

# The digitalising state: Governing digitalisation-as-urbanisation in the global south

## Digitalisation-as-urbanisation

The digital revolution is a key moment that is shaping current state policies and practices of planning and governance in the global south. At the same time, urbanisation as a key mechanism of economic growth in the global south is supported by the rapid uptake of digital technologies and infrastructures in the global south. Yet we lack a sustained analysis of how the state digitalises and how this is shaping a new wave of regional urbanisation in the global south. This is surprising, since over a decade ago, Ed Soja observed the rise of what he noted as the end of a metropolitan era in the emergence of ‘regional urbanization’ (Soja, 2011), leading to a large-scale ‘networked urbanism that blurs the divisions between rural/urban/suburban’. He argued that this was because of three major forces – globalisation of labour, capital and culture; economic restructuring; and formation of a new economy facilitating effects of information revolution and communication technologies. This paper argues that these transformations should be investigated as the dynamics of a ‘digitalising state’ with its operational logics of statecraft rooted in regional urbanisation. Indeed, the digitalisation of state institutions, policies and practices have reorganised the ontologies of metropolitan regions and have shaped the territorial politics of regional urbanisation in the global south.

The increasing digitalisation of urban governance across the world in the last few decades indicates that digitalisation is fundamental to the transformation of the state in an information age. Indeed Shatkin has called for examining the ‘urbanization of the national state’ that he notes

*‘is an essential starting point to understand contemporary trends in mega-urban*

*expansion, both because the national state plays a constitutive role in the processes that are shaping emerging urbanity, and because the processes that are producing the infrastructure push are also transforming national states themselves.’ (Shatkin, 2022: 845).*

Yet digitalisation as a key infrastructural push of the state and nation-building is rarely examined or fully understood. Digitalisation has profoundly transformed state governance through the decommissioning of paper documents (Hull, 2012a, 2012b), digitising land records (Heeks, 2002; Jordan, 2015; Murphy and Carmody, 2015) and automating planning processes in creating the conurbations of mega-urbanisation that have been the focus of contemporary urban geography (Datta and Shaban, 2017). While digitisation may refer to processes transforming analogue documents to digital formats, digitalisation has been defined as the ‘transformation of all sectors of our economy, government and society based on the large-scale adoption of existing and emerging digital technologies’ (Vironen and Kah, 2019). Largely attributed to a ‘fourth industrial revolution’ where the proliferation of technologies has led to transformations in the role of the state, this paper suggests that digitalisation has also brought about a fundamental transformation in the ways that the state directs the urbanisation of metropolitan regions.

The emergence of a digitalising state compels a rethinking of the premise of earlier tropes of developmental (Mathur, 2018; Wu et al., 2007) or entrepreneurial state (Mazzucato, 2013), or even the rise of a ‘homegrown neoliberalism’ (Roy, 2011b) in the global south. Not only are these earlier tropes inadequate to describe the complexities of state restructuring since the information revolution told hold in the global south; but the fragmented, contested and often contradictory exchanges across digital and analogue information infrastructures across diverse spaces and scales of the state underline the need to rethink the role of the state in a rapidly digitalising context. In order to govern, the digitalising state needs to draw upon

new constellations of power beyond the state that include a multitude of actors and global corporate organisations that support the state in maintaining its sovereignty and power.

Easterling calls this ‘extrastatecraft – a portmanteau describing the often undisclosed activities outside of, in addition to, and sometimes in partnership with statecraft’ (Easterling, 2016: 15). Extrastatecraft aims to bypass local bureaucracies with a ‘spatial practice at global scale’, whereby information is produced and circulated not only through the conventional practices of the state but also through the parameters of global standards agencies.

This structure of the digitalising state is akin to Bratton’s concept of the ‘Stack’ – a computational machine that is layered over spaces and territories to create an ‘accidental megastructure’ (Bratton, 2015b: 9). Bratton notes that the stack functions *as if* it is the state by ‘debordering and perforating’ the state’s ability to maintain monopoly over its territories and populations. This does not mean a reduced relevance of the state, rather that the dynamics of how the state sees its territories and populations is transformed through its presence in local and global computational platforms, as well as through close relationships with a whole host of digital brokers including global IT corporations, technology providers and professional consultants. This enables the state to enhance its reach and influence both spatially and territorially. Bratton argues that the state then endeavours to not only to visualise new spaces, but also to establish governance over territories through its ‘vision machines’ – GIS, satellite, and drone imagery to name a few. The emergence of these new technologies cannot be seen for or of governance, rather Bratton understands ‘technological totality as the armature of the social itself’ (Bratton, 2015b: xviii) producing ‘computation as governance’. In this version of governance, the state becomes both unrecognisable, and yet distinct from all other layers in the stack.

Bratton’s conceptualisation of a vast ‘planetary computational machine’ (Bratton, 2015b) however, seems to overplay the role of computational logics and platform urbanism

as an absolute and inescapable aspect of governance in the future. Despite Bratton's critique of smart cities, the Stack presents a conflation of smart cities and digitalisation, although digitalisation involves a far wider socio-technological process than the corporate driven global initiative of smart cities. Digitalisation is also not universal, even in the most ubiquitously wired global north cities such as London, New York or Boston (Kitchin, 2015). In the global south, digitalisation and its computational logics are highly inconsistent and incomplete across different stakeholders, making the state highly fragmented and unevenly connected across layers of a Stack. Indeed, much of postcolonial urban theory has suggested that the state presents itself as 'illegible' (Das and Poole, 2004) and engages arbitrarily across different social groups and spaces in order to maintain power and control over these spaces (Ghertner, 2015; Roy, 2009). The decades of slum clearance and forced eviction programmes (Roy, 2011a), large scale land acquisition for infrastructure or city-making projects (Datta, 2012, 2015b) and pushbacks from ordinary citizens against top-down development projects (Baviskar, 2010; Carswell et al., 2019; Jayal, 2013; Lemanski, 2018) suggest that even though the digitalising state might present itself as an ordered and efficient computational machine, encounters with the state are often experienced by its citizens as arbitrary, informal and illegible (Das and Poole, 2004).

