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"Have a Digital Highway but also have speed limits": Exploring Public Resistance to Cell Tower Radiation in India

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Abstract

Public resistance to environmental and health safety risks from radiations emanating from cell phone towers has been sporadic but spatially and temporally widespread in India. Civic actions have been led by civic activists, resident welfare associations, gram panchayats, lawyers, scientists and even an actor from the Bombay film industry. Large scale technical systems like cell-phone towers are remarkably resilient to public criticism. Industry response to such resistance is usually in the form of aesthetic tinkering to hide structures from public gaze, incremental regulation and science communication to assuage public doubt. The legislature rather than Courts has been more responsive to such civic actions. Courts due to their overreliance on risk discourses have continued to defer to State experts. Faced with incrementalism from formal institutional actors, resistance movements have become localized and used site requirements to stymie such developments. Drawing on Beck's idea of subpolitics, this study explores the disaggregated nature of the resistance movement against cell tower radiation in India. It is based on a multi-sited ethnography based on field research and 35 interviews with activists, journalists, regulators, lawyers, industry representatives, doctors and scientists, conducted between November 2017 to December 2019. Jurisprudential developments, parliamentary committee and scientific reports were also reviewed. Subpolitics as a category has purchase in STS studies because it allows us to focus on the disaggregated nature of affected publics and interrogate public engagement with State institutions and new social expectations and solidarities with reference to technology.

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Introduction

Cell Phone Towers (CT) are a ubiquitous part of the urban landscape in India today. It's spread in rural areas and Tier II cities have also been phenomenal. As on 30-06-2019, there are around a little more than 5.5 lakh mobile towers installed across the country and the numbers have continued to rapidly increase.[1] Concomitant with this expansion, contestations as to the effect of EMF (Electro-Magnetic Frequency) radiation emitted from CTs on public health and environment have erupted across India over the last two decades.

Protestors have highlighted health risks which ranged from dizziness, sleeplessness, brain tumor and cancer. These protests gained considerable coverage in the local print media. Soon thereafter, similar protests were witnessed across India. Most protests were highly localized and concentrated on petitioning the municipal corporation and filing complaints with CT companies for removal of towers from their immediate neighborhood.

Considerable scientific evidence exists attesting to the health effects of CT radiation, although direct causal link is yet to be established (Pearce, 2020). The World Health Organization - International Agency on Cancer Research (IARC) classified radiofrequency radiation as a Group 2B Possible Human Carcinogen (Hardell, 2017). Evidence for carcinogenicity of Radio Frequency Radiation (RFR) was primarily from cell phone/brain tumor studies, but as per IARC rules, it was applicable to all RFR exposures, from all sources including household appliances and power transmission lines.

Current studies have mostly propounded a precautionary approach especially given that some kinds of experiments like the effect of emf on children is not possible to undertake (Moon, 2020). Difficulties in the measurement of health effects of radiation have been highlighted. Admittedly, it is possible to extrapolate observations made on rodents to construe the health impacts on humans (Vanderstraeten, 2019). Epidemiologists have argued for a moratorium on the roll out of 5G as there is disturbing evidence which suggests that harmful biological effects may be triggered by emf radiation due to higher population level exposure (Frank, 2021).

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Confronted by protests and the growing scientific evidence of the health effects of radiation from CTs, the State has taken incremental steps in the last two decades to address the issue. In 2005 the ICNRIP Guidelines was adopted by the Department of Telecom (DOT). Thereafter in 2008 TERM (Telecom Enforcement Resource and Monitoring) Cells were established to monitor conformity assessment of CTs radiations. Legislators have also taken cognizance of this issue and several parliamentary committee reports were published mandating greater public funding for scientific research on radiation from CTs India and transparency in the operations of TERM Cells.

State incrementalism have however failed to curb protests which have been sustained over more than two decades now. Can this be characterized as a social movement? Possibly not because these protests were sporadic, spatially and temporally distributed and although in some cases participants were aware of each other, largely protests were site specific and there was no solidarity built between the participants. So, the obvious markers of a social movement were missing.

Despite the disparate nature of the resistance, civic actions were able to elicit institutional reactions primarily because of the support it could draw from media and due to the social capital of certain participants that allowed them to directly lobby with institutional actors.

The objective here is to gain an insight on the public resistance to EMF radiations from CTs in India, in order to understand the impetus that spurs such actions, the resources and strategies adopted and the institutional responses. Ultimately when citizens recognize and accept their self-experiences triggered by risk from large scale technical systems, how do they engage in social action, wherein such technical systems are embedded within the development narrative often muting public challenges and regulatory scrutiny.

This paper is divided into 5 sections. Section 2, provides an overview of the important milestones in the public resistance movement. Section 3, discusses Beck's idea of subpolitics and explains the theoretical value of the concept in the context of this study. It also reviews the academic literature on cell-tower radiation movements globally. Section 4 discusses the methodology. Section 5 provides an overview of the ethnographic research. The conclusion summarizes the main findings of this study.

Milestones in the Public Resistance to Radiation from Cell Phone Towers

The first petition in the Supreme Court was filed in 2005 by the Karma Jyot Seva Trust, Gujarat (*Karma Jyot Seva Trust v Union of India*, 2005) (Times News Network, 2016) leading to the adoption of the ICNRIP Guidelines by the Dept. of Telecom. This relied on the Dr. N K Ganguly Committee Report of the Indian Council of Medical Research (ICMR) which was established pursuant to an earlier petition filed in the Bombay High Court (*Division Bench of the Bombay High Court*, 2004).

Telecom industry welcomed it because these norms were set at a maximum permissible level and, therefore, much lower than actual levels and thus it was largely business as usual. Protests spread across various localities in Mumbai and also across cities like Bhopal and Ludhiana (Narasimhan, 2010; Network, 2018; Portal, 2014; Vasudevan, 2013).

The Department of Telecom stablished TERM Cells in 2008 and since 2010 they were given an expanded role in the monitoring conformity assessment with EMF Radiations norms (Sandlas, 2014). This was an effort towards disclosure of information to the public so as to ensure transparency and create conditions for challenging non-compliance. Graham refers to this kind of mandatory disclosure as a form of regulation (Graham, 2002).

In 2010, propelled primarily by the increasing number of news reports of protests against CTs as well as questions posed by parliamentarians, the Inter-Ministerial Committee (constituted of Ministry of Environment and Forests (MOEF), Department of Biotechnology, Department of Telecom and ICMR) report stated "it has examined 90 international and national studies/reference papers and recommended lowering mobile towers' EMF exposure limits to 1/10th of the existing prescribed limits as a matter of abundance precaution" (Department of Telecommunications, G. of I, 2016). DOT notified this in 2012. Interestingly the recommendation itself lacked any scientific basis as was evident from the use of the term "abundant caution". This phrasing was disingenuous but effective in stalling further tightening of regulatory standards without accepting the health risks of EMF radiation.

