiwari, *Threat to Privacy in Cyber Age - Need for an Effective Veil*, 31(3 & 4) Indian Bar Review 466 (2004); K. Vishnu Konoorayar, *Regulating Cyberspace: The Emerging Problems and Challenges*, 2003 Cochin U. L. Rev. 413. *See also,* Ramesh Chandra Upadhyay, *Cyber - crime - Indian Perception*, 39(2) Indian Bar Review 157- 174 (2012) (a general anxiety about cyber-crimes); Valsamma Paul, *Cyber-crimes and the Law: A Synoptic View*, (2008) Cochin U. L. Rev. 423 (how legal categories and processes should catch up with the technological advances for theft, trespass, fraud and violence); Nuzhat Parveen Khan, *Cyber-crimes and the Adequacy of the Existing Laws*, 29(1 & 2) Indian Bar Review 121-138 (2004) (how legal categories and processes should catch up with the technological advances for theft, trespass, fraud and violence); Ghanshyam Solanki, *Regulating Cyberpornography*, 17 CILQ 281–294 (2004) (particular anxieties about pornography); Talat Fatima, *Possession Offence: A Paradigm Shift in Online Obscenity Laws - A Probe*, 38 & 39 Delhi Law Review 244 (2006-2007) (particular anxieties about pornography); Divya Chansoria & R. Asoka, *Digital Signature: Strategic Shift from Form to Function*, 17 CILQ 269-280 (2004) (anxieties about other kinds of threats to security of property and identity); K.L. Chawla, *E-commerce and Cyber Laws: A Challenge Ahead*, 28(2 & 3) Indian Bar Review 23 (2001).

7 *See, e.g.*, Madhu. S, *National Data Sharing Policy: A Call for Open Data*, 3(1) IJLPR 48 (2014); Kartik Chawla, *Data Privacy in India: A GLASS-Based Perspective*, 3 (2) IJLPR 267 (2014). *But see,* Apoorva Anubhuti & Rashmi Bothra, *The Contemporary Commons Theory: A Debate in Modern Telecommunication Law*, 1 NUJS L. Rev. 273 (2008).

8 Farooq Ahmad, *Interplay of Internet Domain Names and Trademark Law,* 28 (2&3) Indian Bar Review 233-292 (2001);Ravinder Singh, *The Internet Domain Name System: Interface with Trademarks, Disputes and their Resolution*, 35 Delhi Law Review 199 (2003); B.N. Kirpal, *Protection of Computer Programmes in India*, 2 SCC (J) 1 (1988); Promod Nair, *Copyright Protection for Computer Software* 7 SCC (J) 31 (2004); Yatindra Singh, J., *Open Source Software and Intellectual Property Rights*, 4 SCC(J) 28 (2004); Ankita Goel & Garima Bharti, *Per Se Clause in the Indian Patent Act and the Patenting of Software: Possible Interpretations,* 31(1&2) Indian Bar Review, 195 (2004).

technologies;[9] often with discussions about World Trade Organisation (WTO) law in relation to Trade Related Aspects of Intellectual Property Rights (TRIPS) taking a central stage.[10] Moreover, these debates about IPRs also brought together a host of general concerns in socio-legal studies about property, freedom, ethics and morality, culture, censorship, culture, power and authority, as well as the innate tensions between private, public and common property discourses.[11]As the IPR discourse has evolved as a discipline of its own right within legal studies, it is not surprising that it is also through this domain that much of Law and Society scholarship has engaged with Technology in India.

The domination of these two tropes has restricted law and technology to a narrow sense, and has implicitly equated law and technology with two established fields, *viz.*, ICT law and IPR law. The sheer majority of articles that are dedicated to these themes even within a specialised journal on law and technology, and the implicit assumptions of such restrictions in many of these contributions, stand testimony to this. It is also reinforced by the quotidian conversations in (legal) academic spaces where such restricted assumptions about law and technology are encountered. This has had a hegemonic effect on the imaginations about law and technology in India, which has more or less naturalised ways of imagining 'Law

9 *See,* N.S. Gopalakrishnan, *Biotechnology and Intellectual Property Protection,* 19(1&2) The Academy L. Rev.1 (1995); Arundhati Kulkarni, *Patenting of Microorganisms in India,* 35 (1-4) Indian Bar Review, 172-188 (2008); T.G. Ajitha, *Patenting Life Forms: Problems and Perspectives,* (1994) Cochin U.L. Rev 342; Sreenivasalu *et al, Patenting Genetically Modified Life Forms: Legal Issues and Challenges*, 32(3&4) Indian Bar Review 485–498 (2005); Ajay Kumar, *Indian Patent Regime and its Impact on Life Saving Drugs,* 32(3&4) Indian Bar Review 15 – 62 (2005). *See also,* T.R. Maruthi, *Intellectual Property Rights in Outer Space,* 35(1-4) Indian Bar Review 209 -220 (2008).

