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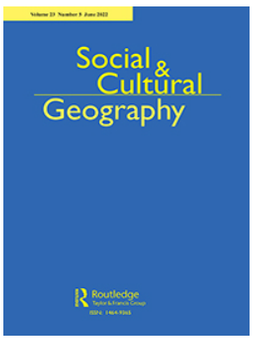

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Ankit Kumar

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Promises of a truth machine: deception and power in smart grids in India

Ankit Kumar

Department of Geography, The University of Sheffield, Sheffield, UK; School of Innovation Sciences, Eindhoven University of Technology, Eindhoven, Netherlands

ABSTRACT

Smartness in smart grids and cities is an assemblage of devices that produce data as truth claims and deploy new modes of governance focused on *chal* (deception, cunning) and *bal* (power) with a promise to reduce losses and maximise profits. Building on post-colonial geographies, the paper argues that *chal* (छल) and *bal* (बल) are central to understanding the deployment of smart grids in India. Managers use the idea of the practice of *chal* and *bal* by political citizen-subjects, and the disorder of governance this causes, to justify the deployment of smart infrastructure. However, the paper shows that smartness can be understood as automation, and deployment from a distance, of *chal* and *bal* by a capital-state nexus to counter the *chaliya* (छलिया) (deceptive/cunning/cheat/trickster) citizen-subjects. Planners and implementers expect data and digitalisation to bring order by (re)training and excluding lower-level workers and consumers. These promise to reduce resource losses, making electricity utilities profitable. Rather than being distinctly corporate or clearly in the domain of the state, smart is situated at the fracture of public and private resources, and political and civil spaces. By developing a postcolonial analysis of smart grids and focusing on the 'inbetweeners', electricity utility staff and middle-class citizen-subjects, the paper furthers the understanding of smartness and subalternity of elites.

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MOTS CLEFS
Réseaux intelligents; théorie postcoloniale; électricité; détecteur de mensonges; subalterne; Inde

Promesas de una máquina de la verdad: engaño y poder en las redes de suministro inteligentes en India

RESUMEN

La inteligencia en las redes de suministro y ciudades inteligentes es un conjunto de dispositivos que producen datos como afirmaciones de verdad y despliegan nuevos modos de gobernanza centrados en *chal* (engaño, astucia) y *bal* (poder) con la promesa de reducir las pérdidas y maximizar las ganancias. Con base en las geografías poscoloniales, el artículo argumenta que *chal* (छल) y *bal* (बल) son fundamentales para comprender el despliegue de redes de suministro inteligentes en la India. Los gerentes utilizan la

CONTACT Ankit Kumar ankit.kumar@sheffield.ac.uk Department of Geography, The University of Sheffield, Winter Street, Sheffield S3 7ND

idea de la práctica de *chal* and *bal* por parte de los ciudadanos-sujetos políticos, y el desorden de gobernanza que esto provoca, para justificar el despliegue de infraestructura inteligente. Sin embargo, el artículo muestra que la inteligencia puede entenderse como la automatización y el despliegue a distancia de *chal* y *bal* por parte de un nexo capital-estado para contrarrestar a los ciudadanos-sujetos *chaliya* (छलिया) (engañoso/astuto/tramposo/estafador). Los planificadores e implementadores esperan que los datos y la digitalización pongan orden al (re)capacitar y excluir a los trabajadores y consumidores de nivel inferior.

Estos prometen reducir las pérdidas de recursos, haciendo que las empresas de servicios públicos de electricidad sean rentables. En lugar de ser distintivamente corporativos o claramente del dominio del estado, lo inteligente se sitúa en la fractura de los recursos públicos y privados, y los espacios políticos y civiles. Mediante el desarrollo de un análisis poscolonial de las redes de suministro inteligentes y centrándose en los "intermediarios", el personal de las empresas de servicios públicos de electricidad y los ciudadanos-sujetos de clase media, el artículo promueve la comprensión de la inteligencia y la subalternidad de las élites.

Les promesses d'un détecteur de mensonges : la tromperie et le pouvoir des réseaux intelligents en Inde

RÉSUMÉ

L'intelligence dans les réseaux « intelligents » et les villes est un assemblage de dispositifs qui produisent des données censées être véridiques et déploient de nouveaux modes de gouvernance centrés sur le *chal* (la tromperie, la ruse) et le *bal* (le pouvoir) avec la promesse d'une réduction des pertes et d'une maximisation des profits. En s'appuyant sur la géographie postcoloniale, cet article soutient que le *chal* (छल) et le *bal* (बल) sont essentiels pour comprendre le déploiement des réseaux intelligents en Inde. Les dirigeants se servent du concept des pratiques de *chal* et de *bal* par les sujets-citoyens politiques, et du désordre qu'elles créent dans la gouvernance, pour justifier le déploiement d'infrastructures intelligentes. Cependant, cet article démontre qu'on peut comprendre l'intelligence en tant qu'automatisation, et déploiement à distance, du *chal* et du *bal* par un nexus état-capitale afin de contrer les sujets-citoyens *chaliya* (छलिया) (trompeurs/rusés/tricheurs/filous). Les responsables de la planification et de la mise en œuvre espèrent que les données et la numérisation vont mettre de l'ordre en (re-)formant et excluant les salariés et les consommateurs subalternes. Cela promet de réduire les pertes et ainsi rentabiliser les compagnies de distribution d'électricité. Plutôt qu'en étant nettement du monde des affaires ou clairement du domaine étatique, l'intelligence se situe à la délimitation des ressources publiques et privées, et des espaces politiques et civiques. En procédant à une étude postcoloniale des réseaux intelligents et se focalisant sur les « intermédiaires » le personnel des compagnies de distribution d'électricité et les sujets-citoyens de classe moyenne, l'article fait progresser les connaissances sur l'intelligence et la nature subalterne des élites.