In response to parliamentary questions on the effect of radiation from CTs on wildlife, the MOEF established an expert committee in 2010 and, the report was issued in 2014 (Misra, 2011). It undertook a literature review to establish that although there have been some studies which suggest that radiation has resulted in the collapse of pollinator colonies of bees, as such the evidence was inconclusive and therefore precautionary principle should be followed in providing greater scrutiny for erecting CTs in areas with wildlife and highlighted that more research was required in this area. A significant recommendation of this committee was to recognize EMF as a pollutant and that public consultations should be made mandatory for the installation of CTs in any area.

In 2011, the World Health Organization – IARC, classified radiofrequency radiation as a Group 2B Possible Human Carcinogen (Hardell, 2017).

Jaipur (a Tier II city) witnessed a sustained media campaign by Rajasthan Patrika (vernacular newspaper). As a result, a petition was filed by a retired judge and the Rajasthan High Court in 2015, passed a judgment addressing the health risks of EMF radiation by mandating the removal

of CTS from the vicinity of hospitals, schools, playgrounds and ancient monuments and that local bodies should consider aspects such as the cumulative number of towers in an area while granting building permission for the erection of towers. This was challenged and the Supreme Court stayed this judgment(IANS, 2015).

In 2014, the High Court, Allahabad constituted a Technical Expert Committee (TEC) in an ongoing public interest litigation (Smt. Asha Mishra vs. State of U.P, 2016) against the health risks from CTs. It included academics from engineering institutions like IIT Kharagpur, Kanpur, Delhi, Roorkee, Bombay and also the ICMR. The committee found that "there are no conclusive evidence to establish any causal link between the effect of EMF radiation from BTS with biological effects described in cell models, animals or humans, and any possible resulting health effects." The petition was dismissed on the basis of this recommendation.

There were two funded schemes which were inaugurated – first was the DST – SERB Scheme and in 2015 the ICMR launched a multidisciplinary cohort study in the National Capital Region (includes Delhi and its suburbs) to explore whether there is any impact of Radio Frequency Radiation (RFR), emitted from cell phones on the adult population in India. Specifically, it would examine the incidence of reproductive dysfunctions, infertility, neurological disorders (sleep related and cognitive behavior), cardiovascular diseases, cancer and ENT disorders in human volunteers.

SERB projects yielded no concrete findings on the effect of EMF radiation. Results from the ICMR study is expected from 2022 onwards. Although early results have confirmed observed effects on reproductive organs, as well as the cardiovascular and neurological aspects (Deb, 2018).

In 2014, a parliamentary committee of the Lok Sabha (lower house of the Parliament of India) studied "Norms for setting up of telecom towers, its harmful effects and setting up of security standards in expansion of telecom facilities." (Lok Sabha Secretariat, 2015). The report of the Committee highlighted a series of shortcomings of the operational control exercised by the Department of Telecom (almost insinuating regulatory capture), including lack of uniform and enforceable guidelines in in establishing CTs, structural safety of towers and on their restriction in residential areas, schools, colleges and hospitals and non-existence of effective Grievance Redressal Mechanism, need for India specific health research, lack of manpower and equipment in TERM Cells and relying on dubious method of 'Self-certification' of radiation levels by telecom service providers.

On the issue of health research, the Committee was scathing in its finding. It held that, "the Committee find it deplorable that some of the India specific research carried out by eminent scientists and other Governmental organizations have not been taken into consideration by DoT in forming its guidelines. A decade long study conducted by Prof. Gandhi of Department of Genetics, Guru Nanak Dev University, Amritsar had found that radiations emitted from the towers are degenerating DNA and chromosomes. Similarly, a study conducted by Prof. Jitendra Behari in Jawaharlal Nehru has found that the exposure to radiation from mobile towers and mobile phones could have an adverse impact on male fertility and deplete the defense mechanism of cells. Further the Environment and Forest Ministry study has blamed electromagnetic radiation from communication towers for the declining number of sparrows and bees, etc. The Committee, in view of the above findings made by the reputed experts and research institutes, feel that there is no room for complacency on the issue by selectively relying only on the findings of WHO whose research reports are mainly based on developed countries and strongly recommend that the findings of India specific studies should also be taken into consideration by DoT in coming out with its policy initiative on mobile towers" (Lok Sabha Secretariat, 2015, p. 7).

In 2015, another Parliamentary Committee of the Rajya Sabha studied EMF radiation and recommended that TERM Cell reports be made public and that the TERM Cell personnel be increased and that penalties (other than fiscal) should be explored (Rajya Sabha Secretariat, 2015). Thereafter two significant regulatory changes were made by the Department of Telecom; first was the launch of Tarang Sanchar. The portal maps all the base tower stations of 2G, 3G and 4G towers across the country. By paying a fee, one can request TERM Cells to measure EMF radiation in a specified location. In 2018, yet another public interest petition was filed in the Supreme Court by the film actor Juhi Chawla (Press Trust of India, 2018). Several other petitions were clubbed together to create an omnibus legal case in the Supreme Court and is currently pending in the Court. In 2021, the Delhi High Court dismissed a public interest litigation filed by Juhi Chawla asking the State to certify that 5G mobile networks are safe (Sharma, 2021).

Civic Actions as Subpolitics

Ulrich Beck's idea of the subpolitical is embedded within his theory of reflexive modernization (Beck, 1994). Reflexive modernization refers to the second turning in modern (western) society. Modernity witnessed the rapid expansion of industrial action followed by a wave of regulatory measures to address the pollution created by this wave of industrial action. In the second phase of modernity, health and environmental risks are produced by further expansion of industrial action and society soon realizes that such risks cannot be addressed through large scale social action – which is most evidenced in regulatory failure to reduce risk from seemingly ever-expanding economic activity (Beck, 2000).

As with the failure of regulatory measures become more apparent, there is also break down in public consensus as to how to address these risks, given the mistrust of scientific certainty and experts. Despite the mistrust, society has nowhere to turn (as Weber says there is no God in rational

modern society) and this inaugurates a strange relationship with science – that of continued social reliance on science for making public arguments on risks and at the same time growing public mistrust of the scientific establishment.

Public mistrust is further deepened by the institutional response to scientific controversies – which increasingly relies on what Beck refers to as "individuation of risk" paradigm(Beck, 1997).

This mistrust towards the scientific establishment spills over to politicians and the political establishment in general. Does this mean an end to political mobilization and social action geared towards addressing health and environmental risks that characterizes this second wave of modernity? Beck urges us to look for politics outside and beyond formal representative institutions like the legislature. This he terms as "subpolitics". Subpolitics is the inauguration of politics – simply put public action on a public issue – by individuals and associations (i.e., non-formal political actors) to pursue change. Subpolitics is different from formal politics in that it lacks the imperative to legitimate itself through democratic procedures.

