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I. Introduction

1 In 2015, the newly elected federal Government of India launched the Smart Cities Mission (SCM) with the stated objective of re-centering "the citizen of the country" (Press Information Bureau 2016a) as the core decision-maker for urban policymaking. They claimed that the Mission valued "citizen engagement" (Ministry of Urban Development 2015) and was a "paradigm shift" towards a "bottom-up" (Press Information Bureau 2016b) approach to participatory urban development with a strong focus on digital modes of citizen participation (Ministry of Urban Development 2015; Press Information Bureau 2016a). This articulation of participation implicitly valorized "digital positivism"; belief in online technologies as an "architecture of participation" where processes of datafication and digital communication are assumed to be inherently beneficial (Fuchs 2017:40). This promotion of digital democracy misrepresented the reality of internet-dependent modes of participation in India—access to the internet is precarious, not only due to digital divides amongst an unequal population (Piketty 2020:21, 352–61; Sen 2020),[1] but is further compromised by the government's zeal for control over the internet. However, social media has been a key element of current government campaigns (Rao 2020) and is rapidly becoming a space of everyday political and social importance (Lal 2017). In this context, research must engage critically with social media platforms as channels of public participation in the Smart Cities Mission. This paper seeks to a use a combination of critical theory and digital research methods (Fuchs 2017) to explore the pivotal but under-researched subject of the use of social media by governmental entities in India through a focus on one social media platform—Twitter.[2]

2 Our research explores the creation and use of Twitter accounts by the 100 SCM cities. We consider the role of this digital platform in mediating representations of, and public interactions with, smart cities in India. Each SCM city has two main governance

organizations, the local municipal body (Urban Local Body or ULB) and the mandatory corporate parastatal[3] created in each smart city (the Special Purpose Vehicle or SPV). We focus on the Twitter accounts or "handles" created by ULBs and SPVs and provide baseline empirical data to support a larger research agenda for critical government social media research. Our unique data set contains just over 4.5 million tweets made between 2011–21 from 158 ULB and SPV Twitter handles of the 100 SCM cities. The data shows that a) smart city account creation and volume of use appear to be event driven; b) most frequently used hashtags and referenced users are federal government campaigns, agencies and politicians; c) ULB and SPV accounts display different patterns of use and engagement with users, with municipal accounts more active and interactive while SPV accounts are more emotionally positive; d) larger, and higher SCM ranked, cities tweet more; e) Twitter users in higher income cities, tweet more, and there is a steady increase in tweets by others that mention smart city accounts and use the words "complaint" as well as reference to basic services ("water," "roads," "traffic," "garbage," "waste").

3 We interpret these points as follows: a) Twitter use by smart city bodies is primarily reactive in response to SCM and Swachh Bharat Mission (SBM) initiatives, and later the Covid-19 pandemic; b) promotion of federal government messaging is core behavior; c) online participation is not a priority for SPVs—while municipal accounts function for mundane local government issues, SPV accounts primarily project positive campaign messaging around quality of life initiatives, which we refer to as "civic storytelling"; d) social media reflects organizational capacity, rather than increasing it; e) while some major cities move from primarily broadcasting information to receiving formal complaints online in 2018, users (who tend to be higher income) in turn respond to ULB/SPV presence on Twitter by both formal complaints and critique of smart city aspirations in the absence of basic urban services.

4 From here, we make two more general claims: 1) despite the stated aim of participation through social media, smart cities in India primarily use Twitter for city branding (Degen and Rose 2022) and "civic storytelling," albeit, as noted, the behavior of municipal bodies and corporate parastatals shows distinct patterns; and 2) although public participation with these smart city handles was initially tokenistic (Arnstein 1969) one-way government to citizen communication (Gil, Cortés-Cediel, and Cantador 2019; Bennett and Manoharan 2016), we see three phases of interaction over time as communication is effectively forced into a more participatory mode. We argue that these changes are driven by public uses of online complaints to puncture "smart city" rhetoric, forcing government Twitter accounts into initially ad hoc and later formal responses (Epstein, Bode, and Connolly 2021; Mergel and Bretschneider 2013).