The digitalising state in the global south while sharing several features with the global north, thus possess several distinct characteristics that make it worthy of study. This is not to suggest any notion of exceptionalism of global south states in their policies, processes, and practices of digitalisation. Rather in Simone and Rao's words, this is 'to propose a means of interurban comparison among Southern cities and urban regions that need not "pass through" considerations of Northern contexts that frame cities through rational planning and functioning infrastructure' (Simone and Rao, 2021: 152). The digitalising state in the global south is the product and producer of what I call an ongoing and highly uneven process of

‘digitalisation-as-urbanisation’ – with its intensity concentrated across infrastructural and informational peripheries of metropolitan regions. Digitalisation of the local state has been in the making for a few decades across the global south with federal governments investing heavily into national digitisation programmes (Datta, 2015a; Guma, 2013), rolling out smart technologies across municipalities with large scale adoption of digital infrastructures and platforms across state departments specifically directed towards mapping informal settlements and property ownership (Baud et al., 2014; Richter and Georgiadou, 2016). This transformation is marked by a remarkable speed of regional urbanisation in the south (Aguilar et al., 2003; Datta and Shaban, 2017; Webster et al., 2014) that now uses the technologies available to the state through its partnerships with global corporations to render peripheral territories and populations visible and knowable to the state. Digitalisation-as-urbanisation processes in Guma and Monstadt’s words, ‘have come to exemplify the actual realities of ICT-driven city making and infrastructure development in the postcolonial city’ (Guma and Monstadt, 2020: 377).

The digitalising state is the purveyor of digitalisation-as-urbanisation through a network of information infrastructures that are mainly directed towards extracting new territories for regional urbanisation. Territory here is more than land or terrain as Elden (Elden, 2010) argues. For Elden, territory is a political technology – it demands a particular technical and legal apparatus of the state that is strategic. The digitalising state focuses on territories that are still in its informational peripheries, digitising information that is as yet analogue, and extracting ‘born digital’ information through partnerships with global stakeholders. This has not only transformed the state but also changed the nature of informational space and thereby how the state uses both analogue and digital information infrastructures to maximise its reach and influence in the region.

The location of the digitalising state in the global south along the crosscurrents of

global, federal and regional informational flows, is significantly shaped by the geographies of colonial, postcolonial and decolonial knowledge systems. The digitalising state's aspiration is to govern through the speed and ubiquity of digital infrastructures and at the same time this aspiration is continually stalled by its legacy of paper infrastructures. The digitalising state seeks to materialise its sovereignty through territory, and yet large parts of its territory and populations lie outside its information infrastructures. The digitalising state needs to bolster its operational logics of governance, however the territories where governance is desired lie in the informational peripheries, which are characterised by uneven, broken and disconnected information flows. These contradictions have emerged from the legacy of colonial information infrastructures that bypassed the spaces and knowledge systems lying on the peripheries of western knowledge, and their reinforcement through postcolonial nation states that aspire to modernity and progress. The digitalisation of the state builds upon these entrenched paradigms of knowledge of information and knowledge production.

This paper addresses these crosscutting concerns with the emergence of a digitalising state, and the connected dynamics of regional urbanisation in the global south. It argues that the digitalising state in the global south is produced from the specific contradictory processes through which statecraft turns to digitalisation-as-urbanisation. The digitalising state is present at all scales and spaces of governance, but its contradictory processes are evident most profoundly in the peripheral municipalities where digitalisation is assembled through engagements with federal, sub-national and urban scales. The paper thus presents the following two processes in the production of the digitalising state in the global south. First, that digitalisation and urbanisation are connected processes since both are increasingly measured through the information infrastructures of the state. Thus, the process of 'digitalisation-as-urbanisation' suggests that the state extends its power and control over metropolitan territories through its close relationship with global IT corporations which

enable the state to digitalise. Second, the digitalising state then controls informational space through two pathways – the governance of information infrastructures and of informational peripheries. Information infrastructures are political technologies of governance since the transition from paper to digital information underscores what sorts of information continue to matter for the digitalising state, what sorts of information get sedimented and what gets normalised as accepted knowledge. Informational peripheries are material-technological domains of governance since they are located in the networks of territorial and digital exclusions from information. This paper thus argues that the emergent digitalising state pushes us to rethink the limits of both digitalisation and urbanisation in an information age.