10 Ravi Chaubey, *Intellectual Property Rights under the TRIPS Agreement – Curse or Boon for India in the Era of Globalisation?,* 31(3&4) Indian Bar Review 333- 348 (2004); Dhyaneshwar Chouri, *TRIPS vis-a-vis Right to Health in India: An Analysis*, 35(1-4) Indian Bar Review 161 (2008); D.C.Chauhan, *Intellectual Property Rights Have Assumed a Significant Importance,* 28(2-3) Indian Bar Review 61 (2001).

11 *See,* Dwijen Rangnekar, *Re-making Place: the Social Construction of a Geographical Indication for Feni,* 43(9) Environment And Planning A, 2043 (2011); Dwijen Rangnekars, *Is More Less? An Evolutionary Economics, Critique of the Economics of Plant Breeds' Rights,* in Patenting Lives: Life Patents, Development and Culture, 179 (Gibson, J. ed. 2008); *See also,* Rajshri Chandra, Knowledge as Property: Issues in the Moral Grounding of Intellectual Property Rights (2010); Lawrence Liang, Copyright, Cultural Production and Open Content Licensing,1 Indian J. L. & Tech. 96 (2005).

and Technology' in India as merely thinking about either of these fields.

This imagination substantially limits the field as coterminous with these two aforementioned tropes, and can have profound and grave implications on the nature and ambit of various domains of legal studies. For instance, environmental law, a significant field in legal studies that has an intrinsic (and perhaps fundamental) connection to technology, is conspicuous by its omission within this imagination. One of the precursors to the advent of environmental law in the West is the reception of Rachel Carson's influential book *The Silent Spring*, the account of the effects of a specific pesticide technology, *viz.*, DDT on bird populations.[12] Indeed many of the pollution laws in India are a response to make the deployment of industrial and construction technologies more publicly acceptable, and it is conceivable to read natural resources laws like forest laws, or coastal and wetland regulation as responses to sustain current technological paradigms. Nevertheless ecological discourses and environmental law are not proximate to the aforementioned general imagination of law and technology. This banishing of environmental law from the realm of law and technology has not only restricted the ambit and nature of law and technology scholarship, but also impoverished the vigour and substance of environmental law and policy discourses in fundamental ways. Whereby environmental legal studies is seen merely as a debate about a slew of best practices in waste management and resources use, as opposed to a domain through which important and fundamental questions can be asked about the ecological rationalities omitted and alienated from environmental law and therefore about the very nature of modern law that allows the normalisation of the industrial as natural. If legal studies in general, and law, technology and society scholarship in India in particular, have to come to terms with the fundamental ways in which technology changes the way we experience and understand law differently, challenging the proper domain of law and technology is an important and necessary task.

Other Discernible Trajectories

A number of other trajectories of law and technology enquiries are discernible when one attempts to delineate a broader understanding of existing scholarship in India. These trajectories, identified later in this section, show the relatively broad nature of questions pursued within law and technology scholarship in

12 Rachel Carson, Silent Spring (1962).

India. However, as argued later in the section, it is salient that the treatment even in the below-mentioned trajectories imagines that any existing controversy about technology merely pertains to its newness, and implicitly ignores the foundational choices and values relating to the development and deployment of technologies in democratic societies. An early trope pertains to the appropriateness of use of new techniques as evidence in criminal process. These included discussions about the reliability, admissibility and constitutionality of new techniques in criminal trial or investigation, for instance, the use of audio cassettes of election speeches in related litigation, techniques to identify forgery in type writers, DNA fingerprinting or profiling, lie detectors like truth serums, polygraphs and brain mapping.[13] The discussion often moved beyond the admissibility of new techniques in trial to the general advantages of employing new technology in the justice system.[14] At a later stage, the attention moved beyond these issues of appropriateness and desirability of the use of these new techniques in the criminal process to discussions about the admissibility of new scientific methods generally in adjudication (for instance, in litigation pertaining to the validity of regulatory measures). This included a wider discussion on evidentiary practices and the admissibility of new technical/ scientific methods as evidence in general litigation.[15] They often referred to the debates of gate-keeping on 'scientific, technical or other specialized knowledge', as also the tests laid down prominently by the U.S Supreme Court in cases like *Frye*[16]

13 Jyotirmoy Adhikary, *DNA Technology and its Application in the Administration of Justice: Problems and Prospects*, 5 SCC (J) 6 (2004); B. P. Beri, *Typewriter Identification and Expert Evidence*, 3 SCC (J) 16 (2004); P. C.Harigovind, *Scientific Interrogations in Criminal Investigation vis-a-vis Rights of the Accused: Ethical Imbalances*, (2010) Cochin U.L.Rev 64; Mahavir Singh Kalon, *DNA Technology and Legal Issues in India*, 35 Delhi Law Review 149 (2003); Saionton Basu & Shinoj Koshy, *DNA Evidence: Towards a New Legal Paradigm,*15(4) Central India Law Quarterly 442 (2002); Jyotirmoy Adhikary, *Legislation on DNA Evidence - A Proposal*, 2 SCC (J) 24 (2004). *See also,* Tanisha Jahangir Monir & Avinash K.R., *Scientific Issues in DNA Profiling Bill*, 2(2) International Journal of Law and Policy Review 458 (2013).