II. Framing precarious #participation *as* public relations?

II.1. Civic storytelling: participation vs city branding

5 What role does social media play in today's world? Early enthusiasm was later tempered (e.g. Bohman 2004) but returned as a "second wave" of digital democracy around 2010 suggested to some that, if a new digital public realm had not arrived, smaller online constellations of networked publics *were* exercising democratic

influence around the world (Loader and Mercea 2011:758). However, the challenges that internet technologies pose for democracy in contexts of populism and majoritarianism—long-standing themes in South Asia (Anderson 2013; Chatterjee 1999; Jaffrelot 2015; Ludden 1996)—have recently become prominent as a global wave of illiberalism has shifted politics and public discourse into increasingly shrill, divided and dangerous registers (Jaffrelot 2021; Markey 2022; Thiruvengadam 2021). On one hand, modernizing reformers (from the World Bank to Nandan Nilekani) assert that digital technology enables transparency and accountability, leading to "good governance" (Dunleavy 2005; León and Rosen 2020; Nilekani 2010; World Bank 2021); participation may or may not be an additional factor in this account (Gil, Cortés-Cediel, and Cantador 2019). On the other, critical voices observe that just as the internet emerged from military technology, social media (and much of "Web 2.0") emerged from marketing (Loader and Mercea 2011:759; O'Reilly N.d.) to generate rents from advertising and content monetization (Christophers 2020; Levine 2019; Zuboff 2019). It should be no surprise then, that these technologies are predominantly used to promote places and brand cities in line with the wider turn towards entrepreneurial urban governance (Harvey 1989). Political and corporate actors promote a technology-driven "world class city" imaginary within India as both means and end for urban renewal, development and governance reform projects—of which the SCM is only the most recent iteration (Birkinshaw and Harris 2009; Chatterji 2018; Ellis 2012; Ghertner 2015).

6 This paper draws on literature on public participation in urban development, primarily from a sociological perspective, and integrates this with the burgeoning literature on critical digital and social media studies to capture the shifting landscape of Twitter use by ULB and SPV handles in 100 SCM cities in India. Through this interdisciplinary approach we propose the concept of "civic storytelling" where social media is used to bolster positive city-branding through a sustained promotion of quality-of-life initiatives, including engagement with citizens. We argue that this process of city branding and marketing (Degen and Rose 2022) is part of a longer discursive trajectory of "world-class cities" since the turn of the millennium. However, while citizens were offered "tokenistic" (Arnstein 1969) online "participation," they have often attempted to reshape this through the use of complaints to form a more critical space of digital interaction with city governments.

7 Practitioners and theorists debate whether and how the term "participation" should be used and implemented. Arnstein (1969) argued that the most minimal forms of participation were a variety of "tokenistic" processes—"non-participation"—that focus on information dissemination and preclude non-state actors' authority to make decisions. Arnstein here captures what others have called "invited spaces" (Brock, Cornwall, and Gaventa 2001). Our paper suggests that Twitter is molded by citizens from an invited space to a form that more closely resembles an "invented" space, "chosen, taken and demanded through collective action from below" (Cornwall and Gaventa 2000). That said, in Indian cities, discussions of participation have highlighted elite capture and the exclusion of more vulnerable communities (Fernandes 2004; Kundu 2011; Tawa Lama-Rewal 2007, 2013) as well as an increasingly depoliticized process of "corporatisation of governance" where public participation processes do not account for ground-level realities (Coelho, Kamat, and Vijayabaskar 2013:4). The advent of the Smart Cities Mission in India (discussed below) mirrored these exclusions through ambiguous and inconsistent forms of participation (Khan, Zérah, and

Taraporevala 2018) and exacerbated issues of elite domination within participatory networks and consultations (Basu 2019; Datta 2019).

8 For digital participation through social media in Indian Smart Cities, the digital divide ensures that exclusion is built into the process. Social media user numbers are high, but historically have been a low proportion of the population. India was estimated to have over 500 million internet users in 2019, more than 30% of the population (Aneez et al. 2019:8) and social media use grew from just 90 million users in 2014 to 467 million users by 2022 (Kemp, we are social, and Kepios 2022:51). Twitter is India's 8th most frequently visited website, used by 44.9% of Indian social media users monthly[4] (Kemp et al. 2022:54) with 3 billion visits in 2021 (Kemp et al. 2022:36). In early 2022, Twitter had 23.6 million daily active users in India; around 11 percent of the platform's 206 million active daily users in 2021 (Thaker 2022), but 1.7% of India's population (Kemp et al. 2022:72). While WhatsApp and Facebook are more widely used, Twitter is still politically prominent and used particularly amongst politicians, journalists and other elite actors.