### The Digitalising State

Lisa Poggiali offers us a crucial distinction between digitisation and digitalisation that reflects the distinction between earlier e-governance and current digital initiatives across the global south. Poggiali suggests that while digitisation is an ‘optimisation of processes that results in cost reductions’, digitalisation is actually ‘the use of digital technologies to change a business model and provide new revenue and value-producing opportunities’ (Poggiali, 2017). In the global south, while digitisation of governance has been ongoing for decades, digitalisation is a relatively new phenomenon. Earlier versions of state digitisation invariably included e-governance and shifts to digitised service and welfare access. Seen at one time to be the natural outcome and harbinger of development, e-governance was widely embraced across federal states in terms of delivering service to a wider public (Haldrup, 2018). E-governance initiatives across the global south sought to reduce state-citizen exchanges in the everyday state to a series of digitally mediated transactions, but scholars have identified that these unfortunately failed to include those who were already excluded from digital technologies and infrastructures (Chary, 2010; Heeks, 2002, 2008, 2010; Kumar and Bimal, 2015; Mazzarella, 2006). While the rolling out of e-governance across countries in the global

south in the last two decades has enabled the state across all scales to alter the terms and conditions of its earlier developmentalist and neoliberal agenda, a persistent ‘digital divide’ (Graham, 2002; Kamath, 2018; Kleine and Poveda, 2016) presents municipalities with ongoing developmental challenges in delivering online citizen services, taxation, revenues, property registers, citizen ID cards and so on (Bhattacharya et al., 2010; Chary, 2010; Chatterji, 2018; Mazzarella, 2006).

Pradip Ninan Thomas argues that state digitalisation in the global south, embodies ‘a deeply rooted technological determinism that assumes that the layering of ICTs in development will automatically solve the many issues related to the provision of ‘access’ to this information’ (Thomas, 2009: 20). Current processes of state digitalisation have built upon decades of digitisation to integrate private sector involvement within all public sector systems. The digitalising state now presents a distinct shift towards a technocratisation of urban governance through automating planning processes on the one hand, and the extraction, visualisation and representation of information about metropolitan regions on the other hand. As Watson observed in the context of Sub-Saharan Africa, new city plans on the metropolitan edges are manifesting through computer-generated imagery created solely by professionals, rather than through discussion with communities on ground. Watson noted ‘planning is shaped by the circulation of graphics through a network of software programmes and marketing professionals.’ (Watson, 2020: 35) Indeed the digitalising state is a product and producer of what Chatterjee has noted as ‘an autistic science where technocracy is used by governance as a means and an end’ (Chatterjee, 2011: 2580). These new technological regimes of the digitalising state open up new extractive processes for deeper access and control over information, including processes of technological closure through ‘unseeing’ (Nilsson, 2016) particular territories and populations.

Politically, the digitalising state presents a marked distinction from earlier processes of

state neoliberalisation and rescaling (Brenner, 2004; Leitner et al., 2007) which were characterised by the continuation of state restructuring under market capitalism. In a digitalising state, information is the new currency of capital and its flow is enabled by digital infrastructures that have shaped how and to what extent the state now engages with its stakeholders and citizens alike (Kitchin, 2014). In doing so, the state capitalises on a new wave of informational power to embolden and strengthen its reach and influence. Seen another way, the state and its many institutions stand to gain power substantially by switching their mode of information infrastructure from paper to born digital. It is possible for the state to engage in much deeper extraction and mining of territorial and citizen information through digital infrastructures. This draws private stakeholders (such as information brokers) even closer to state processes and institutions, bolstering power for both. As digital infrastructures are increasingly deployed for accumulative processes of capitalism, the state gets involved more and more into ‘data colonialism’ (Couldry and Mejias, 2019) by extraction of information about territories and populations.

Here it is worth drawing upon Dunleavy’s work which noted that the Weberian argument of government as a self-contained entity is now inadequate (Dunleavy et al., 2006). Dunleavy argues that governance conducted through digital platforms and Operating Systems (OS) set up by private global corporations are displacing earlier models of public management to create more ‘disparate, fragmented and networked bureaucracies.’ Dunleavy describes these as akin to a ‘para-state’ – contractors brought into close contact with bureaucracies of the state through digital infrastructures which supports a ‘new world of big governments, IT functions and their relationships with big service providers’ (Dunleavy et al., 2006). Attention to this aspect of public-private partnerships in the governance of information shifts the traditional focus on human side of bureaucracy to the government-industry relationship. This has led to a change in the idea of ‘information’ itself because of

the increasing decision processing capacities that the para-state offers to bureaucratic processes of the state, thus changing the management and efficiency of information infrastructures (Jordan, 2015). Through these new relationships with the para-state, the state enacts what Meijer calls ‘governance games’ (Meijer, 2018) – which includes a ‘politics of data collection, data storage, data usage, data visualization and data access’.

Recent academic interest in digitalisation related particularly to smart cities has peaked in the last few years. In particular, Kitchin’s work on data infrastructures and its impacts on the production of code/space has provided valuable critiques of the ‘technological solutionism’ that has now taken over much of governance and planning of cities (Kitchin, 2014; Kitchin et al., 2015, 2016). Critiques of surveillance and technological utopianism in urban governance (Bratton, 2015a; Vanolo, 2013), the creation of urban dashboards delivering crucial citizen services (Kitchin et al., 2015), the governmentality of urban experience in corporate driven platforms (Anttiroiko, 2016; Barns, 2018; Bratton, 2015a; Janowski et al., 2018; Krivy, 2018; Leszczynski, 2019; Rodgers and Moore, 2018; Stehlin, 2018; Verhoeff and Wilmott, 2016) and the algorithmic biases in software used for predictive urban analytics (Graaf, 2018) provide useful ways to understand the broad dynamics of technocratic governance offered by global corporations but these do not fully explain the challenges and opportunities that these present to a state marked by the histories of indigeneity, colonialism and nationhood.