14 *See e.g.,* Durga Pada Das, *Mobile Forensic Unit - A Boon to Criminal Justice Administration*, 32 (1 & 2) Indian Bar Review 252 (2005); Jitendra N. Bhatt, *A Profile of Forensic Science in Juristic Journey*, 29(1) Indian Bar Review 1 (2002); Nidhi Tandon, *The Journey from One Cell to Another: Role of DNA Evidence*, 8 SCC (J) 17 (2004).

15 *See, e.g.*, Anshu Jain, *DNA Technology and its Impact on India*, 3(1) NALSAR Law Review 41 (2006-2007).

16 Frye v. U.S., 293 F 1013 (DC Cir) 1923.

and *Daubert*[17] which had important implications concerning the (in)validation of environmental or health regulation.

Newness of technology is a dominant trope within much of the literature beyond the aforementioned trope of admissibility of techno-scientific methods in evidence. The anxieties about the radical change that some new technologies may usher in are apparent in much of the literature of the past two decades. This concern is apparent in the discussions about the regulatory lag, common in liberal regulatory scholarship, *viz.*, the anxiety that legal/regulatory change is lagging far behind technological change, bringing unforeseen and grave social consequences.[18] Articulated through possibilities of regulatory lag in technological domains like ICT, GMOs (Genetically Modified Organisms), nanotechnology and artificial/ambient intelligence, the concerns here pertain to the fundamental changes these technologies may bring about in the social world, and the ability of law in shepherding technological change in socially appropriate manners. Such anxieties about newness, and the need for law to respond, is also apparent in the preoccupations with reproductive technologies in India, from an earlier technology like amniocentesis (notorious for its easy facilitation of male sex selection and female infanticide), to more contemporary Assisted Reproductive Technologies (ART) like IVF and commercial surrogacy.[19] For instance, Pattnaik and Nanda seek appropriate regulation of the use of amniocentesis, ultra-sonography and chorionic villus sampling (CVS) including better implementation of the Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, 1994 against female infanticide:

> *(W)hile keeping in mind that there is a 'right to abortion for the female' of the law and that the practice of such techniques cannot be banned absolutely. We cannot completely ignore pre-natal testing and selective abortion to avoid a seriously genetially (sic) impaired*

17 Daubart v. Merrell Dow Pharmaceuticals Inc.,113 S Ct 2786 (1993); *See also*, General Electric Co. v. Robert K. Joiner, 522 US 139 (1997); Kumho Tire Co. Ltd v. Carmichael, 119 S Ct 1167 (1999).

18 *See*, Roger Brownsword, Rights Regulation, and the Technological Revolution (2008) (for a succinct account of the regulatory lag). *See also,* Kirby, *supra* note 5, at 16.

19 Chayanika Shah, *Regulate Technology, Not Lives: A Critique of the Draft ART Bill*, 6(1) Indian Journal of Medical Ethics 32 (2009).

> *child. Because implications are many. It can emphatically be said that a technology can never be bad....we should decide how we wish to use the technology. Birth of a genetically disordered child not only brings stress on the family but also puts a question mark on the existing relationship between the parent and the child besides keeping them under psychological and emotional loss and suffering. So the tests to determine severe abnormalities in a foetus should stay. A parental desire for a perfect baby should always be there (sic).*[20]

Anxieties about IVF and commercial surrogacy follow similar lines in some of the subsequent literature.[21] The driver's role that the law is assumed to play is a common theme in much of these writing for a variety of reasons, including the effect of these technologies on the rights of children,[22] on women involved in ART,[23] protection of the social institution of the family,[24] or to put in place the 'best' technological practices of ART.[25]

Much of the discussion on regulation of new and radical technologies in India, like in the case of GMOs and of nanotechnology, emphasized the imperative to change law due to its perceived lacunae – be it regarding the effect of such technology on the environment or public health, or the bottlenecks it creates for the effective deployment of the technology in terms of adverse effects on the economy.[26] While such responses may well be a template for the future responses

20 N.C. Pattnaik & Sukanta K. Nanda, *Legal Aspects of Pre-natal Diagnostic Technique*, 18 (3&4) Central India Law Quarterly, 566 (2005).

21 *See,* Shashi Bala, *Commercial Surrogacy- the Need for Regulation*, 36(3) Indian Bar Review 209 (2012); Jitendra Bhatt, *Neo Socio-legal Perceptions and Challenges of Bio Genetic Technology*, 26(3&4) Indian Bar Review 7 (1999). *See also,* Archana Gadekar & Sandhya Kalamdhad, *Assisted Reproductive Technology: Are We Heading Towards Designer Babies*, 39(1) Indian Bar Review 82 (2012).