9 Critical literature on Twitter acknowledges that it is a ubiquitous but materially ephemeral space in Indian politics (Mehta 2019; Rajput 2014; Rao 2018; Sircar 2020), routinely used by Indian government bodies and politicians. A "platform for (news) storytelling" (Papacharissi 2015:33), Twitter is considered both "an important platform for breaking news and a lively and often unruly and uncomfortable part of online public debate" (Aneez et al. 2019:10). Twitter is a space for "the elite," a platform where the powerful have conversations that have a ripple effect on news. While critical research on the use of Twitter by Indian politicians and political parties has expanded substantially over the last decade (Martelli and Jumle 2023; Pal, Chandra, and Vydiswaran 2016; Rao 2018), there has not been a concomitant growth in critical assessments of the institutional use of social media by governmental entities in India; this paper seeks to fill this gap by drawing on critical social media studies. Literature on social media use across the globe demonstrates that the use of social media is intended to lead towards greater transparency (Bertot, Jaeger, and Grimes 2010) and can generate more positive citizen attitudes to government than government websites (Porumbescu 2016). However, while social media *interactions* may build perceptions of transparency and trust in government (Bertot et al. 2010; Asamoah 2019), use is primarily for one-way government to citizen communication (Waters and Williams 2011; Mossberger, Yonghong, Crawford 2013; Cho and Melisa 2021). In this paper we examine Twitter, as the most public[5] of social media platforms and a relatively open forum for communication, to understand both the online public presentation of smart cities and their interactions with citizens.

10 In thinking about smart city social media use, we draw on the notion of "corporate storytelling" (Söderström, Paasche, and Klauser 2014) or the rationalization of embedding corporate tech firms as "obligatory" for the municipal administration of a smart city. Our concept of civic storytelling, in contrast, highlights the performance of tokenistic public participation and city marketing; indeed, "there has been a clear co-evolution of urban redevelopment and branding, where the two processes work increasingly hand in hand and are part of urban policy" (Degen and Rose 2022:102). Unlike the existing literature on organizational storytelling where the "story" legitimizes private companies and consultants, or the concerns around private sector influence in the SCM, our data shows social media branding amplifies state narratives.

We argue that municipal and parastatal urban bodies use social media for "civic storytelling" by constructing a positive civic identity through narratives of quality-of-life improvements that combine mechanistic relay of national campaigns and city-specific initiatives.

11 The SCM has been seen by some commentators as an attempt to magnify federal power over cities through digitally-assisted parastatal control (Datta 2015, 2018). Furthermore, the SCM SPV is viewed as a means of privatizing and hollowing out municipal government (Das 2020; Datta 2015, 2018; Davies 2002; Khan, Zérah and Taraporevala 2018). At the same time, SCM rhetoric emphasizes participation and inclusion through digital technology. While research on government social media use asks whether it promotes participation or public relations (Bertot, Jaeger, and Grimes 2012; Bonsón et al. 2012; Petrikova, Jaššo, and Hajduk 2020; Zhou and Wang 2014), very little is known about the digital lives of local governments in India.

II.2. Background: E-governance and social media

12 E-governance—"handling government services electronically" (Bhuvana and Vasantha 2020:1)—is increasingly used around the world (Devlin, Widjaya and Cha 2020; Haman and Školník 2021; Safiullah et al. 2017). The Government of India consistently invested in electronic and telecommunications technologies from the 1970s (Mitra 2012) and by the 1990s was focusing on e-services to improve government and citizen interactions (Madon 2006:878). By the early 2000s, regional governments like Kerala had projects to create computerized e-governance centers ("e-kiosks") within a few kilometers of each settlement (Mitra 2012). This model was widely adopted, to different degrees, across the country (Bussell 2012). In 2005, the Jawaharlal Nehru National Urban Renewal Mission, required computerization of urban management and service delivery as a condition of funding for city governments (Sivaramakrishnan 2011; Birkinshaw 2016). Over the last decade, e-governance has expanded further. By 2018 there were over 8,000 government websites (Department of Administrative Reforms and Public Grievances 2018).