In my examination of the smart cities programme in India, I have noted that the reshaping of history and temporality by a digitalising state is a crucial aspect of imagining and governing smart cities (Datta, 2019). I argued that in smart city development, speed is hailed as a virtue in the march towards modernity and technological progress. Thus ‘smart cities in India are marked by the deployment of two parallel mythologies of speed – nationhood and technology’ – the former looks towards the past in constructing a mythical

moral state and the latter looks towards the future in aspiring for algorithmic governance. Similarly, Chang et. al's work on Taiwanese smart cities call for a provincialisation of smart urbanism to examine 'how smart city experiments reshape power dynamics and regime formation through reorganising actors and interest groups, reconfiguring government institutions, reallocating resource distribution and, in the end, bolstering governing legitimacy.' (Chang et al., 2020: 559). However, most often smart cities literature does not include a concern for small cities and peripheral municipalities that have been historically excluded from colonial and postcolonial information infrastructures. As Ranchod notes in the case of South Africa, 'small, less resourced and socio-economically contentious cities negotiate complex social, administrative and political dynamics in incipient processes of urban smartening' (Ranchod, 2020). Processes of infrastructural and technological redlining peripheralizes both municipalities and territories, as well as the populations therein leaving institutions and actors in positions of path dependency on global IT corporations and the private sector.

The digitalising moment thus presents a paradox for the state in the global south. While the state attempts to make a clean break from the past, it is still burdened by the weight of the past – its colonial and postcolonial paper trails, its systems of land records, its bureaucratic processes that have refused to be completely digitalised over time. However, accounts of smart city-making do not acknowledge the legacy of paper in the digitalising state, even though colonial and postcolonial governments were built upon paper (Raman, 2012). Paper continues to be a significant information infrastructure of governance and is entrenched within ordinary aspects of documenting and record-keeping of information about territories and populations through – letters, memos, notices, logs, lists, gazettes, cadastral maps and so on. While paper archives feature prominently in historical research as tools to understand colonial governmentalities (Allard and Walker, 2016; Legg, 2007), state violence (Tarlo,

2001), and its legacies in remote regions (Mathur, 2018), the role of paper as an enduring infrastructure of information in the digitalising state urges us to rethink the governance of information in a digital era.

A conceptual framework of the digitalising state then captures the ongoing transformation of the state built upon paper. It presents us with distinct challenges that the digitalising state must now deal with – the governance of information infrastructures and the governance of its information peripheries. In the following sections, I follow the digitalising state across these two related and distinct domains.

#### Governing information infrastructures

*The value of information does not survive the moment in which it was new. It lives only at that moment; it has to surrender to it completely and explain itself to it without losing any time. (Benjamin, 1968: 90).*

In one of the first debates on the Information age, Walter Benjamin argued that information is devoid of the richness of experience, while storytelling was a form of craft – an art that captures imagination and creativity. For Benjamin the ‘survival’ of information depends on its ‘verifiability’ and temporality. Its value is captured only in as much as it provides a snapshot of time, rather than building up knowledge through the sediments of time. For Benjamin, information is real-time, while knowledge is delayed because it is reflective and accretive over time.

Debates on information however, have a long history in STS and organisational sociology, which shaped much of the scholarship in framing information infrastructures as socio-technical materiality. The most ground-breaking work in this regard remains that of anthropologists Geoffrey Bowker and Susan Leigh Star (Bowker and Star, 2000) who argued that information not only has an ontological reality, they also require a ‘material force’ of infrastructure – papers, cables, chargers and so on that are required to enable its flow.

Information infrastructures in their words are ‘the whole array of organizational forms, practices, and institutions that accompany, make possible, and inflect the development of new technology, their related practices, and their distributions’ (Bowker et al., 2010: 103).

Bowker et. al. further argue that information is produced through standardisation and rigidity – and is fundamentally relational. Categorisation and standardisation lie at the foundation of information infrastructures which produce both visibility and invisibility of data. For Bowker et. al., ‘people, routines, forms, and classification systems’ are integral to information infrastructures, which produce new forms of sociality within and between organisations, the reorganisation of ethical and political values, and a changing nature of knowledge work conducted by these organisations.

It can be said that digital technologies have changed the ontological reality of information, making the governance of information much more amorphous and complicated. Basu argues that information is something that the state “spectacularly assembles, without narrative fidelity to history or constitution, with a neoliberal monotheme of capital and its ardent religiosity of development.” (Basu, 2008: 248). Basu observes,

*‘A dispensation of power becomes “informatic” when the pace and density of interaction—between knowledge worlds, founding ideas, institutions, dogmas, sciences, the dialects of common sense and social practices—become forceful enough not just to enable mergers but to define the very rules of engagement.’ (Basu, 2008: 245)*

For Basu, this technology based ‘information ecology’ enacts three kinds of power. First, in accelerating the volume, speed and intensity of data that tests the limits of verifiability and authenticity of information. Second in exercising an informational regime that stretches both horizontally as well as vertically to include other actors and stakeholders beyond the state and the para-state. Finally, Basu argues that information thus deployed, can yield a desire for a metropolis that in its ‘boundless virtuality’ can overwhelm the historical-

material-territorial boundaries of the metropolis itself.