Introduction

> Power loss, in other words, theft, is a big issue here. This is specific to India and not faced in the western context. When it comes to meters, tampering is an issue here – *chal* (deception, cunning), *bal* (power, influence) [are used]. Now we can have online, real-time monitoring of the electricity data. The objectives are not directly that of smart grid – compared to the Western context where this is more about demand management and renewable energy integration – [for us it is] more about data, monitoring.
>
> Abhay Sahni, Mid-level Manager, National Smart Grids Mission (NSGM)

Mr Sahni's distrust towards the political Indian electricity users who deploy *chal* (छल) and *bal* (बल), in comparison to their presumably civil 'Western' counterparts is telling. This paper argues that this question of cunning/deception and power is at the heart of the smart grids deployments in India. It shows that smartness is automation, and deployment from a distance, of *chal* and *bal* by a capital-state nexus to counter the *chaliya* (छलिया) (deceptive/cunning/cheat/trickster) citizen-subjects, whether consumers or subaltern staff of electricity utilities. Rather than being distinctly corporate or clearly in the domain of the state, 'smart' here is situated at the fracture of public and private, and political and civil. It is an attempt to shift public goods to private commodities and political spaces to civil.

Many electricity grids and cities around the world *claim* to be smart or to be in the process of becoming smart. These are *claims* because what exactly is smart and how one can conclusively say if a grid or city is smart is unclear. Ayona Datta's (2015a) analysis that many eco, entrepreneurial and finance-technology cities rebrand themselves as smart makes clear the absence of a concrete socio-political definition of 'smart'. Luque-Ayala et al. (2016) explain that smartness is broadly, normatively, and most importantly, in a self-justificatory way, understood as a solution to a plethora of systemic problems, from maintaining circulation and managing resources to climate change and lack of participation. It is this fluid terrain of smartness that cities, grids, governments and consultants take advantage of, to brand themselves, compete, and forge alignments with each other (Ayona Datta, 2015b, 2015a; Watson, 2015). This fluid terrain also makes smartness challenging to grasp and critique (Watson, 2015). Although the physical, spatial and socio-political manifestations of smartness are vague (Wiig, 2015), what is known is that in the domain of technological interventions smartness flags a digitalisation of infrastructures and spaces (G. Rose, 2017).

This paper asks: how do smart grids, working as truth machines, deploy new modes of governance in an attempt to make civil(ised) the political subaltern citizen-subjects and make electricity grids profitable? It sees a truth machine as a socio-material assemblage that promises omniscience to planners and managers, elimination of inefficiencies and corruptions of political subaltern citizens, and automation of civil(ised) conducts. It is a machine that promises to separate truth from lies, objectively and without bias; a machine that demands trust from all. In its material incarnation as smartness, the truth machine is deployed as an assemblage of devices that produce data as truth claims and deploy new modes of governance focused on *chal* (deception, cunning) and *bal* (power) with a promise to reduce losses and maximise profits. The data promises managers better governance. Better governance reduces losses and increases profits to make grids and cities better financial objects. Smartness then, at its core, is a political intervention that claims financial benefits and governmental efficiency, and transparency and equity; both problematic neoliberal motives (Datta, 2018; Luque-Ayala et al., 2016).

This paper engages with socio-spatial interventions like distributed sensing to collect data and centralise functions through smart meters, a smart grid control room, and mobile technologies for electricity bill checking and payments that afford automation and acting from a distance. The interventions discussed in this paper, as McFarlane et al. (2016, p. 185) remind us, take smartness from its vague terrain to specific interventions that are 'connected to existing place-based or organisation-based logics, ideologies and debates'. Most work on smart grids emerges from western countries and focuses largely on issues of demand management, i.e., grid stability vs customer behaviour, and sustainability. These are exemplified by the tensions between environmental and social goals in Australia (Lovell, 2018), questions of flexible consumption and control in Denmark and Australia (Chandrashekeran, 2020; Hansen & Hauge, 2017; Nyborg & Ropke, 2013), and solar integration and energy practices in the UK (Bulkeley et al., 2016). The specific interventions analysed in this paper promise to address problems of *chal* and *bal* that electricity grid managers and policymakers identify in India. In addition to the consumers who informally use electricity and do not pay bills (electricity theft), smart grids are being deployed in India to 'manage' the behaviour of electricity utilities' subaltern employees, who due to their corrupt practices (collusion with customers, rent-seeking) are thought to cause monetary losses to the utility.

Postcolonial geographies work on civility expected by the state and the subaltern politics of citizen-subjects help illustrate how the posturing around ideas of cunning/deception and exercise of power – *chal* and *bal* – are important to the question of smartness in India. Postcolonial geographies have long interrogated the questions of elites vs subalterns[1] (Jazeel, 2014). This paper puts specific focus on the 'inbetweeners', subaltern employees of electricity utilities and middle-class citizen-subjects in India. Here it contributes to a smaller postcolonial geographies literature on the 'subalternity of the elite' (Legg, 2010, p. 70, citing Chakrabarty, 1992). The paper empirically traces the planning and deployment of a smart grid pilot project in Panipat city in the state of Haryana. It follows the perspectives of Indian policymakers, planners, implementers, and grid managers to investigate what they intend to achieve by deploying smart technologies, and how.

The next section builds on postcolonial studies to provide a conceptual background for this paper. Following this, the paper explicates the methodology and provides the case study description. This is followed by the empirical data which explains the motives and modalities of the truth machine. Finally, the conclusions elucidate the main contributions of this paper.