13 In the last ten years, Indian government bodies began using social media platforms like Twitter and Facebook. The earliest Indian municipal government use included our data dates from 2009. In 2012, the federal government created guidelines on social media platform use by government bodies informing them that social media could be used for a variety of reasons including "Brand Building or Public Relations," but that the "objective for the use of social media is not just to disseminate information but also to undertake public engagement for a meaningful public participation for formulation of public policy" (Department of Electronics and Information Technology 2012:12).

14 The launch of the Smart Cities Mission (SCM) in 2015 increased focus on digital communication to enhance citizen participation and "good governance" (Ministry of Urban Development 2015:6) and explicitly encouraged cities to use digital technologies. One example is the competitive use of proposals submitted to the federal government's (and Bloomberg Philanthropies') Smart Cities Challenge to "win" a place in the Mission (Ministry of Urban Development 2015). 100 SCM cities were chosen over a period of three years between 2016 and 2018 through multiple rounds of competition. The competition's proposal grading system assigned 16% of the final mark for participation (Khan, Taraporevala and Zérah 2018). The Government of India, positioning the SCM as

participatory and citizen-led development, demanded that cities demonstrate *how* and *how much* participation the ULBs conducted with their citizens to create their smart city proposal. One effect of this was that the easy quantification of online engagement took precedence (given the limited time windows, budget and capacity available) over face-to-face consultations. Consequently, the SCM resulted in aspirant smart cities creating websites, social media handles, and newsletters. While Joshi (2020) demonstrates that smart city websites were not maintained or updated after cities won a place in the Mission, there is no comparable study on social media use by Indian smart cities.

II.3. Precarity of internet freedom and rights

15 Discussions of the digitalization of urban governance (Parkar and Tawa Lama 2023) in the Indian context raise the contradiction between expanding rhetorical and physical support for digital communication and increasing state control over access to the internet. As noted above, the rising use of social media in India exists despite a severe digital divide based on socio-economic status, gender, ability, caste-identity and literacy, in the absence of a coherent legal and regulatory framework for internet access (Human Rights Watch 2022) and a concomitant encroachment on internet freedoms (Freedom House 2021). These contradictions operate at two levels—denial of digital infrastructure and a proliferation of arbitrary regulation of internet use; and an increasingly hostile environment around citizenship and rights in India.

16 First, the most striking incongruity between the rhetoric and practice of digital communication in India is the mundane act of repeatedly shutting down internet access. As Nyabola (2018) observes, not all nation-states offer internet access as an uninterrupted right. India presents the paradox of having the second largest number of internet users globally while holding the title of global "internet shutdown capital" (Krishnan 2023) for five consecutive years. The country has achieved this in large part due to the active role of state agencies, at multiple scales of government, advocating for "Digital India" with increased internet availability, government e-communications, and online services (Press Information Bureau 2022) while at the same time executing multiple blanket internet bans as well as more targeted social media bans of accounts and specific posts (Mukhopadhyay 2023; Sharma 2023). Till 2021, India was the democracy with the highest number of internet shutdowns globally. The number of shutdowns increased from three in 2012 to 109 shutdowns out of the global total of 155 shutdowns in 2020 (Business Standard 2021a; Alawadhi 2021).

17 Second, there has been an increase in regulations around the use of and access to digital communication. In 2018, the Ministry of Home Affairs put out an order that empowered ten government agencies the right to "intercept, monitor and decrypt" any computer resource (Ministry of Home Affairs 2018); these investigative entities could physically or virtually access any computer or device *without a warrant*. Other new regulations afford government bodies disproportionate control over use of the internet, including threatening platforms like Twitter with withdrawing their immunity from prosecution over user content if they do not comply with government demands to delete or block accounts (Press Information Bureau 2021). There are also more recent attempts by the federal government regulations in 2023 to determine what constitutes "fake information" and order all media platforms, including newspapers, to

remove online content (Ministry of Electronics and Information Technology 2023). We argue then, that it is imperative to locate the expanding space of e-governance and the use of social media as participation within these disconcerting developments of democracy in India in the digital sphere.