Achieving this boundless virtuality requires the local state to transform itself “into terms of corporate management via ICTs” (Mazzarella, 2010: 790). Private corporations collecting and building databases for the state not just hold power and control over the stories told by the digitalising state, they also direct the production of new kinds of decentralised state spaces. For eg. in India, urban municipalities have invested substantial budgets in new ‘digital state spaces’ (such as the IT-GIS departments) building data centres, establishing centralised information systems and integrated command and control centres (Praharaj et al., 2018). As Easterling notes in the context of ISO standards, ‘quality standards demonstrate the power that non-state actors have in the world – an authority that does not precisely correspond to the familiar modes of legal, historical or political analysis.’ (Easterling, 2016: 209) that is conducted of the state. Yet the state draws the para-state closer and closer to itself in order to build, develop and manage new information infrastructures for governance.

Information infrastructures then are the tools of the digitalising state, which gives it control over the ‘information ecology’ (Basu, 2008), through access to vast reservoirs of data that are both paper and ‘born digital’, that rests historically with the state as well as extracted by the para-state. Agarwal’s research on Indian Census notes that information is also a ‘political weapon’ (Agrawal and Kumar, 2020) whereby information infrastructures of the state reveal new territories and populations that are ripe for governance. Information is bound to infrastructures of indexing, coding, storage, retrieval, analysis, representation and destruction – and these infrastructures are vastly different between analogue and digital systems. The governance of information is to tell stories about both digital and analogue data. Starting from early colonial mapping to the establishment of Census and datasets, to more recent initiatives of e-governance, the governance of information in various forms and formats has established the rule of law and power of the state.

It is worthwhile then to reflect upon what happens to paper documents that produced the information infrastructures of the colonial and postcolonial state. The rich anthropologies of everyday state which examine paper as a site of bureaucracy (Gupta, 2012; Hoag, 2011; Hull, 2012a, 2012b; Mathur, 2018) suggest that paper, in its materiality as well as in its semiotic and symbolic forms assembles specific flows of information between state institutions and civil society; it establishes mechanisms of power, control and authority, both of those who hold them and those who are denied its possession. While paper has its own materiality and socio-technical dynamics, transferring information held in paper to digital formats means developing new infrastructures for digital storage, retrieval, quality control, data assurance and secure transmission.

While the digitalising state collects and processes information through geo-spatialised, integrated and centralised visualising machines, its power is bolstered by transforming ‘material infrastructures of documentation’ present in paper (Hull, 2012b: 255) into ‘spatial knowledge’ (Baud et al., 2014) – geo-spatial maps, dashboards, platforms, centralised and integrated systems. These infrastructures of information circulate through state and non-state actors to produce a local digitalising state, showing how ‘national policy agendas, technological infrastructures, legal measurements and local institutions coalesce’ (Schou and Hjelholt, 2019: 449). While municipal offices and state departments have been slowly digitising paper records, maps, lists, forms and other forms of information into digital formats in order to automate bureaucracy and citizen services, these processes of information retrieval, translation into digital formats and integration within centralised systems are not seamless and are often selective. Agrawal and Kumar argue that “Bureaucratisation and technocratisation of policymaking as well as the growing capacity of non-state actors to challenge government policies” (Agrawal and Kumar, 2020: 3) have pushed the state towards digital information systems even as their legacies of paper information infrastructures

highlight the limits of digital information. In the words of Easterling then, ‘discrepancy may be a better analogy than certainty’ (Easterling, 2016), when information flows from paper to digital infrastructures through the filters of categorisation, standardisation and quality control. This is highlighted succinctly in Cowan’s work in the municipal cadastral office in Gurgaon, India where ‘bureaucratic uncertainty structures the commodification of rural land’ and the very digital technologies that are ‘designed to produce clarity, are being wielded by powerful groups to flexibly settle property claims’ (Cowan, 2021: 442).

Yet paper remains one of the least examined themes in digital geographies scholarship. Although the digitalising state embodies the aspiration to decommission paper documents altogether, as Sellen and Harper (Sellen and Harper, 2003) noted a decade ago – it is unlikely that digitalisation will totally replace paper very soon. In their investigation of technological regimes of urban planning across Asian and Latin American countries, Baud concludes that although extensive coverage of digital infrastructures are planned across different municipal governments, they are often stalled or do not reach their full potential because of lack of capacity and resources among local officials (Baud et al., 2014: 501). Similar, Richter too in her work on the *Bhoomi* project on the digitalisation of spatial planning in Hyderabad, notes that the Indian regional state of Karnataka aimed to digitise all of its land ownership records. While most municipalities held rich records of colonial and postcolonial maps and documents, this information was selectively incorporated in digital systems (Richter, 2011; Richter and Georgiadou, 2016). Fundamentally then, and despite increased digitisation of governance, the local state cannot bypass the ‘burden’ of paper that still overruns its bureaucracies (Hull and Scott, 2013) and that still circulates during citizen encounters with bureaucracy (Carswell and De Neve, 2020). Indeed ‘paper’ as a material information infrastructure has become even more salient in establishing the historiography of information in a digital age.

In this process, paper can both lose meaning and acquire increased value during digitalisation. While paper records are destroyed, audit trails are broken, and the state aims to reduce the volume of paper in order to make governance efficient, paper information infrastructures continue to remain significant for the verifiability of digital information in information-scarce spaces. Disconnected, absent or inaccessible information about land, terrain and territory can potentially open up digital information to all sorts of manipulations, that can only be settled by referring back to paper information – a practice that is common in local municipalities in the global south. For example, across India, there are several challenges to the digitalisation of land and property records due to mutilation or missing paper documents, customary land occupation, multiple claims of same property, mismatch between paper and geo-spatial (GIS) information/maps and poor digital capacity of municipal officials. Yet even when it faces significant challenges of physical storage, maintenance and indexing, the process of settling these contested claims has been to trace their ‘paper truths’ (Tarlo, 2001) within public and private repositories. Tarangini Sriraman (Sriraman, 2018) for example looks at how paper information infrastructures of the Indian state are ‘being radically transformed owing to the technological infrastructures’. She argues that for the poor, paper remains a significant ‘pursuit of proof’ of their identities despite some of the ways that digital infrastructures restrict them from accessing justice.