Between order and disorder: a postcolonial politics of public and private

Postcolonial literature on waste develops a useful understanding of public and private in India (Chakrabarty, 1992; Kaviraj, 1997). Public, according to Kaviraj (1997), has very different understandings for middle-class citizens and poorer Indians. The middle classes see 'public' as that which everyone has equal rights over and equal responsibility for. Kaviraj (1997) provides an example of public parks used for recreation by the middle-class bourgeois in post-colonial Calcutta. To be used in particular ways, ways that afforded first rights to the middle classes, these parks were anything but public. Everyone else coming to the parks (e.g., vendors, gardeners) was to support the middle classes' right to use. This

idea of public, then, is 'restrictive rather than inclusive' (Ghertner, 2012, p. 1170). For poorer people, public means that which is not private, something they cannot be excluded from. Many sleep, live and build livelihoods in public spaces like parks and sidewalks. This has changed the public spaces throwing them into what the middle-class bourgeois, many of them part of governance assemblages, think of as disorder (Kaviraj, 1997), or what Ghertner (2012) terms as nuisance. This has pushed the middle classes, who have less resistance to disorder, out of such public spaces, and made the claims of the poorer stronger. However, the middle-class continues to romanticise 'the beauty of the early postcolonial city and the ugliness of the contemporary city, substituting negative postcolonial associations of the city with dystopic "filth", "disorder" and "decay" (Kaviraj, 1997) with an image of sanitation and order, symbolised through the daily ritual of manual street cleaning and street lighting' (Lahiri, 2011, p. 861). On the other hand, such 'nuisance talk', Ghertner (2012, p. 1163) argues, has also brought 'codes of civility once restricted to the home and neighborhood into the core of public life'.

The omnipresence of a politics of disorder in the everyday life and the middle-class desire for civility manifest as two forms of mediation between the state and the citizens: civil society and political society (see, also, Ghertner, 2012). Civil society is a bridge with the nation-state based on western ideals of 'popular sovereignty and granting of equal rights to citizens' (Chatterjee, 2004, p. 37). Political society leverages the government's focus on security and welfare to develop a particular '*political* relationship with the state' (Chatterjee, 2004, pp. 37–38). While members of civil society, often seen as 'responsible citizens', participate in the formal governance process outlined by the state, political society uses various means, like non-cooperation, adopted from the anticolonial independence movement. Negotiations and bartering between the state and subaltern sections of the society take place in this space (Legg, 2006). Chatterjee (2004) also reminds us that these two categorisations are not always exclusive. Members of civil society can enter the realms of the political to negotiate with the state.

There is a problem, however. Chatterjee (2004) explains that increasing governmentalisation has meant that the state gains legitimacy through 'taking care' of the population rather than the citizens' participation in state matters. Therefore, rather than 'deliberative openness', the focus is on 'costs and benefits', maintained by a surveillance assemblage to collect information and conduct conducts (Chatterjee, 2004, p. 34). The result is that governance has become a business of experts rather than political representatives; a technocratic depoliticised exercise (Chatterjee, 2004). For such technocratic depoliticised governance civil society is synonymous with *order* and political society with *disorder*. For such governance to succeed, the political needs to be made civil(ised). Therefore, much of the governmental machinery in India still focuses on educating and steering the subaltern to transform her 'into the citizen' (Chakrabarty, 2008, p. 10). Specific forms of knowledge and truth claims are crucial to these forms of education and steering.

Data and truth

From the perspective of colonial and post-colonial governmentality, the relationship between data and truth has two interlinked facets. On the one hand, data are justificatory – justifying particular truth claims –, and on the other, disciplinary – conducting conduct based on these truth claims (Appadurai, 1996). Justification of particular truth

claims establishes ideal and non-ideal conducts and the rules of the game. Conversely, rules of the game impose which truth claims are justified. As an example, Guha (2003) points out that enumeration in pre-colonial, colonial and post-colonial India helped in the solidification of identities, while delineation of identity itself was a prerequisite for enumeration. Following on from this, the relationship between data and truth hinges on the fact that data are both, a part of truth claims and a producer of truth claims (Kitchin, 2014).

Surveillance and enumeration techniques like the census, and their results in the form of data, statistics and reports afford governance in two ways (Appadurai, 1996; Chatterjee, 1997, 2004). First, they give experts a sense of knowing the truth about the population and support their 'will to govern'. Second, they help depoliticise and place experts in the rational rather than the political domain. These together help establish the knowledge of experts as legitimate and unbiased, in other words, objective.

Chatterjee (1997, p. 218) explains that a failure of development planning happens not because experts do not know the objects of planning, instead because the objects have not been 'explicitly specified as objects of planning'. To achieve this, experts establish 'objects of planning as objects of knowledge' (Chatterjee, 1997, p. 218). Driven by this importance of knowing, enumeration techniques have become central to 'modern governmentality' (Appadurai, 2013, p. 166). Data and statistics, the result of such measurement techniques, create 'simplified approximations' and help experts 'see' human activities of interest (Scott, 1998, p. 76). These simplification techniques help grasp 'a large and complex reality' by reducing it to schematic categories (Scott, 1998, pp. 76–77) and data give experts an 'illusion of bureaucratic control' (Appadurai, 1996, p. 117).

In a smart grid, data, and the knowledge it produces foster education and 'desirable' conduct among citizen-subjects and gives an illusion of control to the experts. As the empirical material will show, this is aimed towards transforming the *chaliya* political subaltern into a civil citizen-subject that acts rationally. Backed by 'objective' data legitimate and unbiased technocratic depoliticised exercise governance is enacted but through new forms of *chal* and *bal*.

Methodology and case study

This paper is based on qualitative research conducted from September to November 2017 on a smart grid pilot project in Panipat city in the north Indian state of Haryana. Panipat Smart Grid Pilot Project is part of India's central electricity grid in the Panipat city in the northern state of Haryana. Panipat city has 31,623 electricity consumers, out of which about 73% are domestic. Uttar Haryana Bidyut Vitran Nigam Limited (UHBVN), the regional electricity utility struggles with Aggregated Technical and Commercial (AT&C) losses (including electricity thefts) of 23.15% and a billing efficiency (bill generation vs electricity supplied[2]) of 77.35%.

Panipat Smart Grid project is one of the 14 pilot projects approved under the National Smart Grid Mission (NSGM) by the Government of India (Datta et al., 2014). The Government of Japan's New Energy and Industrial Technology Development Organisation (NADO) has funded the project. The Energy and Resources Institute (TERI) has designed the project. UHBVN is responsible for implementation and is the ultimate owner of the smart grid. Fuji Electric Company Limited, a Japanese company, provides

technical support for the project. Based on the technology developed by Fuji Electric, an Indian company, Lotus Wireless, provides smart meters and a smart grid control room. The chief minister of Haryana inaugurated the smart grid pilot project on 25 January 2018.