III. Smart city social media

III.1. Methodology and Limitations

18 At the time of writing, there was no comprehensive study of social media use by municipal and parastatal authorities in India. While there are no public databases of Indian government social media, our research found over 2,600 Twitter accounts for Indian government entities and individuals at federal, state and municipal levels.[6] To locate smart city Twitter accounts, we first used a manual search to identify SCM ULB and SPV handles and cross-referenced them with municipal websites. There are often multiple accounts for any given city[7] and most accounts are not verified by Twitter as "authentic"; ULB accounts, (29% verified), are four times more likely to be verified than SPV accounts (7% verified).[8] Not all cities had Twitter accounts for either or both organizations, but we identified Twitter handles for 97 of the 100 SCM cities; 89 SPVs and 69 ULBs.

19 We applied for, and were granted, Academic Research access to Twitter and used R (v4.1.2; R Core Team 2021) with RStudio (RStudio Team 2020) and academictwitteR (Barrie and Ho 2021)[9] to build a full timeline data set containing all tweets made by 157 of the 158 accounts,[10] ending on December 31, 2021 and starting with the first SCM city tweet in 2011. This data contains 265,478 tweets (190,002 municipal, and 75,476 SPV) and was joined to Census 2011 data for 95 cities.[11] We collected profile data for each account, including creation date, location, verified status, followers, following and tweet count. We also collected all 1,673,087 usernames followed by and following each of the 158 accounts in our dataset. Finally, we gathered all 4,380,407 tweets (from 693,370 users) where the 158 SCM account handles were mentioned[12] for the years 2011 to 2021.

20 We processed the text content of tweets by cleaning punctuation, digits, and frequently occurring English, Hindi, Marathi, and Bengali words with no substantive content ('stopwords'). We broke the text it into words or "n-grams" and sorted by frequency. This allowed us to note the frequency of words, bigrams, hashtags, and username mentions by individual accounts and groups of accounts (such as ULBs, SPVs, states, and city sizes). We later connected network analysis in which hashtags or usernames were the edges and usernames were nodes to observe frequencies across multiple accounts (see e.g. Ognyanova 2021). Lastly, we used topic modelling to determine themes among content (see e.g. Grün and Hornik 2011).

21 It is a limitation of our research that we approach Twitter use by Indian smart cities through Twitter data itself. Future research can and should investigate the production and reception of government social media communications in India to explore different understandings of this phenomenon by different actors. Other research could also investigate how the municipal employees and private consultants performing social media work ("digital marketing"?) on behalf of city governments, as well as who responds to them and why. We have limited information on the people interacting with

smart city government bodies through Twitter or their motivations for choosing the medium. We also do not know if smart cities follow up on complaints transmitted through Twitter more or less than complaints received through other channels; this would require access to internal data on ULB and SPV complaint handling. However, we regard it as significant that municipal bodies are registering complaints (and assigning complaint tracking numbers) via social media. In this paper we also do not consider visual media (images, posters, gifs, videos, etc.), but this could be a focus of future research (e.g. Rose and Willis 2019).

III.2. Social media lives of smart cities and municipal bodies

22 We group Twitter use by Indian smart city municipalities (urban local bodies or ULB) and parastatals (special project vehicles or SPV) into three phases. Initially, use is limited and confined to cities which were successful in early "rounds" of the SCM competition—we interpret this as reflecting competent and enthusiastic entrepreneurial governance already existing in these cities. The advent of the Covid-19 pandemic leads to a dramatic increase in the use of Twitter, both by smart city entities to promote Covid-response activities, and more importantly, their publics, who question and interact with their local government bodies in increased volume. The third phase that we identify is the adoption of Twitter by several major cities as an official channel for complaint registration—bypassing earlier models of e-governance based around e-kiosks or specific government web-portals.[13] Within these three phases of use, we identify contrasting patterns across parastatal (SPV) and municipal (ULB) users.