Subpolitics a theoretical category has been widely explored by STS scholars. Hunsinger suggested mechanisms for enriching the theoretical approach of Social Construction of Technology (SCOT) with the aim of allowing "the subpolitics of SCOT to surface"(Hunsinger, 2005, p. 257). On similar lines, Vries has emphasized that subpolitics needs to be conceptually delineated as a critique, where simplified notions of politics has been deployed in STS analysis. Several STS scholars had identified democratic deficit as the primary issue which needs to be addressed in response to a number of studies which demonstrated how subpolitics had emerged in modern technological societies where political issues were being dominated by experts and shielded from public discussion and debate (Collins & Evans, 2002; Jasanoff, 2003).

Responding to this debate, Vries argues that these debates fail to account for the complexity of the "politics" in subpolitics. Instead, drawing on Aristotle's idea of *praxis* he proposes that we need to have a greater appreciation of processes, actors and institutions through which "political objects" come to be constituted. He urges us that "we can analyse subpolitics by following the processes in which, by arising from a plurality of views, experiences and interests, a common object emerges together with the appropriate technologies that establish the constitution of an association in which this object can circulate and in which it may serve as an aim for praxis." (De Vries, 2007, p. 806).

STS scholars have responded favourably to Vries's suggestions. Sreekumar and Vadrevu traces the counternarratives being constructed by the political twitterati in Singapore and thereby constituting the quality of democracy (Sreekumar & Vadrevu, 2013). Different forms and sites of public resistance as subpolitics has attracted considerable STS scholarship (Buizer & Turnhout, 2011; Knight & Greenberg, 2002; Stevenson, 2012). Such studies have highlighted how public resistance movements driven by civil society have contested State's hegemony on scientific knowledge and expertise specifically in newer areas such as climate risk (Teo & Amir, 2021). Adopting a subpolitical lens also allows us to investigate subterranean political action which may be subsumed within the wider narrative of large-scale social action addressing nation building and collective identities (Junka-Aikio, 2012).

What is the value in applying this theoretical category of the 'subpolitics' to this present case study? I address this in the following paragraphs.

Following Vries, I posit that the political object being constituted here is *the acceptable level of radiation risks from CTs*.

CTs are part of the large-scale technical infrastructure that forms the telecom industry. It is an industry that has been celebrated worldwide and especially in India in facilitating the internet revolution and is a mainstay of government plans to bridge the digital divide and allow for rapid expansion in economic activities through connectivity. Expansion of this infrastructure, is therefore, also an integral part of the development narrative of the State. This is evident from the DOT's vision statement – "To provide secure, reliable affordable and high-quality converged telecommunication services anytime, anywhere for an accelerated inclusive socio-economic development" (Department of Telecommunications, G. of I, 2018). It is intimately connected to the modernization of the nation state and constitutes its sociotechnical imaginaries (Jasanoff & Kim, 2015). The protests were faced with obvious resistance in the first instance from State institutions, keen to maintain hegemony over the political object and consequently dismiss such civic actions as individual reactions lacking in any scientific and rational basis.

Nevertheless, unrelenting civic actions have challenged this state narrative of development and have forced a response from the State. Parliament was instrumental in directing greater funding for generating scientific research on this in India, TERM cells were established to provide real time information of radiation levels from CPTs to citizens and in pushing for the adoption of a precautionary approach to the erection of CPTs. In contrast, the Courts heavily imbued in the State's development narrative(Chowdhury, 2014) and despite the *de jure* discourses on precaution in the face of uncertainty, have been generally dismissive of cases, citing lack of evidence of harm.

Given that CPTs is also a local artifact, protesters have also preferred street action to stymie the erection of CPTs in the neighborhood. In states like Kerala, such protests have led to the formation of District Level Telecom Committees (DTCs) which have opened up new spaces for deliberation over *what is the level of radiation risks from CPTs that is acceptable to the neighborhood.* Similarly in Mumbai, Housing Cooperative Societies have witnessed extensive deliberation on this issue. Opening of these new spaces have allowed the public to play an active role in constituting the political object.

There have been several studies on civic actions against radiation emanating from CTs worldwide. Studies have largely coalesced on two tracks. First, on risk perception and the role of media and specifically risk communication and second; on theorizing about such social movements on resistance.

Burgess has conducted several studies on public perception of risk. He noted how nations have largely taken a precautionary approach in addressing public anxieties (Burgess, 2002). He has been deeply critical of such public anxieties as they are deemed to be irrational since they focus on radiation emanating from cell towers, at the same time ignoring radiation risks from mobile gadgets. Public anxieties are sought to be explained by heightened media narratives which do not rely on scientific proof but information which amplify risks(Burgess, 2007b, 2007a). Claassen also suggests that media articles often lack scientific perspectives(Claassen et al., 2012). Risk communication is then identified as the primary problem in this context and recommendations are made for improving risk communications (Claassen et al., 2016). Implicit here is the acceptance of the premise that public anxieties can be addressed through risk communication.

Studies from the perspective of social movement theory have generally been less emphatic in their conclusions. Some have sought to challenge the irrational actor model suggested by Burgess, arguing that in fact social movements display multiple modes of both instrumental and substantive rational action(Law & McNeish, 2007). Similarly, Drake has shown in the context of UK, that few protestors believed that precautionary approach had been taken by the State and therefore such movements are emblematic of citizen's increasing suspicion that science and technological developments lead to a good life (Drake, 2006). Underlining the centrality of Beck's risk society thesis, Drake emphasizes that such protests are an outcome of the tension between active citizenship as propounded by State policies that support public deliberation and neoliberal imperatives which push the public to be passive consumers (Drake, 2011).

DeGraff and Broer have mapped the changes in citizens perception of technological risks and acknowledged the general petering out of site-specific resistance due to change in local processes accommodating citizen's participation in Netherland (de Graaff & Bröer, 2019). Intra-country variation in such collective action movements have sought to be explained by cultural approaches to social movement theory (Bröer et al., 2016). Citizen's involvement in local authorization decisions was studied by Larsson in the context of 3G in Sweden and he shows how those deliberative approaches are abandoned in favor of one based on expert deliberation(Larsson, 2014). Similarly, Stilgoe suggests that representation of "non-experts" in policymaking is critical for ensuring credibility of such initiatives (Stilgoe, 2007).

Focusing on risk perception from a media studies perspective, Rahul Mukherjee has studied the resistance to CTs in India. "Mediated technocience public" is the term proposed by Mukherjee to denote disparate resistance movements in India. These publics emerge out of resistance against technological infrastructure. Deficits in scientific expertise is sought to be circumvented by these publics by partnering with media. Media plays a critical role in the emergence of technoscience publics(Mukherjee, 2020b). His study is based on the newspaper campaign of Rajasthan Patrika (vernacular daily) on CT radiation (Mukherjee, 2017). In his book *Radiant Infrastructures,* Mukherjee brings STS into conversation with media theory to explore public perceptions of risk in different radiation emitting infrastructures (e.g., cell towers and nuclear reactors) by theorizing on affect and remediation in terms of its representation on bodies and screens. Mukherjee acknowledges that the publics are disaggregated by class, technology and media politics(Mukherjee, 2020a).