This leads us to the key characteristic of the digitalising state as what Kitchin has called a ‘space-time machine’ (Kitchin, 2019). While Kitchin noted that smart cities were engaged with reorganising and reorienting the timescape of cities, the digitalising state goes much further in simultaneously governing over two seemingly asynchronous information infrastructures of – paper (files, permits, memos, letters, lists, cadastral maps, record rooms, file bearers, rubber stamps, seals) and digital (wifi, secure networks, apps, platforms, cloud storage, smartphones, command and control rooms). Temporal rescaling is fundamental to

state digitalisation since state actors must work with the differential rhythms of state spaces in order to bring them within the ‘speedy time’ (Sharma, 2014) of automated governance. The tempos of state departments working with bureaucratic mechanisms of paper, whilst slowly and laboriously transferring paper into digitised formats, civil servants grappling with the demands of new apps whilst maintaining the flow of communications across state spaces, the flows of paper information vis-à-vis digital data, the tempos of territorial information capture through satellites and drones vis-à-vis that of ordinary life on the streets, reveal the multiple asynchronicities of governing information infrastructures by the digitalising state.

Governance of information infrastructures then is about simultaneously confronting their historicities, materialities, territorialities and temporalities. As Hull points out ‘The relation between electronic forms of communication and studies of paper is not only historiographic, but also historical and theoretical.’ (Hull, 2012a: 261) The challenge then is to rethink the notion of governance as embodied in the incessant onslaught of ‘born digital’ information confronting the slowness of paper-based information flows. The politics and socio-material nature of flows of information across paper and digital formats, are key to the making of the digitalising state at all scales. Even as the digitalising state extends its reach and significance at a global level, the role and significance of paper information infrastructures remain central to local spaces of governance across all stakeholders and institutions of the state.

### Governing informational peripheries

In analysing the nature of territory as simultaneously political-economic and political-technical, Stuart Elden notes that,

*Territory is not best understood through territoriality, but through an examination of the relation of the state to the emergence of a category of ‘space’. ... To put this more*

*forcefully, boundaries only become possible in their modern sense through a notion of space, rather than the other way round. (Elden, 2010: 810–811)*

Elden's proposal for rethinking the political-technological force of territory is built from the assertion that we need to move beyond land and terrain as constituents of territory. Elden suggests that territory needs to be thought of as emerging from its historical, political and economic contexts of law and technique. He argues that while law purports the nature of sovereignty, jurisdiction and authority that modern states ascribe to territory, technique is crucial to understanding how territory is measured and expanded. Historically, technique related to the numerous methods of mapping territory through the development of cartographic tools, algebra and surveying instruments. Although Elden's analysis does not reach the advent of digital techniques, his arguments can be read from an informational perspective to understand how the digitalising state develops the spatial boundaries of territory through new digital techniques. In an informational age, technique also refers to the numerous ways that land and terrain are mapped through remote sensing, satellite imagery, drones and GIS.

The analytical lens of a digitalising state urges us to expand Elden's notion of territory through the incorporation of digital as another category of political-technological space. In a digitalising state, territory refers to the terrain of municipal power and governance that is incorporated within its information infrastructures. Digitalisation provides a temporal fix to territories by 'seeing' (Scott, 1999) through the digital – visualising territories that had little or no visibility on paper and often existed in oral records and customary law (Benjamin, 2008). Here it's worth mentioning that urban and regional studies have also worked on political-legal understandings of territory as a policy and practice of the colonial and postcolonial state. In this framing, those excluded from political-legal rights to territory constitute the urban periphery. As Levy argue 'The periphery used to be where precarious

dwelling predominate: a way of 'behaviour' of the poor, their social class, or an aspect of one's appearance.' (Levy, 2018: 61). Urban peripheries are often conceived as zones of 'autoconstruction' (Caldeira, 2016; Holston, 2009) where marginal actors assert their rights to citizenship through legal recourse to land and terrain. And as Salet and Savini also note, peripheries possess an 'uncrystallized condition' (Salet and Savini, 2015: 449) alternating between a new centrality and socio-political marginality, while at the same time going beyond themes of 'core/periphery dynamics' (Storper and Scott, 2016) or suburbanisation (Keil, 2017) that have been the stalwart topics of postcolonial urbanisation. Peripheries are now increasingly recognised as experimental sites for new infrastructural or investment models and therefore seen as new frontiers of urbanisation and expansion of metropolitan regions. Urban studies scholarship thus often present the periphery as a territorial strategy of the state in the making of techno-utopian futures (Datta, 2015b, 2017; Datta and Shaban, 2017; Dattani, 2019). Critiques of a new 'speculative frontier' (Goldman, 2011; Shatkin, 2016; Sood, 2021) or new 'real estate frontiers' (Gillespie, 2020) in the urban edges are directed towards critiquing urbanisation as a smokescreen for state entrepreneurialism. Evidence from across the global south shows how new cities planned on the metropolitan peripheries are digitally mapped and presented as 'terra nullis', by erasing and obscuring information about lives and livelihoods embedded in indigenous and agricultural land (Datta, 2012, 2015b; Datta and Shaban, 2017; Moser et al., n.d.; van Noorloos and Kloosterboer, 2017).