22 *See, e.g.,*, Indu Nair, *Rights of the Child: Challenges for Law in the New Era of Technology*, 27(1&2) Cochin Univ. Law Rev. 101 (2003); Ragunath Patnaik, *Vulnerability of Children to Cyber Crimes*, (2003) Central India Law Quarterly 265.

23 *See, e.g.,* Kalpana Kannabiran, *The Clinical Establishment (Registration and Regulation) Bill*, 5(3) Indian Journal of Medical Ethical 108 (2008).

24 Gadekar, *supra* note 21.

25 Shashi Bala, *supra* note 21.

26 *See, e.g.,* P. Madhavan Pillai, *Environmental Protection and the Products of Biotechnology*, 11(1) Cochin Univ. Law Rev. 40 (1987); Sheeba Pillai, *Genetically Modified Food*

on even newer technologies like Synthetic Biology, Xeno-transplantation and 3-D printing (if and when they are deployed in India), it is notable that response to 'older' technologies like nuclear and space continue to have similar attendant anxieties about their effects on public health and environment. Further in some of the technological domains, these anxieties have only increased notwithstanding the wearing off of their tag of 'newness'.[27] Importantly, there were a number of instances in literature where legal strategies for protecting existing ethical frameworks from the effects of technological change were explored, for instance through human rights discourses and the child rights discourse. The instrumentalism in approaching law is unambiguous even in much of these articulations.[28]

The fact that deep differences in public values about the introduction of technologies persist long after their tag of 'newness' wears off brings to focus certain foundational debates. These debates regard foundational choices and values relating to the development and deployment of specific trajectories of technologies in democratic discourses as opposed to technical and instrumental debates – for instance in health, environment, property or technology law – and are merely restricted to answering the question: 'what is to be done?'.

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and Regulatory Regime in India, 3(1) NALSAR Law Review 33 (2006-2007); John Sebastian & Apoorva Sharma, *The Bt. Brinjal Debate - A Few Comments on GM Crops and Farmers' Rights*, 8 NALSAR Student Law Review 140 (2013); Neha Mishra, *Nano Technology: The Uncertain Terrain & Failure of 'Precautionary Principle'*, 3(2) International Journal of Law and Policy Review 323 (July 2014); Namrata Gupta, *Sustaining Agriculture and Community Resource in the Fragile Environment – A Case of GM Crops*, 1(1) International Journal of Law and Policy Review 67 (May 2012); Monalisa Kosaria, *Genetically Modified Crops: How Far Eco-Friendly? An Analysis of Indian Experience*, 1(1) International Journal of Law and Policy Review 45 (July 2012); Sandeepa Bhat, *Space Technology and Law: Some Unresolved Questions*, (28 - 29) Delhi Law Review 231 (2006-07).

27 Madabhushi Sridhar, *Limiting Liabilities and Extending Immunities: An Analysis of Civil Liability for Nuclear Damage Bill 2010*, 5(1) NALSAR Law Review 84 (2010).

28 *See,* M. Chandrashekharan, *Human Rights and Biotechnology in the Twenty First Century*, 24(1&2) Cochin Univ. Law Rev. 64, 66 (2000); N.S. Gopalakrishnan, *Intellectual Property Protection and Human Rights Violations*, 14(1&2) Cochin Univ. Law Rev. 92 (2000); P.V. Balakrishnan, *Commercialisation of Organ Transplantation: Impact on Human Rights*`, 14(2&3) Cochin Univ. Law Rev. 285 (2000); Indu Nair, *Rights of the Child: Challenges for Law in the New Era of Technology*, 27(1&2) Cochin Univ. Law Rev.101 (2003).

A Technocratic Cage for Imagining Law

The scope of the debate amidst persisting differences about values concerning the development and deployment of technological trajectories has to include conflicting worldviews about danger and safety, evaluation of social necessities in appraisals of technology, the cultural milieu appropriate for the deployment of specific technologies, attendant ethical, moral, environmental and public health issues, as well as the nature and importance of political values itself in the social engagement with science and technology. This section argues that these issues are currently swept under the carpet of efficiency and economy, which impoverishes any promise of understanding the implications of the impact of deployment of technologies in the democratisation of Indian society.

Persistence of anxieties about technologies can conceivably be engaged through different approaches mentioned below. One way would be to examine the existing legal framework to suggest appropriate measures that either facilitate or discourage the thriving of particular technologies, be it GMOs, IVF or ICT, on an unsubstantiated assumption that there is fundamental agreement about public and constitutional values, including about the said technologies. A second approach would be to unearth the fundamental assumptions about the 'good life' that is attendant in the deployment of the specific technology, and argue how the specific technology is reinforcing or disrupting the attendant values of good life vis-à-vis these concerns, and the need for legal change to address this effect. Both responses are problem-solving approaches that are shaped by a peculiar instrumental notion. Further, attention could also be paid to law's arenas to have discussions and make decisions regarding the differences in public values, and about the good life, in the light of the development and deployment of technology through its various trajectories; for instance, what regulatory spaces are created to articulate these fundamental differences. Equally importantly, explicit or implicit preference of specific technological trajectories within legal systems can also be a resource to understand the governmentalities and normativities that embody modern law.