Media is also an aspect which I explore because it is an importance ally in civic actions. Albeit, it is only one part. My focus here is to provide insights on the interaction between different stakeholders within the movement and their negotiations with state institutions through which the political object comes to be constituted.

Method

This article is based on a multi-sited ethnography conducted in Kochi, Jaipur, Mumbai, Bangalore and Delhi between November 2017 and December 2019. These sites were chosen as all of them witnessed sustained civic action against CTs. Sites were identified on the basis of media articles reporting on such civic action and also ongoing cases and judgements on EMF radiation in Supreme Court Cases (SCC), one of the largest legal databases indexing Supreme Court and High Court cases. To follow the litigation on EMF radiation, it was important to identify the different epistemic communities at the various sites. For example, doctors, journalists, lawyers, scientists, representatives of the telecom industry. I set about identifying experts alongside those involved in civic action. At each site, I interviewed the lawyers and experts who played a key role in the cases which I was following. Eventually 20 experts were interviewed and I spoke with 15 civic activists.

I began the fieldwork in Mumbai wherein several Housing Cooperatives were engaged in challenging CTs. Mr. Prakash Munshi played a major role in coordinating civic actions in Mumbai and also introduced me to a cohort of doctors (specializing in ENT(ear nose and throat) and neurosurgery) practicing in Breach Candy Hospital, Saifee Hospital and Poddar Hospital, who had been researching the link between radiation and hearing impairment. I interviewed Mr. Mihir Desai, a senior advocate of the Bombay High Court who was involved in multiple litigations in Mumbai on EMF radiation (Vidya, 2016). I spoke with Prof. Girish Kumar. He is a scientist who was a member of the Technical Expert Committee appointed by the Allahabad

High Court on EMF radiation (Smt. Asha Mishra vs. State of U.P, 2016).

In Kochi, I met with Mr. Santosh Matthew, a senior advocate of the Kerala High Court who had successfully defended multiple telecom companies in cases on CT radiation (*Essar Telecom Infrastructure vs. C.I. of Police, Angamaly*, 2010). He introduced me to Mr. Babu Prathanaman, representative from the second largest CT company operating in Kerala who discussed the nature and scale of civil actions and their response to them.

In Jaipur, I spoke with a journalist who headed the media campaign of Rajasthan Patrika on CT radiation. Mr. Sudhir Kasliwal, was personally affected by CT radiation and had supported the media campaign. I also interviewed Mr. Prateek Kasliwal, lawyer of the Rajasthan High Court, who had represented Justice Irani and was also coordinating legal actions for several petitioners in the Supreme Court (*Justice I S Israni (Retd)Anr vs. U O I (Dep Of Teleco) Ors, (2012)*.

I interviewed three scientists from the Indian Institute of Science (IISc) in Bangalore since all of them had made public statements on the risk from CTs and some were also recruited by DOT as spokespersons in the public communication exercises. In Delhi, apart from RWAs, I also interviewed public officials who had worked with DOT and were involved with addressing this issue. I also spoke with Mr. Rajan Matthews, the Director General of the Cellular Operators Association of India (COAI), the industry body representing telecom operators. I also interacted with Dr. R.S. Sharma, principal scientist in ICMR, overseeing the long-term study of health impacts of emf radiation. Dr. Asad Rahmani, scientist with Bombay Natural History Society (BNHS) and one of the authors of the MOEF report on the environmental impact of CT radiation was also interviewed in Delhi.

The interview transcripts were generated from 35 semi structured interviews. Selection of respondents was initially based on review of scientific literature, media articles, court judgements and parliamentary committee reports. Thereafter, snowball sampling and convenience sampling methods were used. Apart from my field notes, municipal regulations, judgements and parliamentary commentary reports were also analyzed as part of this study. some interviews were anonymized as per request of respondents.

Interviews lasted between 2–3 h and the respondents were asked to describe the nature of their involvement. Further, they were asked to comment on such civic actions, scientific evidence of harm and the conduct of State institutions. Interviews were conducted in their offices or laboratories. I accompanied those involved in civic actions in Jaipur, Kochi and Mumbai to specific sites in which CTs erected were challenged or were functioning allegedly in violation of norms.

The questions were deliberately kept broad and respondents were invited to narrate and describe in detail their involvement. The field was identified through media articles and case law search through which I could identify people and places of importance. The discourse on risk was my primary entry point to this issue, however the narratives which I documented through interviews and also my field notes allowed me to discover other aspects. This is typically so in ethnographic research, wherein research objectives and outcomes develop iteratively through the term of field work (LeCompte and Goetz, 1982).

I confronted the experts with contrarian views expressed by other experts. This was helpful in establishing *inter se* validity of the results. Expert interviews should be viewed as partial and embedded within the context of the field and therefore it provides new perspectives on how law grapples with the challenges of address issues like, health risk from EMF radiation and conclusive proof of harm. Such perspectives are seldom visible from analysis of judgements. Triangulation of research results was sought to be addressed by relying on multiple sources of information including, municipal regulations, media reports, parliamentary committee reports, judgements and scientific articles. This helps address the cultural bias which may creep into such ethnographic studies.

The analysis of media reports, case law and parliamentary reports allowed me to create a timeline of development, which revealed that the Parliament had been responsive to civic actions by prodding the DOT to take precautionary action. Parliament had also underlined the need to generate India specific health data on the impact of emf radiation, which resulted in the ICMR long term study. In general, the Courts have taken a more contrarian position in dissuading challenges which have recurrently filed challenging the regulations governing emf radiation from CTs. The interviews helped me understand the imperatives and resources governing the use of litigation as a strategy rather than direct civic actions. Uptake of litigation as a strategy was influenced by access to social capital. Consequently, district level litigation was found to be more effective than in appellate courts. Finally, constitution and production of scientific evidence was embedded in institutional mechanisms that impeded the production of "conclusive proof", which in itself was a political category.

Multi-sited ethnography was well suited as a method which could have been adopted for this study, since the aim was to trace the imperatives driving the evolution and circulation of these civic actions across the country and their influence in shaping the political object – i.e. *what is the level of radiations risks from CTs that is acceptable to the neighbourhood.* Focussing exclusively on judgements would have only given me perspectives on the legal regulation of risk from CTs and would have privileged the role of the Court. Similarly, a case study which relied exclusively on interviews with policymakers and scientists would have accorded primary significance to those actors. Further although I went to the field with some assumptions, the

beauty of ethnographic research is that it allowed me the academic flexibility and indeed demanded that I reflect and review these assumptions.

An Intermediary

"I think that this (referring to EMF radiation from CTs) is a very important health issue. Prakashji and I have tried to spread awareness and also filed cases in Bombay High Court and Supreme Court. Please speak with Prakashji he knows more than me" (Juhi Chawla, Personal Communication, 9 November, 2017).