The digitalising state therefore produces a distinct category of territory that can be identified as the informational periphery – spaces of informational exclusion and fragmentation in the margins of political- informational rights to territory. As territorial entities, informational peripheries are marked as sites of informal settlements, migrant camps, and refugees surviving under the worst infrastructural conditions (Aguilar et al., 2003), and

selectively targeted by digital surveillance. One might then approach informational peripheries through what de Falco (de Falco et al., 2019) identify as a combination of digital, material and social peripherality. Informational peripheries are produced when satellite, drone and GIS technologies of measuring and mapping land and terrain enable the state to redraw its administrative and jurisdictional boundaries and generate new opportunities for land capture (van Noorloos and Otsuki, 2019). The digitalising state initiates new systems of documentation, classification and categorisation towards the production of new informational peripheries.

In the informational periphery, exclusions are marked by both geographic and informational distance from the digitalising state. It includes subjects who are uncountable as well as territories that are unmappable. As Agrawal and Kumar show in the case of India (Agrawal and Kumar, 2020), it was the relative scarcity of maps, survey statistics and Census data in the pre-digital era that produced the informational periphery in colonial and postcolonial states. These exclusions are also evident at a geopolitical scale where global south states are seen to be on the peripheries of informational infrastructures and digital technologies. The wider discussion of this peripheralisation in a digital age is captured in the debates around the 'digital divide' (Graham, 2002; Rao, 2005) which manifests across geopolitical, national, regional and local scales. However the digital divide refers largely to lack of access and capacity to use digital technologies in order to achieve the full potential of states and citizens alike. In this conceptualisation, the divide is constructed as a binary between 'haves' and have-nots', seen through the lens of policy guidelines and Sustainable Development Goals.

The informational periphery captures elements of what Nishant Shah calls the 'networked margin' (Shah, 2015) – 'the blending together of the edge and the margin that shifts and recognizes that as we identify certain processes, communities and practices'. The

informational periphery here is produced through different modes of infrastructural redlining, shutdown, blackouts and bypassing. In all of these modes, as Shah points out, the state may be the orchestrator of information, mis-information and even dis-information, using ‘infrastructural tool[s] that allows for the state to gain monopoly over information and to propagate (dis)information by taking control of the communication infrastructure.’ (Shah, 2021) New digital informational infrastructures enable the state to establish its power and sovereignty by redefining what constitutes the core and periphery of metropolitan regions. Informational peripheries builds upon the notion of what Luque-Ayala and Neves Maia call ‘digital territories’ (Luque-Ayala and Neves Maia, 2018) – ‘a political technique re-making territory through computational logics – operating as a calculative practice that, beyond simply representing space, is productive of the political spatiality that characterises territory’. However, unlike the digital territories created and extracted by Google maps, informational peripheries bring together the networked margins and digital territories under the governance of a digitalising state working in closew partnership with the para-state.

A key feature of governing this informational periphery has been through administrative reclassification, which involves recategorization of information related to land and terrain through digital techniques – evident in the proliferation of remote sensing, satellite and drone mapping and GIS driven master planning across the global south. As Jose points out in the case of Vasai-Virar, a periphery of Mumbai, the key role of the planning authority has been in the unmaking of agricultural land to facilitate metropolitan expansion. He notes, ‘regional and metropolitan planning – that are intended to prevent, domesticate and tame speculation in land serve instead to fuel it.’ (Jose, 2022) Sood’s work in the metropolitan peripheries of Delhi and Hyderabad in India further suggests that the parastatal organisations of the state are produced to reshape and redefine the boundaries of the city’s edge. Digital technologies support these policies and practices of reclassification and

reshaping of metropolitan peripheries. As Pfeffer observes ‘Digital geo-technologies such as geographical information systems, online applications and spatial simulation models are increasingly becoming embedded in urban governance processes to produce, utilize, exchange, and monitor contextual knowledge and create scenarios for the future.’ (Pfeffer et al., 2015: 147) But it is in the work of Baud and her team (Baud et al., 2014) where we can see how state digitalisation is a key technique through which the ontology of spatial information is transformed in order to identify new territories suitable for expansion of state sovereignty. Baud notes that ‘integrated land use planning processes in which geo-referenced databases from different sources provide evidence for policy choices’ (Baud et al., 2014: 504) determine how municipal boundaries are to be expanded or defined. One of these attempts has been in the digitisation of land records across municipalities. Although this varies across different countries and municipalities, municipal boundaries are often determined through the use of satellite mapping and GIS data, and increasingly without the consultation of communities that inhabit these territories. In so doing, the digitalising state in the global south produces new informational peripheries through new digital infrastructures of ‘measure and control’ of land and terrain.