Examining how regulators seek to navigate governance of the desirability of techno-scientific advancements is related to the study of the nature and role of law in mediating these conflicting worldviews.[29] When techno-scientific communities and relevant regulatory structures are unable to acceptably mediate these public concerns about technology and its various possible trajectories, bringing rationalities from other sections of society to the regulatory table has been argued as vital for democratic law.[30] To make democratic decisions about the public values that should drive research, development and deployment of technology may, then, need further inputs rather than simply relying on scientific communities and business establishments. It is in this context of recognizing the importance of democratic representation and values in making public decisions about technology, that the enlargement of arenas of public deliberation is crucial. The role law plays in this is not only crucial for seeking democratisation but also for understanding the nature of contemporary law. These crucial aspects were found to be rarely focused on in the surveyed literature, and the significance of such silences on the cultural subjectivities and political normativities of legal studies in India is elaborated on later. From the survey of the literature, it was evident that the instrumental approaches dominated the law and technology landscape in India.

However, this instrumentalism is not a feature particularly unique to India. Kieran Tranter, in an insightful essay identifies a common template in the law and technology scholarship in Western academia, which she terms as the 'law and technology enterprise'.[31] Through an examination of the Western law and technology scholarship of the last sixty years, she gleans three generations of law and technology literature *viz.*, space and law scholarship from 1957 to 1962, IVF and law scholarship from 1978 to 1985, and a third generation of virtual worlds

29 Most commentators rightly rule out, at the outset, libertarian or *laissez faire* attitudes to technology development as misguided and unrealistic. That society should put constraints on the development of new technology to guide it in socially desirable ways is generally considered uncontroversial; for a detailed exploration of this aspect, *see,* Janet A. Kourany, Philosophy of Science after Feminism (2010).

30 *See, e.g.*, Robert A. Dahl, Polyarchy: Participation and Opposition, 4 (1971) (Dahl's definition of democracy in terms of granting public contestation, where rationalities emanating from groups other than dominant governing groups can inform these contestations.).

31 Kieran Tranter, *The Law and Technology Enterprise: Uncovering the Template to Legal Scholarship on Technology*, 3(1) Law, Innovation and Technology 31 (2011).

and law scholarship between 2002 and 2008. She makes this delineation through the identification of three respective crisis events, *viz.*, the launch of Sputnik, the birth of Louise Joy Brown (the first IVF baby) and of the advent of the virtual real estate in the popular virtual world of Second Life. She demonstrates that much of the law and technology scholarship on these themes was generated around these respective crisis events, and demonstrates a common structure manifested in the three generations of scholarship. She asserts that constituent elements in this structure, termed as the 'law and technology enterprise', are the description of a problematic technology, the identification of inadequacies of existing law and the call for new law. The technologies are characterised through their respective crisis events as a panacea or a Pandora's Box. Flowing from such characterisation, the literature focuses on recommending disparate legislative strategies (including possible routes of judicial interpretation) to adequately respond to the requirements of the technological future, perceived either as a grave danger or as an usher of a revolutionary good life. The structure of the enterprise, she finds, includes an energetic exploration of the inadequacies in the existing legal framework due to the advent of the specific technology. Further, depending on the vantage point from which the technology is viewed, which may term it as either risky or as having revolutionary capacities, the dangers of not responding to the legal lacunae are pointed out. The legal inadequacies, then, become an immediate resource to seek legal reform. This is since the narrative of the enterprise frames the attendant dangers emerging from the legal lacunae as hindering us from attaining a Promethean paradise, or from the final barricade to opening Pandora's box. This identification of the dangers from legal lacunae, in Tranter's account of the law and technology enterprise, necessarily brings forth the next step of law reform exercises towards ameliorating this inadequacy, to lead society towards an appropriate technological future.

The instrumentalist template in Tranter's enterprise is similar to that of the literature reviewed in the previous section. Notwithstanding this, avoiding an imitation of delineating generations of scholarship around anxieties of specific technologies in India is important, however tempting an attempt of a similar temporal classification of generations of law and technology scholarship in India may be. For instance, one can delineate a generation of ICT literature that is

preoccupied with the effect of internet on society and how law should deal with the changes to facilitate, regulate and plug the loopholes or inadequacies of existing legislations or legal framework, including about issues of cyber security, cyber-crimes, cyber-signature, cyber-privacy, or a generation of literature around issues concerning ART and gestational surrogacy in Indian society, and the need for law reform, or a similar pattern of enterprise in space law and so on. Avoiding such an imitation is also important because of the reality of simultaneous engagements with a plethora of the aforementioned technological domains, which is apparent from a cursory survey of Indian literature. The anxieties about legal regulation of technologies like GMOs, nanotechnology, the UID, nuclear and ART are simultaneous, with no particular crisis event perceptibly shaping the literature on each as a generation. Further, there appear little shifts of emphasis along the axes of time and newness of technology in the new millennium. Hence it could be surmised that the facilitation or reigning in of (high) technological trajectories itself could be the central axis of conversation with a stated aim of attendant law reform; albeit with the domination of the issues of (financial) regulation of ICT including spectrum, security, identity, privacy and attendant issues of these technologies, with similar concerns about protection of IPR of technologies. Much like Tranter's enterprise, an important characteristic stood out in the Indian literature, *viz.*, 'a desire to make law but a reluctance to state the values that such law possesses', a description implicit in the literature that 'made the technology problematic in an even handed way, distancing itself from specific ethical positions and aversion to values'.[32] This important refusal to recognise the values that the law possesses not only highlights the instrumentalism in the literature, but also points to a restricted conceptualisation of technology, the limitations of which is elaborated shortly.