This quote is excerpted from a brief phone conversation which I had with Juhi Chawla, an actress in Bombay film industry and also an activist on this issue. Despite multiple attempts it was difficult to meet Juhi Chawla and finally we agreed to a phone conversation. Incidentally, when I had established contact with Mr. Prakash Munshi, a resident of affluent South Mumbai actively engaged in civic actions. He had agreed to facilitate a meeting with Ms. Chawla. However, Munshi when we met him, seemed wary of facilitating the meeting. Perhaps Munshi hoped to assure us of his own importance as the *legitimate civic activist* and therefore more worthy of being interviewed. Munshi was my first interviewee,

Opposite his residential apartment building was the Maharashtra State Guest House (Sahayadri Guest House) – atop which in the space of few days multiple CTs were installed. Juhi Chawla, who also lives in the neighborhood was concerned about the CTs and had given a few media interviews on this, with little effect. Munshi got in touch with Ms. Chawla and worked out a strategy to address this issue. Banners were put up across the road drawing attention to the health risks of radiation, RTI (Right to Information) requests were filed and a petition was filed in the Bombay High Court.

Although the RTI requests revealed no information, it alerted the concerned government department to greater public scrutiny and possibly led to the removal of the illegal towers. Media publicized the removal of CTs thereby further burnishing Munshi's reputation. Media coverage, led to many individual citizens, schools and RWAs in Mumbai contacting Munshi for mentorship.

This also triggered many other citizens to lodge complaints with their local municipalities, Department of Telecom and also CT operators. Munshi helped other citizens in measuring the radiation levels locally and helped in filing complaints. In effect, Munshi functions as an intermediary supporting and coordinating between disparate civic groups in Mumbai. Media has been instrumental in providing visibility and expertise to such civic actions (Mukherjee, 2020b). Additionally, my explorations show, Munshi's role has been equally critical, in highlighting commonalities of experience and being a conduit for accessing expertise to undertake such civic actions. Munshi disclosed that he was in touch with Prof. Devra Davis (an American epidemiologist) who shared new research findings on the link between CTs and health effects. He also invited Prof. Girish Kumar to address meetings with RWAs.

Munshi and the Ms. Chawla, also appeared before the Parliamentary Standing Committee of the Lok Sabha and gave evidence as part of the proceedings. This was facilitated by the intervention of the local Member of Parliament from South Mumbai constituency – Mr. Milind Deora – who was then the Minister of State (Junior Minister) in the Ministry of Communications (which had operational control over the Department of Telecom). Affluence and the celebrity status of the actor secured access to the legislators.

Emergence of New Deliberative Forums

In an effort to stem litigation and in response to sustained media exposure, State governments, have explored new deliberative forums.

In 2014, the State government in Mumbai, issued directions under the Maharashtra Cooperative Societies Act of 1960, with regard to the procedure and practice of installation of mobile towers on the terraces and within the premises of the Cooperative housing societies (Directions to Be given to Co-Operative Housing Societies under Section 79 (A) of Maharashtra Co-Operative Societies Act 1960., 2014). Cooperative housing societies comprise the bulk of residential housing in Mumbai, and the regulations provided that erection of CTs within the premises would require the approval of 70% of the members of these housing societies. Opening up of this legal space, allowed them to organize referendums and exercise choices regarding the siting of CTs in their neighborhood (Ashar, 2013).

However, such referendums were never easy and straightforward affairs. Those opposing such siting had to invest considerable time and effort in collecting in circulating "evidence of harms" relying mostly on news reports on EMF radiation and the expert committee report of the MOEF in 2014. Munshi was active in giving talks in housing societies to convince skeptical fellow members. The arguments were based on as one interviewee put it,

> "abundant caution and that the housing society did not really need to raise maintenance money by jeopardizing our health." (Anonymous Respondent, Personal Communication,10 December, 2017)

Cooperative housing societies became new arenas for public reasoning and argumentation wherein residents had to engage debate what was once considered a "routine matter" (i.e., providing NOCs for erection of common facilities) and new rules of engagement were formed like the demand for quorum.

Frequently, the management of Housing Societies did not observe quorum while conducting such referendums. This resulted in a flood of complaints being filed with the

government, triggering a follow up notification which mandated that quorum should be ensured with atleast 70% of the members present and voting. Since then, there have been recurrent resistance to the erection of CTs not only amongst residents within their own building or recreational areas but also in the neighborhood specifically when the terraces of lower buildings are used which directly overlooking residents in other taller buildings (Ashar, 2019).

Like Housing Societies in Mumbai, Gram Panchayats in rural Kerala have emerged as deliberative forums for resistance against CTs. Section 233 of the Kerala Panchayati Raj Act (KPRA), empowers Gram Panchayats to license construction of buildings. Similarly, Section 232 of the KPRA empowers the Panchayat to notify an area wherein certain activities which are dangerous to human life, health or property will be allowed only after obtaining a license. Both these provisions have been used by Gram Panchayats to exercise regulatory control over the siting of CTs.

Kerala High Court (KHC) witnessed multiple litigations on this issue and gave divergent views on the matter (*Dishnet Wireless Limited vs. Circle Inspector of Police*, 2009; *Reliance Infocom Ltd. vs. Chemanchery Grama Panchayat*, 2006; *Essar Telecom Infrastructure (P) Ltd. vs. Circle Inspector of Police*, 2008). Finally in 2010, a Full Bench of the KHC held that the precautionary principle would not be applicable to the operation of the mobile towers and therefore the burden of proof did not lie with the petitioner (in this case the CT company) to show the lack of pollution or nuisance (*Essar Telecom Infrastructure vs. C.I. of Police, Angamaly*, 2010). However, it did recognize that that SPCB (State Pollution Control Board) is empowered to take appropriate measures upon determination that EMF radiation is an air pollutant. This was reiterated by the Court and most crucially the Court in that case (*Essar Telecom Infrastructure Pvt. Ltd. vs. State of Kerala*, 2011), did not foreclose the possibility of local bodies interpreting the components parts of CTs to be "machinery" and hence their installation would require their permission under Section 233 of the KPRA. Further it also clarified that the Court's judgment would not in any way preclude other competent authorities (for instance, local bodies, SPCB, civil courts) from determining questions of pollution, nuisance and health hazard from CTs. Since the Court left out the final determination on the question of health risks, litigation on this issue continued unabated (*Indus Towers Ltd. vs. The S.I. Of Police*, 2014; *Sudevan C. C. vs. Mundur Gram Panchayat*, 2013).

DTCs were recommended first by the Parliamentary Standing Committee on Information Technology in its 53rd Report, for addressing public grievances. Following the advisory from the DOT for establishing DTCs and State Level Telecom Committee (Department of Telecommunications, G. of I, 2014), the Kerala State government lost little time in establishing DTCs. DTCs were constituted consisting of 14 members to provide for addressing public grievances regarding installation of CTs.