The informational periphery thus extends the idea of a territory beyond land and terrain to informational space. Governing this space is a political technology of the digitalising state. Informational space is simultaneously digital-informational and material-genealogical – manufactured by glitzy computer enhanced images of metropolitan expansion while on the other hand burdened by the weight of paper information infrastructures. The informational periphery then is also a paradox. On the one hand, it is characterised by data scarcity/invisibility through infrastructural redlining, and on the other hand, it becomes the target of information extraction in the service of regional urbanisation. Digitalisation simultaneously decontextualises these informational peripheries in order to expand the

influence and reach of the digitalising state. As Simone and Rao note,

*'At best, big-data integration positions those traced as elements of a set or as data points within databases whose parameters change continuously, depending on who is viewing the data, with what other databases these individual points are being linked, and for what specific, instrumental purposes those links are being forged.'* (Simone and Rao, 2021)

This has distinct consequences. First, as the digitalising state becomes more and more fragmented and decentralised across various scales and institutions, peripheral municipalities with poor digital capacity and resources continue to face several challenges in implementing and managing digitalisation even in relatively highly digitalised regions in the global south (Chary, 2010; Chatterji, 2018). This often leads to path dependency with para-state actors and centralisation of power at the upper scales of the digitalising state. Second, as Guma and Monstadt (Guma and Monstadt, 2020: 377) highlight, the top-down high-tech city-making initiatives have not been able to capture and capitalise on the small and medium scale endogenous innovations and entrepreneurs that emerge from the situated contexts of each city.

Finally, as Gurumurthy and Bharthur (Gurumurthy and Bharthur, 2019) point out, the simultaneous rise in global e-commerce and logistics supply chains (such as Amazon and Walmart) also relies upon the emergence of a digital service economy in the informational peripheries, which offer cheap and abundant labour in its young, unemployed citizens; yet at the same time keep them outside unionisation and rights campaigns (Sharma, 2014). In particular, the transformation of logistics chains through increased connectivity has facilitated a more dispersed spatially decentralised geography of warehouses that seek out locations in metropolitan peripheries with lower land prices and larger land parcels but with its precarious labour market outside the information infrastructures of the state.

Thus informational peripheries are not just comprised of those marginal informational spaces of the metropolis. Rather, as Kanai observes in Latin America, the peripheries have ‘precipitated territorial restructuring and socio-spatial change far beyond the city’s boundaries’ (Kanai, 2014: 1071). Governing the amorphous nature of the informational periphery means both grappling with the decentralisation of power and politics of information across state spaces, as well as acknowledging and accounting for the informational spaces that are involuntarily or purposefully unseen by the state. Governing the informational peripheries means subjecting the local digitalising state to the temporalities of the federal and corporate scales as well as the asynchronicities of both paper and digital information infrastructures.

### Regional futures and the dynamics of digitalisation-as-urbanisation

The digitalising state in the global south is not just an extension of the developmental, neoliberal or entrepreneurial state, rather it represents a fundamental reorganisation of state institutions, information infrastructures and metropolitan peripheries through and for digitalisation. The digitalising state is emboldened and bolstered through its partnership with the ‘para-state’ which includes a diversified and specialised network of actors from global corporations providing platforms and services to the state as well the private consultants and professionals who are drawn into state institutions with the aim of building technology, information and capacity to state officials. Yet the digitalising state is more than this partnership. Through these multitude of private actors and corporations involved in digitalisation, the digitalising state emerges as a distinct entity that neither completely recedes nor aims at full control – rather embraces the organisational practices of private and global actors within the state. Although sharing several features with digitalising states globally, the digitalising state in the global south is worth studying due to its entanglements with colonial and postcolonial information infrastructures and the entrenched inequalities along the edges

of informational and territorial exclusions.

Examining the digitalising state in the global south enables us to understand why the metropolitan periphery remains relevant and indeed a significant actor in shaping the global informational age. The digitalising state in the global south also enables us to trace the contours of an regional urbanisation that is largely propelled by the contradictory encounters between digital and analogue information. This is what I have called the dynamics of ‘digitalisation-as-urbanisation’ – initiatives that are geared towards generating regional urbanisation and digitally oriented futures by expanding the informational spaces of the state at all scales. Digitalisation-as-urbanisation initiatives use the apparatus of governance across two realms – information infrastructures and informational peripheries. The former entails a recalibration of information from paper files, memos and documents, into the flows of digital data across cloud platforms, GIS maps and smartphones. The latter entails efforts to reduce the cognitive distance between the state and hitherto metropolitan peripheries characterised by simultaneous territorial invisibilities and data scarcities. The digitalising state then presents a fundamental transformation in the material-genealogical nature of the metropolitan periphery into a hybrid digital-informational entity – manufactured by glitzy imaginations of regional futures using Google Earth and mapping software while on the other hand burdened by legacies of infrastructural exclusions, acute socio-political marginalisations and customary claims to land and territory.

Although there have been references in this paper to grassroots encounters with the digitalising state as well as to the creative digital capacities of citizens in the margins, there has not been enough space to explore how these might challenge the very foundations of the digitalising state. However, suffice it to say that encounters between paper documents held by citizens and the digital cartographies held by the state provide rich sites of investigation into the fault lines of information infrastructures of the state. Similarly, the impacts of the

contradictory processes of digitalisation-as-urbanisation are evident in the dispersal and concentration of global e-commerce and logistics supply chains in the metropolitan peripheries. In other words, digitalisation-as-urbanisation not only supports deeper extraction of information, it aids an even deeper extraction of precarious labour and the rise of the gig economy in the peripheries.

In conclusion, governing informational space is a key technique through which the power and sovereignty of the state is expanded in the global south. This is fraught with challenges given the often incomplete, fragmented, informal and disconnected nature of infrastructures that produce information. And yet the state continues its pathway to digitalisation with potential costs of path dependency on the para-state, contributing to further precarity in the informational peripheries, as well as overlooking the vibrant nature of digital innovations at the grassroots. The digitalising state then needs to be examined in its own right, alongside critical studies of urbanisation, digitalisation, infrastructure and informational politics as it unveils the challenges of the urban digital age.

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