Related to this is a kind of instrumentalism not uncommon in socio-legal scholarship on technology, notwithstanding the fact that the pursuit of law reform projects here usually unpacks and highlights the problematic values that law often embodies. Law and society scholarship has remarkably evolved in the last two decades in India, as evidenced in a plethora of conferences, the broader methodologies through which many mainstream courses like family law and legal history are taught in various autonomous law schools, establishment of a few law

32 *Id.* at 24-26.

and society journals, as also – importantly – in the emergence of a global research network called LASSNet based on law and society scholarship on South Asia. Within these traditions of law and society scholarship in India, however, a focus on technology and its centrality to modern law has been scarce apart from a handful of contributions in more than a decade.[33] The LASSNet conferences, which have played an important role in broad-basing law and society scholarship in India, had organised a few panels and papers dedicated to techno-science. Though the first conference had, among others, a thematic emphasis on 'Body, Techniques of Governance and Regulatory Power' with a specific title of 'Technology, Life and the Law', it is significant that all the papers presented were organised around the rubric of IPR.[34] Accentuating the trend of scarcity, there was no paper on law and technology presented in the third LASSNet conference in 2012, despite a panel titled 'On Technology, Resources and Expert Knowledge'. Outside of the attention on IPR, the 'black-box' of techno-science has been left intact in the critical unpacking that much of law and society scholarship has attempted towards

33 *See,* Upendra Baxi, *The Posthuman and Human Rights*, *in* Human Rights in a Posthuman World,197 (2007); In the Wake of Aadhaar: The Digital Ecosystem of Governance in India (Ashish Rajadhyaksha ed., 2013), http://www.academia.edu/4668710/In_the_Wake_of_Aadhaar_The_Digital_Ecosystem_of_Governance_in_India; Rajshree Chandra, *The Inscription of Technology in Life*; Centre for Policy Research (May 15, 2015), http://www.cprindia.org/research/papers/inscription-technology - life; Rajshree Chandra, The Inscription of Law in Life, Centre for Policy Research (May 15, 2015), http://www.cprindia.org/research/papers/inscription-law-life; Liang, *supra* note 11; Rangnekar, *supra* note 11.

34 Titled 'The Bright Lines and Rhetoric of Intellectual Property'. Significantly, a plenary session titled 'Law's Technologies: Critical Enquiries into the Domains of Science, Capital, and Regulation' was organized, with contributions from Suman Sahai, *Ownership and Regulation of Transformative Technologies*, Rosemary Coombe, *Intellectual Property and its Cultures: Informational Capital and Cultural Resources in a Neoliberal Era,* Kaushik Sunder Rajan, *Intellectual Property, Pharmaceutical Logics, and Ideologies of Innovation* and Sheila Jassanoff, *Natural or Naturalizing? – Law and Knowledge in a Constitutional Moment*. Apart from these, the only other relevant paper found in the first conference was from Sangeeta Udgaonkar, titled *India's Regulations on Embryonic Stem Cell Technology*, notwithstanding another specific thematic in the conference titled *'Technosciences, Environment, Risk and Regulation'.* The second LASSNet conference had a panel titled 'Enframing Technology: Constructions of Public(s), Law, and Ethics' with three papers from Naveen Thayyil, *GMOs and Re-articulations of the Scientific as the Legitimate Public in Europe*, Sitharamam Kakarala, *"Slumbering Sentinels" in Knowledge Society: Human Rights and the Framing of the Ethical Publics in the Debates on 'Harnessing Technologies for Development*,' and Koen Beumer, *Framing the "Public": Nanotechnology and Development in Indian Print Media.*

understanding power, authority, state, law and (in)justice in South Asia.

Further, most law and policy literature that acknowledges technology as worthy of academic attention has often supplemented the instrumentalism of the law and technology scholarship in India, with 'specific and methodologically diverse research that uses social scientific methods to provide understandings of the effectiveness of rules and models of regulation in specific moments within the law-technology interphase.'[35] In much of these scholarships, quite like the general law and technology literature, there is a reification of technology as a mere application of scientific knowledge.[36] In such a picture of technology, technical change is an unfolding of a pre-ordained track of optimal progress and universal scientific reason through scientific enquiry, where technological change is assumed to be more or less a good thing. Elaborated in the next section, this assumption is in contradistinction to the recognition that technological change is subject to social and political values, including through legal institutions and processes. For identifying the appropriate contours of law, technology and society scholarship in India, it is therefore necessary to challenge this common-sense understanding of technology for recognizing the instrumentalism dormant in much of the contemporary literature.