Indeed, Kerala High Court has moved to strengthen this intervention of the government, by refusing to intervene in matters where the DTC has been bypassed. The Court while rejecting an application for police protection, commented on the wide powers of DTCs to consider any public apprehension of the petitioners and also take *suo moto* cognizance of related matters (*Indus Towers Ltd. vs. The S.I. Of Police*, 2014, para. 22). This is an indirect acknowledgement that public apprehensions on health effects of radiation could be genuine and that it is precisely for this reason that the DTCs have been established to explore such representations on a case-by-case basis.

Interestingly, the full bench decision of the KHC in 2010 was quoted by Mr. Santosh Matthews, to argue that the law on this issue including the lack of evidence on the health effects of radiation was conclusively settled. Unabated litigation and establishment of DTCs belies this claim. The wide powers of the DTCs and indeed the recognition by the Court that DTCs are also empowered to consider representations based on apprehensions of public health and safety from radiation from CTs meant that essentially this issue was left open to be deliberated at the local level.

According to Mr. Babu Prathanaman, civic actions have been more sustained and pronounced in the rural areas in Kerala. One possible reason suggested by him was that in urban areas initial resistance to CTs fizzle out because people soon realize the High Court's stand in the matter. He showed me several whatsapp groups in which he had circulated excerpts from the 2010 Full Bench decision of the KHC, as a strategy to dissuade civic action.

He states,

> "in contrast to urban areas where there may be initial bursts of whatsapp activism, the rural areas we have to frequently ask for police deployment when erecting CTs. In most cases apprehensions are genuine. We have taken many steps like circulating reports that CTs are safe and have no adverse health impact. We have also hired lawyers on a retainership basis in many civil courts at the district level just to inform us when such cases are being filed, so that we can file immediate representations to be heard before any orders are passed against us. It is more difficult for us now (than in 2008 when the protests started) because there is much more awareness, we have to frequently ask for police protection because we face violence while erecting towers." (B. Prathanaman, Personal Communication, 13 March, 2019).

Kerala has witnessed hyper local civic actions against CTs that tap a range of institutional forums at the local level viz. panchayats, district civil courts and more frequently DTCs. Access to these forums at the local level has also ensured that multiple avenues are available to challenge and resist such installations.

DTCs were inaugurated as specialized forums to provide an accessible and non- adversarial platform to debate acceptable levels of radiation from CTs. Similarly, the jurisdiction

of Housing Cooperatives was expanded. Despite being established by the State, these are subpolitical as they operate largely outside the jurisdiction of state authorities. Admittedly that itself is not a guarantee for lay deliberation (Soneryd, 2007). However, their very existence indicates a grudging acceptance by the State that the development narrative is inadequate in assuaging public fears and therefore alternate forums are required to allow for greater public decision-making. This is a departure from the "individuation of risk paradigm" as characterized by Beck. These forums provide for public deliberation of risk in a decentralized manner. In effect this challenges the State hegemony over determination of the political object.

Conclusive Proof of Harm

My interaction with the regulator (DOT) involved speaking with two persons who were closely involved with public outreach to address health and safety concerns. One of the respondents from TRAI was dismissive of such resistance movements and termed the demand for regulatory intervention to address health and safety issues as "dichotomous demand" – in the sense that they wanted both mobile connectivity and also no siting of CTs in the vicinity. Suggesting that such demands were therefore unreasonable and is akin to Burgess's denoting of the public as irrational actors (Burgess, 2007a).

Public communication of risk, is an important aspect which many commentors have underlined as critical for social acceptance of technology and an important indicator of good governance(Bagla & Binoy, 2017; Cousin & Siegrist, 2010). Public outreach events were organized by TRAI in several cities wherein scientists were fielded to address public apprehensions and to convince the public of the benign nature of EMF radiation emanating from CTs. This was not an easy job to pull off. Risk perceptions may often reflect a general lack of trust in authorities and sometimes may also be rooted in a local context (Peretti-Watel & Vergélys, 2012). Perhaps intuiting this lack of public trust, TRAI roped in physicists in academic institutions to argue this point in the public (K. S. Parthasarathy, 2017). Nevertheless, studies suggest that the relationship between public communication of risk and acceptance of risk is rarely simple and uncomplicated. Communication does not necessarily translate into higher acceptance of risk specifically in cases of conflict over CT siting decisions (Wiedemann & Schutz, 2008).

Prof. Girish Kumar is one of the main protagonists. Kumar teaches and researches at the Department of Electrical Engineering in IIT Mumbai. In 2012, he published a report on electromagnetic radiation from CTs, which discussed the health impacts of such radiation based on secondary sources. His own research on antennas which emitted EMF radiation and the frequent use of mobile phones convinced him that recurrent and sustained exposure to such radiation has a negative impact on health. The report has since then been used extensively by researchers and petitioners to support their contentions on the harmful impacts of EMF radiation. Equally, it has drawn scathing criticism from TRAI, CT companies and other scientists as being unscientific and biased(K. Parthasarathy, 2012). Relying on such charges of bias to discredit Kumar was necessary given that unlike lay persons, he could not be easily dismissed as "irrational".

I would like to unpack this category of bias in such controversies. Kumar had an interesting response to this charge of bias (Indian Express, 2014). The charge of bias was based on the fact that soon after publishing this report, Kumar had incubated and then established a company with his daughter which fabricated and manufactured radiation shields. Prof. Kumar argued that the manufacturing of radiation shields was a direct outcome of his effort to find a solution – which he described as "his duty as an engineer is to find solution to a problem." he did not perceive this as a "conflict of interest" since engineers especially those at IITs often fabricate solutions at the laboratory level which are supported institutionally to be upscaled into manufacturing through incubation centers. – this is a model which is widespread in engineering teaching institutions like IITs.

According to him, this charge of bias was a result of powerful industry interests who wanted to delegitimize his arguments by undermine his standing as a professional scientist as they did not have an adequate response to his scientific arguments. As a member of the expert committee to explore the public health and safety of EMF radiation, established by the Allahabad High Court, he tried his best to convince his fellow members, failing which he refused to sign a "consensus report" suggesting that EMF radiation did not lead to health and safety risks. He even wrote letters addressing all individual judges of the Allahabad High Court providing scientific evidence. This act, of course also drew criticism from fellow members who likened it as an attempt to influence the judiciary.

I asked Kumar about the validity of this refrain of "lack of conclusive scientific evidence" of harm resulting from EMF radiation emitted from CTs. His response was,

> "see if they (scientists given funding to explore whether EMF radiation is harmful) will say that everything is conclusive then they will not get any more funding." (Prof. Girish Kumar, Personal Communication, 6 December, 2017)

Funding system for scientific research acts as a disincentive to providing conclusive findings of harm. I shared this response with Dr. Asad Rahmani, a member of the MOEF Committee to Study the effect of radiation from CTs on wildlife. He disagreed with Kumar's assessment and remarked that it was possible to generate conclusive proof through a scientific study if specific objectives were formulated and through identification of variables.