The project involves the following technical interventions[3]:

- Installation of about 11,000 smart meters in homes and shops in Panipat city.
- A Supervisory Control and Data Acquisition (SCADA) system and Meter Data Management System (MDMS) that collects, manages and visualises the data from meters and sensors in the smart grid control room.
- An Outage Management System (OMS) that involves the installation of sensors in the distribution lines to identify the exact locations of faults swiftly.
- A smart grid control room and a training facility for developing local capabilities.
- Several non-ICT features like upgrading to more protected distribution wires, moving consumers' electricity meters out of their homes into public view and upgrading distribution transformer capacity.

I carried out semi-structured interviews with 15 households and shopkeepers in two Panipat neighbourhoods – Old Housing Board Colony and Paramhans Kutiya – and four elite interviews with project designers, managers, and funders of this smart grid project in Panipat and Delhi. During this time, I recorded observations about the city, its electricity infrastructure, and homes and shops. I also collected data from several reports and presentations from NEDO, TERI, NSGM and the provincial electricity regulatory commission, in addition to articles from local newspapers about Panipat city, its electricity infrastructure and the smart grid project.

These different methods provided a range of data for a more comprehensive understanding of smartness. The interview transcripts, data from document analysis, and photographs were coded using NVivo to extract themes and develop the analysis following a grounded theory approach. For all the interviewees, I use pseudonyms to provide anonymity.

Old Housing Board Colony, with its planned nature, wide roads, neatly organised plots and *pucca* homes was inhabited by what could be considered as middle-class families. Most people interviewed had government jobs, had retired after working as government employees or owned small businesses. Paramhans Kutiya consisted of smaller plots, narrow alleyways, smaller family homes. Here people interviewed also had government jobs and small businesses. Most of these families were also middle-class (in the Indian context), although with more modest incomes than those from Old Housing Board Colony. The participation of these middle-class citizens helps understand how the 'civilising mission' that is understood to radiate outwards from the state and [urban] middle classes (Coleman, 2016) towards subaltern citizens, folds many from the middle classes into its target through interventions like smart grids.

A machine that makes financial and governmental sense

Primarily provided by the state through public utilities in post-colonial India, electricity was a public good. Although, the Indian state saw electricity as a 'universalising agent', it was far from universalising (Kale, 2014, p. 26). Between independence and the 1980s, the

state expanded India's national grid to provide wider access to electricity. However, in an effort to make electricity more accessible, invigorate rural development, and capture farmer vote banks, many provincial governments kept low tariffs, with some providing electricity for free (Balls & Fischer, 2019; Dubas & Rajan, 2001; Dubash, 2007). This resulted in the costs of running and maintaining the electricity grid outstripping the revenues (Dubash et al., 2018). There were two outcomes of this initial round of electrification. First, it was clear that electricity was for particular purposes (initially for irrigation and industrialisation) and particular people (landowners and industrialists). Many, without formal access to electricity, made claims on it, as they did on Calcutta's public parks. Informal tapping of electricity and theft, an exercise of *chal*, became everyday ways of claiming this public resource. Second, the public nature of electricity was enmeshed in 'political and electoral considerations' (Kale, 2014, p. 52). While political parties dangled the carrot of free electricity, poorer people in rural and urban centres in an exercise of *bal*, started organising as political society and negotiating with the state and public utilities (Chatterjee, 2004).

At the same time, electricity utilities became rife with corruption that was 'difficult to measure' (Kale, 2014, p. 53). They amassed major losses that could not be attributed to specific sources. A combination of informal access, crumbling infrastructure, and corruption in electricity utilities resulted in low quality electricity supply (Dubash, 2007). This depreciation of electricity infrastructure and supply meant that the middle-class bourgeois could no longer depend on the public electricity provision and started relying on private generators and pump sets.

Corruption, data unavailability and degradation of infrastructure pushed privatisation in the sector. The Government of India introduced new actors to the electricity sector that helped particular areas of infrastructure and generation but failed to fix the problems of corruption, theft and losses (Dubash et al., 2018). Further privatisation of the sector was understood as the way out.

Gupta (2018, pp. 62–63) notes, 'investments in infrastructure always involve calculations about the future, and because infrastructures are usually public goods, the calculation of return is often uncertain'. Sitting at the state-capital nexus, electricity now inhabits a semi-private realm in India. The move from public to private needs a move from uncertain to certain financial returns. Transparency and accountability afford this move.

> Advanced Metering Infrastructure [AMI/Smart Meters] is a major push in smart grids in India. The resources spent now on billing, reading etc. will be avoided. In Manipur, all pre-paid meters have been installed. This had made revenue collection easy. Losses from theft will be reduced. Demand response measures will be rolled out. Due to the data available from smart meters, energy audits will be more robust. Any losses are [currently] put on rural and agricultural consumers, and accounts are not properly managed. So ultimately, there will be transparency – "data *to aaye pehle*" (let the data come first)!
>
> [. . .]
>
> The aim is to create a strong and sustainable utility.
>
> Abhay Sahni, NSGM (paraphrased)

A[4]: so, if I understand it correctly, problems that utilities face are the focus of the smart grid here.

RB: Ya! I think that should be for every smart grid project. Ultimately, the utility has to see the benefits. Because there should be economics or viability of the investment. Because ultimately the utility is going to make the investment.

RB: So, of course, the priority will be to reduce the AT&C losses, and the losses will be minimised, and it will give you the payback you can say.