A Broader Understanding of Technology

The instrumentalist assumptions implicit in the enquiries in the law-technology interface have mostly failed to open the 'black-boxes' of technology and science, notwithstanding various productive avenues of engagement offered by technology studies. There is a vast tract of sociological and historical scholarship that emphasises the fundamental difficulties with characterising technology as a fixed category of scientific application. While technological change can entail the application of existing scientific theories, the overwhelming consensus in contemporary studies of technology is the inappropriateness of equating the

35 Tranter, *supra* note 31, at 50.

36 *See, e.g.,* Shamnad Basheer, *India's Tryst with TRIPS: The Patents (Amendment) Act, 2005*, 1 Ind. J. L. & Tech. 15 (2005); Sudhir Krishnaswamy, *Intellectual Property and India's Development Policy*, 1 Ind. J. L. & Tech. 169 (2005).

two.[37] The common-sense approach of defining technology as applied science conceives of technology as a neutral tool. It naturalises the fiction that technology is devoid of values, good and bad, and can be easily 'used, misused, or refused', much like a hammer that can be used to 'drive a nail or smash a skull, ... where the tool user is outside of the tool (as in the case of carpenters' tools) and controls it.'[38] On the contrary, there is ample literature that demonstrates the shaping of technologies by a range of heterogeneous factors – social, political, economic, scientific and historical, where the development and firming of technological designs is contingent on various values including profit, conflict, difference, resistance, domination and prejudice. The form in which a specific technological design has been stabilised is related to the strategies of a whole range of actors, akin to a game of chess, and cannot be seen as a neutral application of scientific principles.[39]

Further, it could be that many technological artifacts can have inherent political properties inscribed upon them in a way that the 'physical arrangements of industrial production, warfare, communications, and the like have fundamentally changed the exercise of power and the experience of citizenship'. Notwithstanding the general adage that 'people have politics, not things', it has been argued that 'technical arrangements can be forms of order.'[40] Langdon Winner famously used the well-known example of the parkways that connected Long Island public parks to the city of New York built under Robert Moses, 'the master builder of roads, parks, bridges, and other public works from the 1920s to the 1970s in New York'. Moses specified that these parkways be built to specifications that would discourage the presence of buses on his parkways, through over two hundred low-hanging overpasses. The design of these freeways excluded the use of high ceiling buses that were the only mode of commute for poor and African American inhabitants of the city to access the island parks, and

37 Val Dusek, Philosophy of Technology: An Introduction, 33-37 (2006).

38 *Id.* at 36.

39 *See,* Shaping Technology/Building Society: Studies in Sociotechnical Change, 12-14 (Wiebe Bijker & John Law eds., 1992). *See also*, T. P. Hughes, The Human-Built World: How to Think About Technology and Culture (2004).

40 Langdon Winner, *Do Artifacts Have Politics?,* 109 (1) Daedalus 121, 122 (1980). *See also,* Lawrence Lessig, Code and Other Laws of Cyberspace (1999).

thus reserving the use of these 'freeways and vast recreational public parks to the automobile owning whites of upper and comfortable middle class'. This reveals the social class bias and racial prejudice in these technical artefacts, which remained intact long after the death of its author, demonstrating the values a technological system can possess.[41]

The forms through which technology changes can shape societies, and, conversely, are also shaped by societies, as opposed to a picture of technical change as an unfolding of some inner scientific logic and economic optimality. In such interpenetrative shaping of technology and society, technical development can be seen as an 'open branching process more akin to organic growth', interacting with:

> *wider social structures and contextual contingencies to become channelled in highly path-dependent ways… In a complex, dynamic, interconnected, and finite world, only a small subset of the totality of potentially viable developmental pathways will actually be followed. This can be as true at the level of the design of an individual consumer product, like the video or DVD, as at the global scale taken in the configuration of major infrastructures, like those underlying energy, transport, communication, and industrial production systems.*[42]

These complex factors underline the centrality of law and legal values in the path-dependencies of technological change, bringing to focus the truism that legal decisions about science and technology inevitably entail questions of democracy through the commingling of categories of technology, society and law.[43] Thus a law

41 Winner, *supra* note 40, at 123-124. *See also,* Esha Shah, *What Makes Crop-Biotechnology Find its Roots? The Technological Culture of Bt. Cotton in Gujarat*, 20(3) European Journal of Development Research, 431 (2008) (which suggests that agricultural biotechnological practices, like Bt. Cotton, makes small scale farming practices far less viable, and thereby increases the possibilities of concentration of farm lands in the hands of few, and further intensify large scale environmental unfriendly practices).

42 *See,* Andy Stirling, *Science, Precaution and the Politics of Technological Risk: Converging Implications in Evolutionary and Social Scientific Perspectives,* 1128 Annals of the New York Academy of Sciences 95, 97 (2008).