Nevertheless, Kumar's point remains valid and is therefore valuable, if we were to assess the various university level studies conducted by scientists that have shown proof of harm – if not conclusively – but through fairly robust studies published in peer reviewed journals (A. G. Gandhi & Singh, 2011; G. Gandhi & Anita, 2005; Kesari et al., 2018; Kesari & Behari, 2010, 2012; Sarkar et al., 2006).

Such studies have limited end points – and therefore the demand for conclusive proof of harm from such studies is a misplaced expectation. Academic studies are meant to trigger regulatory concern, which should in turn, galvanizes scientific investment towards generating evidence with very specific endpoints so as to become the basis for regulatory interventions. Such investments necessarily have to be borne by the State so as to negate allegations of bias.

It is instructive to point out at this stage, that many courts have rejected intervention in numerous public interest litigations challenging the safety standards on EMF radiation on the ground that there was no conclusive scientific proof of harm (*Reliance Infratel Limited vs. State Of Chhattisgarh And Ors*, 2017; *Manivannan vs. The District Collector*, 2002; *Pearl Green A cres Owners vs. Union of India (Ministry Of Telecom) Ors, 2012*; *Muktipark Co. Operative Society vs. Ahmedabad Municipal Corporation*, 2014). This argument has also been used repeatedly by the regulator as well as telecom companies to argue that current standards (brought in 2014) which are 1/10 of the limits prescribed by the ICNRIP is adequate. Interestingly, Munshi pointed out the current standards was itself not based on any scientific assessment of harm, and the courts should have arraigned the Ministry of Health and Family Welfare (MOHFW) instead of the Department of Telecom (DOT) as the ministry concerned in this regard.

Indeed, it was surprising, that courts have routinely relied on averments from the DOT on health safety issues rather than involve the MOHFW or the MOEF. Furthermore, given that precautionary principle is well recognized within Indian environmental law (Chowdhury & Sabhapandit, 2007), such casual dismissal of public interest litigations on environmental and health harm is inexplicable. Demand for conclusive proof itself goes beyond the balance of probabilities evidentiary burden that governs civil litigations and thus such expectations seem to be parroting the DOT's policy stance.

Kumar pointed to the huge amount of revenue which spectrum sale regenerated for the government, also made it an "interested party", and this was reflected in the stand of the DOT – the ministry in charge of promoting and developing telecom infrastructure – which may have also influenced its position on this issue of EMF radiation. Indeed, the regulatory failures of DOT drew harsh criticism from the 2014 Parliamentary Committee.

DOT's policy stance is an expression of the eminent place of technology in the development narrative. Evident from the discussion, this narrative is often influential enough to misrepresent public grievances as "irrational" and to even disallow procedural access to fair redressal of grievances by demanding "conclusive proof of harm" as an impossible bar for anybody challenging this narrative. Imbued in this narrative, Courts have largely functioned as gatekeepers of the State's hegemony over expertise to define, the acceptable levels of risk from CT radiation. Indeed, the structure of public interest litigation lends itself to the exercise of greater discretion by the Court which it often deploys to legitimize state action in the face of public challenges (Chowdhury, 2020).

Another interviewee who was associated with TRAI as a regulator, had conducted a study of cell phone usage (based on call data records (CDR)) across India based on data provided by telecom companies and had pushed for a more stringent standard agreed with this assessment. Indeed, he argued that the 2014 strengthening of standard was not contested by telecom companies because it was based on unimpeachable data of cell phone usage which were provided by telecom companies themselves. The WHO-IARC guideline presumes 150 h of mobile usage over the lifetime. In India, the CDR data gathered in 2012 showed that for the top 100,000 mobile phone users, the average exposure was 620hrs per year. Further this was a conservative estimate as it did not account for incoming calls nor EMF radiation emanating from CTs (Bhatnager, 2013). Studies have shown that actual emissions from CTs far outpaces the regulatory norms on emissions (Singh et al., 2019).

Most stories of activism were triggered by personal suffering. Kumar had been testing antennas in his laboratory for the past few years and he noticed his body temperature going up and swelling in his fingers and ears were warmer. After self-testing high levels of radiation was recorded. Interview of an ENT (Ear, Nose and Throat) specialist doctor was published in the newsletter launched by Kumar, where he reported increasing number of cases of partial hearing loss, ear tumors, recurrent head aches and sleeping orders primarily due to excessive use of mobile phones. A neurosurgery consultant in Breach Candy hospital (Mumbai) confirmed the effect of EMF radiation on biochemical life and has been suggesting the use of protective measures to his patients. Archiving of such experiences served as evidence of harm and was helpful for activists challenging the narrative of TRAI that EMF radiation was benign.

When I shared these perspectives with Mr. Rajan Matthews of COAI, his response was to underline that some are more hypersensitive and therefore such individuals should take necessary precautions. Regulatory standards though are meant to address the majority of the population and the ICNRIP establishes global standards and since India has adopted a much lower level (1/10) they are adequate because there was "no conclusive proof of harm". Prof. Amajyot Dhami agreed that the ICNRIP standard was globally recognized and accepted but underlined that the standard did not reflect the reality of long term and low

intensity exposure to EMF radiation given the higher levels of usage of mobile phones and the vicinity of CTs.

She contended that,

> "no conclusive evidence does not mean no evidence" (Amanjyot Dhami, Personal Communication, 21 November, 2018)

Thus, we need to independently evaluate health effects in slow and long-term exposure and make India specific guidelines. Given the actual scale of usage of mobile phones and that emissions from CTs far outpaces norms, the ICMR study currently underway is expected to address this lacuna.

It is evident, from the preceding discussion that the category of scientific evidence in such contexts is fiercely contested. Archiving of self-stories of harm by activists is a form of counternarrative which challenges the TRAI-DOT casual dismissal of such civic action as irrational. Funding structures of academic research may disincentivize the search for conclusive findings. It is incumbent on the State to provide stable public to generate scientific evidence. The ICMR long terms study id supposed to address this lacuna. When the executive agencies (like TRAI or DOT) or the Court demands conclusive proof of harm from activists, it is nothing more than a deliberate attempt to silence them.

Social Capital and Judicial Interventions

The Rajasthan High Court judgment in 2012 (*Justice I S Israni (Retd)Anr vs. U O I (Dep Of Teleco)Ors*, 2012) is an outstanding outlier and therefore worth exploring.

The Rajasthan High Court in 2012 upheld the bye laws of the State Government which required the removal of CTs from the vicinity of hospitals, schools and playgrounds. Further it directed that the local administration should decide on the installation of mobile towers in densely populated residential areas so as to safeguard health. It recommended that TERM cells should consider including public members as a confidence building exercise. Why was this decision such an outlier? I posed this question to a prominent advocate based in Jaipur who represented some of the petitioners in this case and also to a journalist who led the public campaign on safety issues related to CTs for Rajasthan Patrika (the largest circulated daily newspaper in Rajasthan).