Rupesh Bishnoi, Fellow at a major research and consultancy organisation,
Panipat Smart Grid Designer

India's Electricity Act 2003 opened up privatisation and marketisation of electricity unlocking the path for electricity as 'a commodity rather than a social good that the state is obliged to provide its citizens' (Kale, 2014, p. 59). As of 2016 42% of India's electricity generating capacity was privately owned (Dubash et al., 2018). This privatisation of generation seeped into electricity supply and distribution through restructuring schemes like Accelerated Power Development and Reform Programme [APDRP] in 2001, Restructured-APDRP (R-APDRP) in 2008 and Ujwal Discom Assurance Yojana in 2015. These interventions aim to 'improve the operational and financial efficiency of distribution utilities' (Dubash et al., 2018, p. 9).

Smartness is the next crucial infrastructure intervention for actors that aim to govern – policymakers and managers responsible for managing utilities, and utility managers responsible for managing electricity supply and demand. The two quotes above express that experts believe in the promise of governmental efficiency and financial profitability that smartness would bring to the electricity sector. Mr Sahni points out that smart grids will solve three main problems of electricity utility management. First, the resources spent on billing. For billing, electricity utility staff visit individual consumers and note their meter readings or capture them through electronic handheld devices. They feed the readings into a computer, print and post the bills to individual customers, and finally collect payments. The smart grid will automate a large part of this process and reduce the number of staff needed. Planners and managers expect that with fewer employees on their payrolls, the utilities will save money spent on salaries.

Second, corruption, which emanates at two levels, has made electricity utilities financially weak. The next section explains how the managers envisage smart grids preventing corruption among lower-level staff. Corruption is also at the level of utility management. As Mr Sahni points out, utilities often have poorly managed accounts, and a lack of data impedes the identification of the sources of losses (see, Dubas & Rajan, 2001; Dubash et al., 2018). Accurate data from the smart grid will help identify losses accurately.

Third, utilities incur losses due to electricity overuse and theft by consumers.[5] The smart grid promises to eliminate thefts by (re)training, identification, and exclusion of deviant consumers. Besides, it 'regulates' utility staff complicit in thefts. Exclusion of political, corruptible, and deviant consumers and the inclusion of neutral and truthful machines are central to this.

As electricity becomes a private commodity, saving and generating money through a smart grid becomes critical. For Mr Sahni, smartness makes the grids *better financial objects*, i.e., more governable, and more profitable. Moreover, this, as Mr Bishnoi points out, makes smart grids themselves *better objects of finance*, i.e., better investments. How do smart grids promise to achieve these three aims of reducing billing expenses, eliminating corruption and bringing accountability, and excluding deviant customers? By conducting their conduct, and countering *chal* and *bal*, smart grids (re)train lower-level staff and citizen-subjects to become civil(ised) rather than political and attempt to turn disorder into order.

Ordering lower-level staff

Through smart meters and sensors embedded in the electricity network, Panipat smart grid will continuously collect and monitor data on electricity usage and network status. It will upload data to a data centre in the smart grid control room in Panipat and a disaster management centre in Hisar. Chatterjee (1997, p. 281) suggests that experts need omniscience for faultless planning. Vast and continuous data is necessary for such omniscience. Appadurai (1996) finds that in colonial India, data was more important for rhetorical purposes because the vastness of data made their referential use impossible. Digitalisation promises to make the 'increased volume, variety, velocity, veracity' of data manageable (Amoore & Piotukh, 2015, p. 342), and open up its referential use, in addition to the rhetorical. They promise to extend observation and analysis beyond human limits (Amoore & Raley, 2017, p. 4). The referential is a crucial advantage as the machine can produce and use big data to provide small answers – objective truths, steps, and judgements for policy and practice. Eliminating human mediation in its automated collection and processing, uploading data to a common data centre, and sharing it with all actors, establishes this one shared source as *the single truth* (Marvin & Luque-Ayala, 2017, p. 97). Infused with this idea of truth, smart grids, through their networks of sensors and devices, create the *illusion of omniscience* through which experts can completely and faultlessly know and thoroughly and faultlessly plan for objects of electricity delivery. Continuous access to this kind of data, analysis and visualisation through line diagrams and tables on websites and mobile device application (app) dashboards gives policymakers and managers perception of omniscience – an ability to see all and exercise control from a distance. By making their actions visible and reducing their autonomy, the smart grid promises to control lower-level staff.

This digitalisation of infrastructure falls in line with the unbundling of electricity utilities carried out in the two preceding decades which aimed to run distribution utilities like private companies with a clear accounting of profits and losses, even if most of these were state-run monopolies (Joseph, 2010; Kale, 2004). As more 'reforms' were introduced in recent years, increasingly, the work of electricity distribution has been outsourced to fully private companies. UHBVN outsources billing to a private company but like most electricity utilities in India bill generation and revenue collection (billing) is currently done by humans. There is a problem, however. People who were earlier part of public electricity regimes are now responsible for order in a semi-public/semi-private space. They have inertia in their work, one affected by the idea of electricity as a public good. Surveilling, educating and disciplining them is essential, but challenging.

> The smart meters will make consumption readings more accurate. Now readings will be automatically registered in the system and bills can be directly produced at the control room. Earlier there was also corruption by meter reading staff. They sometimes collude with customers to provide lower meter readings to the utility. Now through automated meter readings, this corruption can be prevented.
>
> Bhushan, UHBVN Sub Divisional Officer and smart grid project manager (paraphrased)

As Mr Bhushan explains, the private company staff occasionally collude with customers to reduce bills in exchange for bribes. This corruption talk indicates towards the *chal* that the subaltern staff of the utility embody, either alone or in collusion with consumers. Local newspaper reports mention multiple instances of electricity bill alteration and bribe-taking by UHBVN's lower-level staff[6] (Dainik Jagran, 28/09/2017). Mr Bishnoi, a designer of Panipat Smart Grid, describes the avenues of corruption through data manipulation in the current billing process.

> [Meter reading] will go into the computer in the substation. They will connect the device manually and upload the data. Now, if they manipulate the data, then you are done.

[. . . .]

> I have told you the possibilities [of corruption] because there is after all *human intervention*. When you are copying the file, the cell can separate, or the file can get corrupt. This cell can go into that column. So, a *human error* is possible. But in this [smart grid], nothing will happen. You enter the customer number, and the bill will print. You will have a monthly date that on 30th you will get the bill. You will keep getting it automatically. You will not even need to press a button. Everything will be programmed.