43 *See also,* Yaron Ezrahi, Descent of Icarus: Science and the Transformation of Contemporary Society (1990); Steve Fuller, The Governance of Science: Ideology

and technology enquiry, sans an instrumentalist emphasis on law and an avoidance of characterising technology as a neutral scientific tool, can be seen as an arena to not only understand the nature of development of appropriate technology,[44] but also to understand the values that embody legal systems and legal thought.

Towards a Law, Technology and Society Sphere

Therefore, a significant task for the law, technology and society scholarship in India is the liberation of the legal discourse on technology out of a technocratic cage that reifies itself as a mere project of legal reform, and its target as a downstream product whose development is immune from political, social and legal values. Ample use of existing openings from science and technology studies and the methodologies prevalent in law and society scholarship can help cross a wake in the constitution of this 'law, technology, society sphere', one that occupies the domain of technology as a site to understand law and its normativities better - its governmental rationalities, violences and (in)justices.

Within the current milieu of the law and technology enterprise in India, this special issue is indeed is a much needed intervention. Four varied and rich articles offer a promising avenue of engagement within the domain. Kalyani Sen unpacks the official narratives about the introduction of Aadhar, the national biometric identification project in India, in the stated policies and manifestos of the two national political parties in the country. She points out how the national party which had originally opposed the introduction of this technology, while sitting in the opposition benches, it had dramatically (though unsurprisingly) reversed its stance on the technology once it came to power. She unearths the various illegalities by the government, including the repeated flouting of the various injunctions of the apex court, in the continued deployment of the technology. Arguing that Aadhar facilitates the transition of Indian society to an authoritarian one, where critics and dissenters are attacked and silenced, she suggests the use of the technology

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and the Future of the Open Society (2000); Sheila Jasanoff, Science at Bar: Law, Science and Technology in America (1995); Philip Kitcher, Science, Truth and Democracy (2001); Science, Technology and Democracy (Daniel Lee Kleinman ed., 2000).

44 For instance, by taking 'ethical, legal and social aspects' on board. *See,* Arie Rip, *The Tension Between Fiction and Precaution in Nanotechnology*, in Implementing the Precautionary Principle: Perspectives and Prospects 270, 272 (Elizabeth Fisher *et al* eds., 2006).

has both the intention and effect of promoting hyper militarised nationalism and entrenching neo-liberal globalisation. Nishant Shah, on the contrary, focuses on the new contours of identity that the Aadhar biometric project is in service of, and its implications for governance and law within a broader context of the redrawing of the self away from the notion of an autonomous individual in heavily networked societies. He emphasises the difference between identity and identification in the construction of a new notion of individual in networked societies. He discusses the problematic assumptions in debates about privacy and identity of Aadhar, when the notion of identity itself gets transformed in a networked society, and the possible implications for law and legal theory.

Manasi Gandhi explores the blurred lines in separating an artist's work from the artists 'being', by discussing the instances of Wagner, Allen, Polanksi and other public figures whose work is under attack - either for their controversial private lives or for their anti-democratic ideological positions. By taking an assay in analytical philosophy, through the works of liberal legal theorists like Dworkin, Waldron and Mill, she argues for the law to recognise the legitimate space of free speech for such art, irrespective of the politics of the artist; unless the piece of art itself 'is prejudicial to a community'. Nehaa Chaudhari seeks an enabling environment for the sub-hundred dollar mobile devices in India, 'a stable, open and future-proof environment…comprising of existing laws and policies and their developmental effects' as a facilitator of access to knowledge. Through an examination of recent litigational trends on Standard Essential Patents (SEPs), in India and elsewhere, as well as liberal arguments about good governance *viz.*, efficiency, predictability and certainty, she identifies the potential of competition law as a regulatory tool to increase access to cost mobile phones. Through an incisive enquiry, perhaps well within the traditions of Tranter's law and technology enterprise, she recommends the suitable empowerment of the Competition Commission as a regulator who can make the appropriate interventions to aid 'the production and consumption of the low cost mobile phone, facilitating connectivity and access to knowledge' in India.

Given the significant paucity of serious reflection on the relationship between law and technology in legal studies in India, this special issue can only hope to pave the way for further law, technology and society scholarship that deepens the

interrogation of law and its values. Technology is usually thought of as only a downstream product, and not as a social, political and cultural practice through which relationships between humans as well as between humans and others are structured.[45] Multiple intellectual resources and avenues are necessary to make sense of the interface between law and technology, and to understand how categories of law, technology and society construct and shape each other. How law and legal thought approaches these issues, tell us as much about the law as traditional discourses about the nature of law that calls itself jurisprudence in the Anglophone world. The time is ripe and the space is rife for such contributions towards a productive law, science and technology sphere in India.

45 *But see,* Donna Harraway, *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*, *in* Simians, Cyborgs and Women: The Reinvention of Nature 149, (1991) (for the famous notion of the cyborg that transcends these leaky distinctions).