The main petitioner in this case was a retired judge and the immediate provocation for the petition was the illegal erection of CTs outside the judges' colony – a residential block for judges in Jaipur. Bye laws regulating the erection of cell phone towers were already in the statute books, so the relief being demanded by petitioners was limited to the enforcement of rules. Most pertinently, during the pendency of the case, there was a public campaign launched by Rajasthan Patrika. All these factors taken together perhaps explains why the Rajasthan High Court felt compelled enough to take a contrarian position on this issue.

One of the main petitioners in the ongoing case in SC is a prominent businessman of Jaipur, whose brother and family pet (a dog) passed away due to cancer. The doctors who were treating his brother in the USA hinted that one of the reasons could have been radiation from CTs, since a couple of months before a CT had been erected in the plot next door to their residence and the beam was directly facing the room in which his brother lived.

This led the businessman to give interviews in local newspapers and speak with prominent physicians in the city. As a prominent figure and a local elite in Jaipur, his activism was also a reason for the local newspaper to launch a public campaign to address the issue of health safety issues due to radiation from CTs. The campaign was very successful as a human-interest story and was able to elicit public participation in terms of letters being written to the newspaper offices and residents pursuing local authorities in highlighting irregularities in the authorization for siting CTs in their neighborhoods.

The use of analogy both in the media campaign and in the litigation were quite interesting. It was based primarily on advocating a precautionary approach in the face of risk of irreversible damage to human health. While justifying the Rajasthan High Court's intervention and why the SC should uphold that decision, Kasliwal argued,

> "Supreme Court has previously in certain cases intervened to ensure that health is prioritized. To address air pollution, it ordered the entire public transport of Delhi to be run on CNG (Compressed Natural Gas) rather than diesel or petrol, even when the health effects of air pollution was not conclusive." (Sudhir Kasliwal, Personal Communication, 13 October, 2018).

Eight years have passed, since the Rajasthan High Court judgment, was challenged. The Supreme Court granted a stay on the decision of the HC, which essentially nullified its legal effect, while the matter continues as pending. Despite several attempts, the matter has not been listed for hearing in all these years. All the three interviewees in Jaipur were disappointed and felt that the Court's interventions have been largely arbitrary. Rajasthan High Court's intervention was triggered by the fact that it was Justice I.S. Israni, a retired judge was a prominent petitioner in this case and that particular incident occurred in the judge's colony. Although the illegal towers had been removed from that colony, in other areas developments were quickly rolled back once the judgment was stayed.

Access to social capital triggered litigation in the Rajasthan High Court and also explains why the judgement was an outlier. Interestingly, although social capital helped facilitate access, it however could not guarantee ultimate success, as it was undercut by the development narrative embraced by Courts.

Vasant Kunj, an upscale neighborhood in South Delhi has witnessed a number of civic actions against siting of CTs, led by the RWAs. I interviewed two RWA presidents and several residents. Both the presidents, had filed separate public interest litigations in the Delhi High Court against the siting of local towers. Local protests near the tower and in the site office of the Delhi Development Authority (DDA) – which owned and managed the community park, and had rented it out to the tower company which was installing the towers were held. Meetings with the local municipal councilor and also a number of RWA meetings with experts to gather knowledge on this issue, were all organized by the RWA.

On the question of litigation, both took the lawyer's advice that although there were a number of petitions on this issue from other RWAs pending with the Court, it was better to do a separate petition, since there were too many "vested and varied interests" and the health argument was not the primary argument made to support the prayer for cancellation of license. Instead, they highlighted the security aspect, given that CTs were in community parks and would require unknown maintenance staff to regularly access it, and this would pose a security threat to residents.

There are startling similarities between the urban resistance movements in Mumbai and Delhi. In Mumbai, I had met a resident who refused to join the omnibus petition on the health impacts of CTs which was ongoing in the Supreme Court as he felt that it would fail because Courts demanded "conclusive proof of harm" which petitioners did not have. He had instead decided to file an individual petition using his community's network to recruit a top lawyer in Delhi to represent him in the Supreme Court. He shared that he felt his problem was specific – siting of a multiple number of towers facing his residential apartment. It is similar to the RWAs in Vasant Kunj refusing to join together and coordinate the litigation on this issue.

Conclusion

Langdon Winner in his book *Autonomous Technology,* explores the ways in which the anonymity of large-scale technical systems allows it to escape from public attention although they play a fundamental role in shaping humans (Winner, 1978). Quite to the contrary, this study shows how technical control is not only negotiated through demands for incremental regulation, but sustained resistance to artifacts emblematic of such large-scale technical systems forces the State to cede its hegemony to authoritatively determine political objects – in this case what is *the acceptable level of radiation risk from CTs*.

I use the term "disaggregated publics" to denote the wide geographical and class spectrum that characterizes this movement. It also emphasizes their localized nature and consequently that such civic actions are informed by materialities and interests which are highly localized. Social elites in urban areas have chosen to approach the Court through PILs only to be rebuffed by a Court which is deeply taken in by the development narrative of the State. Legislature has shown greater responsiveness than Courts which have continued to frustrate such litigation by showing fidelity to risk discourses that privilege conclusive proof of harm as a prerequisite for taking cognizance.

Reliance on formal institutions have also been coupled with lack of solidarities amongst disaggregated publics. Perhaps this explains the elevated status of Munshi in Mumbai, whose role as an able supporter of different urban social groups have assumed importance. Extraordinary resilience and resourcefulness have been shown by local panchayats in Kerala and cooperative societies in Mumbai who have used their regulatory jurisdiction to initiate referendums on siting of CTs.

Civic actions by *disaggregated publics* have little in common with traditional social movements, given that they remain disparate due to lack of coordination between groups. Owing perhaps, to this very disparateness, such resistance movements resemble a many headed hydra where each head chooses a different form of engagement depending on the local specificities to counter a technological development and yet they are connected in body because there is a distant acknowledgement and learning between these social groups facilitated by media reporting and also in this case by specific personalities like Munshi.

Indeed, this is a form of subpolitics because it eschews formal political institutions and yet its aims and forms of representation is very much political. In this case the political object sought to be constituted was *the acceptable levels of risk emanating from CTs in their neighbourhood.* State institutions are forced, to negotiate back with these disaffected groups in providing concessions whether in the form of tightening of regulatory standards to more substantive yielding of regulatory jurisdiction to local bodies like the DTCs. Such disaggregated publics are able to have long term impacts on the polity by invigorating the polity in providing for renewed citizenship engagement on technological issues and technical artefacts which by their very definition as developmental public goods have been sought to be corralled from political decision-making.

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Note

1. See Response Given to Unstarred Question No. 3663, Answered on 25 July, 2019, by Ministry of Communications to the Question Asked by Member of Parliament, Mr. R. Vaithilingam, Rajya Sabha, Parliament of India. Retrieved from rajyasabha.nic.in on 20 April, 2020.

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