The smart grid will limit the corruption of lower-level staff by automating the billing process and limiting their control, lower-level staff will have no role in collecting and managing the data. By removing 'human intervention', the smart grid promises to remove not only corruption but also errors that mar the current process. For UHBVN bills, the private company staff go house-to-house, note meter readings, and feed them on a computer in the head office. They make mistakes while noting meter readings[7] and feeding them to the computers. Because of such mistakes, electricity users suspect billing inaccuracy and occasionally refuse to pay. One local smart grid project manager explains:

> At the moment, people also suspect billing accuracy. There is a manual reading of bills. This sometimes leads to huge bills for customers. And people sometimes refuse to pay bills. Now people can check bills every day on a mobile app. They can also pay bills and lodge complaints on this app.
>
> Rupesh Karnik, project manager in-charge for smart grid installation, Panipat (paraphrased)

Indeed, some customers agreed with the billing problem.

A: Sometimes people get incorrect bills?
Yes! Many! Many!

> Sometimes the glass of the meter becomes translucent and creates inconvenience in meter reading. Sometimes there are problems with the computer too. People who prepare the bills, sometimes they are the problem. People end up getting very high bills. Some people get zero bills.

Vimal Rathi, young male, shop owner, Old Housing Board Colony

The problem of inaccurate electricity bills regularly features in the local news.[8] People who get very high bills resist payments, and those who get zero bills do not pay. Whether it is corruption or errors, ultimately the utility loses money. Smart systems remove these human mediations. As Mr Bhushan explains, the smart meters will automatically record electricity consumptions and send them to the control centre to automatically generate bills. Customers will receive bills through emails and SMS (and paper copies if needed) and pay digitally through UHBVN website or mobile phone app. Even if humans mediate bill collections, the automatic generation of the 'true' bills will deter utility staff from corruption and mistakes in bill collection. In a fashion similar to colonial officials' trust in numbers (Appadurai, 1996), managers and policymakers expect that the data that the smart grid generates, and its acceptance as 'one truth' will help arrest the *chal* of the lower-level officials and discipline them. Here managers can match the bill amounts collected by staff with the numbers generated by the machine to determine their veracity. This exercise of *bal* establishes order and makes governance smoother.

Ordering the rhythms of people's everyday life

Panipat smart grid promises user participation by enabling electricity consumers to visualise and monitor their data through websites or mobile phone apps. Customers can also get periodic electricity use information through SMS and emails. The ability to monitor usage data will give customers greater awareness of the outcomes of their energy choices. With this, utility managers hope to instil 'self-conduct' within the customers – self-governance through which one attempts to change oneself (Foucault, 1994). Mr Sahni of NSGM explains:

> [we want to] . . . . give choice to consumers through future measures like time of use tariffs and smart meters through which they can visualise their energy consumptions, especially in the form of money. When consumers see electricity in the form of money spent, they will become more responsive.

This is indeed something that electricity consumers in Panipat agree with.

> We will know how much we are using; [that] this much bill will come. Taking that into account we will use less or more. Carelessness will be done away with.
>
> Ramraj Ahlawat, Elderly retired male, Old Housing Board Colony

> [We will know] How many Rupees worth of electricity we have already consumed. That could benefit people, as they would know how much money they have already spent. If we reduce the load on something, we could save some money.
>
> Rajesh Parashar, young male, Electrician, Paramhans Kutiya

The knowledge that the truth machine generates works to synchronise the everyday rhythms of people and the electricity grid in such a way that it becomes essential for people to modify their everyday life to match that of the electricity grid. This is important for utilities because often during particular hours of the day, known as peak hours, electricity consumption ends up exceeding generation. This results in power cuts and

losses to utilities. Electricity utilities raise prices in these hours to discourage use.[9] While inaugurating the smart grid in early 2018, the chief minister of the province explained that the utility would reward users with lower tariffs between 10 pm and 5 am (CM's inauguration speech). Over a period, the utility aims to 'train' people to use electricity outside the peak hours, thus flattening demand, and matching supply. Such 'training' is important to transform the 'irrational subaltern' to the educated rational who is 'more amenable to government' (Legg, 2006, p. 714).

By sharing data with customers and implementing time of day tariffs, the smart grid conflates the profits and losses of the electricity grid and the individual customers. This attempt to align citizen interests with state-corporate interests (Datta, 2018), facilitates a calculative way of acting and intervening. It 'secures' people biopolitically as customers who are free to act as they like, but this freedom is contingent on 'the principles of economy' (Dillon, 2015, pp. 47–48). The utility managers expect that driven by monetary considerations, the consumers will behave 'rationally'. The synchronisation between the rhythms of the consumers' and the electricity grid's everyday life will result in a match between electricity production and consumption. If the utility can match generation with demand, it can optimise its profits.

Identifying and excluding deviant customers

While managers hope people will behave 'rationally', electricity continues to be political, and people continue to make claims in this semi-public/semi-private space. The electricity grid in a city like Panipat is expansive. Such spread makes surveillance, identification, and exclusion difficult and expensive. Smart grid with its network of sensors and claim of omniscience promises to identify and exclude deviant consumers. This adds to the promise of smoother governance and financial benefits. Panipat smart grid can automatically disconnect a consumer exceeding her 'ideal' electricity use limits. This is *technically possible* through the smart meters, but as it stands, the electricity regulations do not permit such exclusions. UHBVN has filed a petition to Haryana Electricity Regulatory Commission[10] to amend policies and make remote disconnection *politically possible* (HERC, 2014; UHBVN, n.d.)

In the opening quote for this article, Mr Sahni's expresses his distrust of political Indian electricity consumers who deploy *chal* and *bal*, in comparison to their presumably civil 'Western'. Jack et al. (2020, p. 4) explain that a growing middle-class in India has meant that the narrow ideas of 'civility and public behaviour' embedded within the middle classes have come to define a specific view of citizenship. While most often this 'civilising mission' radiates outwards from the state and [urban] middle classes (Coleman, 2016) towards subaltern citizens, interventions like smart grids, as evident in Mr Sahni's explanation, fold the middle classes into the targets for this mission.

Utility managers and policymakers explain that electricity theft (included in AT&C losses) causes significant monetary losses to Indian utilities. In Panipat, the current AT&C losses are about 23%, and the smart grid project aims to bring this down to 10%, and subsequently to a single figure. Electricity overuse and meter tampering to hide such overuse are major contributors. UHBVN conducts regular 'raids' to identify, prevent and penalise tampering and theft.[11] A local newspaper reported in August 2017 that in Panipat 'every second premise checked over the last three months has been found stealing power'.[12] In these three months, UHBVN detected 751 theft incidents and filed

684 police cases against consumers in the city. To counter the citizens' *chal* and *bal*, UHBVN uses forms of state power it has access to. In the past, it has drawn on the local police surveillance infrastructure to detect thefts.

> VS Mann, Superintending Engineer, UHBVN, Panipat circle, has asked SP[13] Rahul Sharma to depute nine policemen, one each to nine power subdivisions, for providing information on power theft. The SP has already deputed policemen to six of the nine subdivisions last week.
>
> These policemen will collect information about electricity theft in their respective areas and forward it to the power corporation. "Acting on tip-offs, our teams will conduct raids and nab offenders," Mann says, adding that policemen will be given cash rewards.
>
> The Tribune, 16/08/2017[14]

The deception of plain cloth police officers and the raids of uniformed officers are the *chal* and *bal* that have been the exclusive domain of the colonial and post-colonial states (Anwar, 2012; Datta, 2018), deployed here to secure the semi-public/semi-private electricity. The Panipat smart grid promises to automatically detect thefts and delineate theft locations, in effect, automating the state-sanctioned use of *chal* and *bal* by private actors. The smart meters will do the surveillance job of police officers. The smart grid designers and managers reported that the smart meters can record meter tampering even if there is no power supply and send alerts to the utility managers in near-real-time. The system can also alert the managers if particular customers do not pay bills on time.

> If someone puts a direct wire [tampers or bypasses the meter], we will come to know about it because their meter will have no load at that time. If my line is functioning, my transformer is functioning, but the meter does not have supply, we will know that they are using electricity, but the meter does not have electricity. This tells us clearly that they are stealing. This will provide us with evidence. Based on this evidence we can shut their theft down.
>
> A UHBVN Officer on Voice of Panipat news channel[15]

Automated use of *bal* follows *chal*. The exclusion of deviant consumers follows identification. In a not-so-smart-system, humans physically identify and prevent theft. These humans face resistance, disagreements, and difference of opinion. Many news articles from the Panipat district report the utility staff facing aggressive resistance, a form of *bal* that Mr Sahni referred to, when checking for thefts and disconnecting customers. For example:

> Praveen Dahiya, SDO, UHBVN, Bapoli, said, "The team . . . reached the village at 6 am in an official vehicle for taking action against those indulged in power theft. A group of villagers intercepted the officials and attacked them when they started checking power supply in the houses. Meanwhile, more villagers gathered, and they did not let the officials return."
>
> The Tribune, 28/11/2017[16]

Such events have forced UHBVN staff to take local police[17] along for safety while detecting and preventing thefts. Smart grids afford human decision-making at a distance, away from the uncivil spaces of resistant consumers. It is an exercise of *bal* from a distance, safely away from spaces where citizen-subjects can exercise their *bal*. It also instils

a performance of 'objectivity'. Smart meters will automatically exclude deviant customers from the network, without intervention from the utility or humans representing the utility (UHBVN, n.d.).

> Those who tamper meters will not be able to do so now. If they tamper, their electricity supply will stop automatically. Sitting there [in the control room] it will be known that some tampering has been done.
>
> Chief Minister of Haryana (speech while inaugurating the smart grid)

The exercise of *bal* or power does not involve 'brute force' here, as with the use of police officers. What N. Rose (1999, p. 30) refers to as 'experts of truth', have always been central to how the government functions. However, human experts who gather, interpret, and act on data, have time and again, been suspected and challenged, faced resistance, and been rebelled against (Anand, 2015; Appadurai, 2013). Li (2014, p. 39) explains that governance assemblages are 'fractious and fragile' with actors debating, disputing, and unravelling them. Digitalisation and automation promise to eliminate human mediation and deliver standard measurements to resolve such issues. The crucial nature of data, its ability to create 'clearer, easily demonstrated and unarguable' truths (Aiken, 2016, p. 26), and the trust that this objective data can remove disputes, discontentment and dissatisfactions, has led to technicisation politics[18] – increasing technological mediation to collect, analyse, and act on data (N. Rose, 1999). Although the relationship between data and politics is mutual and co-constitutive, assumed objectivity of data and actions from digital interventions helps depoliticise issues and portrays data producers and decision-makers as disinterested (N. Rose, 1999). It places them in a rational rather than political domain. The exercise of *bal* by the state-private nexus has the power of 'truth' behind it, one that rationally and objectively delineates the *chaliya* (छलिया) or cheat/trickster who invariably is the citizen-subject and never the state-private electricity utility. By identifying and excluding deviants, the machine promises reduced losses and increased profits. It helps reinforce the threats and exclusions that are often carried out by state and non-state actors in the 'public interest' (Doshi & Ranganathan, 2017).

Through a threat of exclusion, and a constant awareness of individual monetary benefits and losses, the smart grid *attempts* to shifts electricity further from public good to private commodity. From a public resource, exclusion is not possible. From a private commodity, exclusion is possible. In the past, many consumers neither cared nor needed to care about their electricity use. They could tamper or bypass meters. Many did not have meters. Smart grids promise to hold them accountable for their private electricity usage. Seduced by such a promise, the Government of India has decided on a large-scale, nation-wide deployment of smart and pre-paid meters.[19]

Conclusions

This paper has answered the following research question: how do smart grids, working as truth machines, deploy new modes of governance in an attempt to make civil(ised) the political subaltern citizen-subject and make electricity grids profitable? It explains that, in India, the movement of electricity from the domain of public good to a quasi-public /quasi-private domain raised a need for efficient governance and robust profits. The main

argument of the paper is that *chal* (छल) – deception, cunning – and *bal* (बल) – power, influence – are central to understanding the deployment of smart grids in India. Planners and policymakers identify the use of *chal* and *bal* by post-colonial subaltern citizen-subjects, whether lower-level workers or electricity consumers, and their manifestation as electricity theft, collusion and corruption, lack of bill payments and accounting as main problems. *Chal* and *bal* make the Indian consumers and utility staff political in their comparison to their more civil 'Western' counterparts. Political citizen-subjects are who need to be ordered and civilised for smoother governance and profits. Building on postcolonial geographies, this paper shows that smartness is automation, and deployment from a distance, of *chal* and *bal* by a capital-state nexus to counter the *chaliya* (छलिया) (deceptive/cunning/cheat/trickster) post-colonial subaltern citizen-subjects. Smartness promises to convert disorder into order in grids and cities by conducting the conduct of the subaltern citizen-subjects.

The paper also shows that rather than being distinctly corporate or clearly in the domain of the state, smart here is situated at the fracture of public and private resources, and political and civil spaces. Smart is the latest in a long line of interventions aiming to push electricity from the domain of public good to that of a private commodity. Due to the 'problems' of electricity that elites face, smartness has not only the ethical backing of civil society but also the neoliberal backing of the market. New calculations of costs and benefits are being made – benefits not only of a more civilised citizen but also of better financial returns.

By engaging with postcolonial geographies and opening the questions of *chal* and *bal* within the discourse of smartness the paper takes a step beyond the long interrogated questions of elites vs subalterns and puts specific focus on the 'inbetweeners', subaltern employees of electricity utilities and middle-class consumers in India. Here it contributes to a smaller postcolonial geographies literature on the 'subalternity of the elite' (Legg, 2010, p. 70, citing Chakrabarty, 1992).

The paper opens two new critical avenues for geographical research with a bearing on justice concerns that require urgent research attention. First, smart, with its logics of either-you-are-civil-or-you-are-out could have exclusionary impacts in post-colonial spaces that are inherently racialised and gendered. Much of the geographical research on smartness focuses on cities even as the smartness of electricity grids and digitalisation of other infrastructure in countries like India will affect many in small towns and villages. Critical research needs to reach out to these less studied spaces and learn from their everyday experiences.

Second, as smart systems become operational, and bring into their fold a wider range of 'publics', the paper calls for more research on the 'inbetweeners' – middle-class citizens and subaltern staff who occupy the space of elite-subalterns or subaltern-elites. How are questions of 'corruption', that Doshi and Ranganathan (2017) argue to be integral to the working of capital-state nexus of dispossession, used to justify the privatisation of public resources and to further capital-state nexus of dispossession? Indeed, what role does 'corruption talk' – like *chal* and *bal* – play in the material and social tactics of resistances, tactic through which people seek justice. Many of these resistance tactics will be political, appealing to the quasi-public electricity and rights to such public goods. News from

Panipat in January 2020 suggested that the smart grid project had been non-functional for six months due to the 'due to the lethargic attitude of senior officials' of the utility and that the 'smart grid pilot project was a den of corruption' (20/01/2020).[20]

Notes

1. Indeed the emergence of Subaltern Studies is based on the fulcrum of elite-subaltern, and an effort to excavate the subaltern position and history to 'provincialise' the 'universalising implications of elite history' (Jazeel & McFarlane, 2010, p. 122).
2. https://npp.gov.in/glossary
3. http://www.nedo.go.jp/english/news/AA5en_100335.html
4. Author
5. This is partly a chicken and egg story. Utilities blame customers' theft and non-payment for losses and therefore bad quality electricity supply and customers put non-payment down to the fact that they do not received good electricity supply. Smart grids and associated restructuring and infrastructure upgrade schemes hope to solve both issues.
6. https://www.tribuneindia.com/news/haryana/sdo-suspended-for-letting-defaulter-get-power-supply/449179.html
7. This process is now partly mechanised. In places, clicking photos of meters has replaced manual bill noting but mistakes still happen due to dirty, dusty and blurry meter display screens.
8. https://www.tribuneindia.com/news/haryana/panipat-residents-get-power-shocker/666778.html
   https://www.tribuneindia.com/news/haryana/rs-83-lakh-power-bill-shocker-for-panipat-resident/649846.html
9. UHBVN already does this for industrial consumers (Interviews, 2017).
10. The independent provincial authority that decides electricity regulations.
11. https://www.tribuneindia.com/news/haryana/crime/power-theft-panipat-factory-owner-fined-rs-40-lakh/390081.html
12. https://www.tribuneindia.com/news/haryana/police-to-help-check-power-theft-in-panipat/452773.html
13. Superintendent of Police, the highest police officer in a district.
14. https://www.tribuneindia.com/news/haryana/police-to-help-check-power-theft-in-panipat/452773.html
15. https://www.youtube.com/watch?v=EVY2IOlL7Ro
16. https://www.tribuneindia.com/news/haryana/power-officials-assaulted-by-villagers/519858.html
17. In Hindi often referred to as Police *bal* or Police power
18. I build this on N. Rose (1999, p. 199) phrase, 'technicization of politics' – 'increased technical expertise to gather and interpret' data as facts.
19. It is not clear however if such deployment will solve the governance and justice issues related to grid electricity. See for example: https://indianexpress.com/article/opinion/columns/smart-meters-ministry-of-power-6320887/
20. The corruption allegations were made by a workers union representative which represents the utility's subaltern staff: https://www.tribuneindia.com/news/haryana/1st-smart-grid-pilot-project-non-functional-28659

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ORCID

Ankit Kumar http://orcid.org/0000-0001-7958-7083

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