ULB and SPV patterns of tweeting

23 If Twitter is a channel for civic participation in the Indian smart city, it does not seem to be priority for SPVs. Municipal accounts are largely more active and consistent users, generate more original tweets, and interact more with users than SPV accounts. One in three SPV accounts has barely used the platform, double the proportion of similar municipal accounts.[14] Similarly, 40% of municipal accounts tweeted *at least* 30 times a month for over 60% of their life on Twitter; only 12% of SPVs tweeted as much for the same amount of time (Table 1: Consistency). ULB handles were more likely to have a larger number of "followers" (people who received their tweets) than SPVs.[15] It is possible that the municipal handles' consistent tweeting, improved their chances of having larger followers than SPV accounts (Dudley N.d.). ULB accounts for cities with larger populations had higher numbers of followers and the highest ratio of followers to accounts they follow.[16]

24 Municipal accounts were more responsive and replied to tweets more than twice as often as SPVs (32% of ULB tweets and 13% of SPV tweets were replies).[17] Municipal accounts also generated more original content, while SPV accounts retweeted others twice as often as ULBs (22% of SPV tweets and 12% of ULB tweets were retweets). We interpret the greater number of replies from ULB accounts as a more interactive use of Twitter than SPV accounts—and therefore a move, albeit small, towards more participatory use. Conversely, we interpret the SPV tendency to retweet as reflecting the relay of federal government campaign messages. Additionally, municipal accounts were more likely to use regional and national languages other than English, suggesting

interest in reaching a broader audience than the English-speaking elite. The average proportion of tweets including non-English words was much higher for municipalities[18] than that for SPVs.[19] SPV accounts were more likely to use non-English words if they tweeted more, but a linear model accounting for volume of tweets, found that the type of organization was still a significant predictor of vernacular-language use.[20]

Event driven use

25 The creation and use of Twitter handles (both municipal and SPV) appear to be event driven, spiking around the launch of the Smart Cities' Mission in 2015 and the Covid-19 pandemic in 2020. 2015 was the most active year for creation of SCM city Twitter accounts (30% of SPVs and 17% of ULBs). Most municipal accounts and all SPV handles were created after the launch of the Mission in 2015. Just 13 municipalities created accounts prior to the launch of SCM in 2015,[21] the other 56 municipalities created their accounts later. Similarly, only one SPV (Gwalior) created a handle in 2014, the remaining 91 SPVs created handles in or after 2015. The second busiest year for account creation was 2020 as the Covid-19 pandemic began (21% of SPVs and 17% of ULBs).

26 In addition to being event driven, the use of Twitter is disparate and does not ensure a consistent space for public participation. There is an increase in use between 2011 and 2021, by ULB and SPV accounts and others mentioning them, but municipal and SPV accounts differ in their frequency of use over time. Data shows considerable SPV tweeting around 2015 (the launch of SCM) and then a gradual decline, while ULB tweets gradually increased until 2020 when both categories of accounts begin to tweet prolifically (Plot 1). Accounts often did not tweet consistently until 2020 and the Covid-19 pandemic; between 2020 and 2021, the number of accounts tweeting once a day doubled for ULBs and tripled for SPVs[22] (Table 1). Similarly, between 2019 and 2020, SPV total tweets increased from 7,400 tweets to 27,000 while ULB total tweets jumped from 17,600 to 56,800.

City size and capacity

27 We found that cities with higher rankings in the SCM competition, and presumably better administrative infrastructures, were more consistent in their tweeting patterns and generated a more conducive space for public participation by being more responsive to tweets from citizens. The 100 smart cities were selected in six rounds between 2016 and 2018. As noted above, there are clear differences between the six rounds with first and second round cities tweeting more, and more consistently, from 2015 onwards. In 2021, cities awarded smart city status in round I and II of the SCM competition accounted for over 77% of tweets, while the "Fast Track" round (FT) and round III provide 19%. Mean tweets per city was highest for round I cities (4,741), and second highest for Round 2 cities (3,161). Round 1 and 2 are fairly consistent tweeters over time but increase in 2018 and then again in 2020. Fast Track and round III cities did not tweet extensively until 2020 and were likely galvanized by the Covid-19 pandemic. The final two rounds—IV and V—provided a negligible volume (0.2%) of tweets.

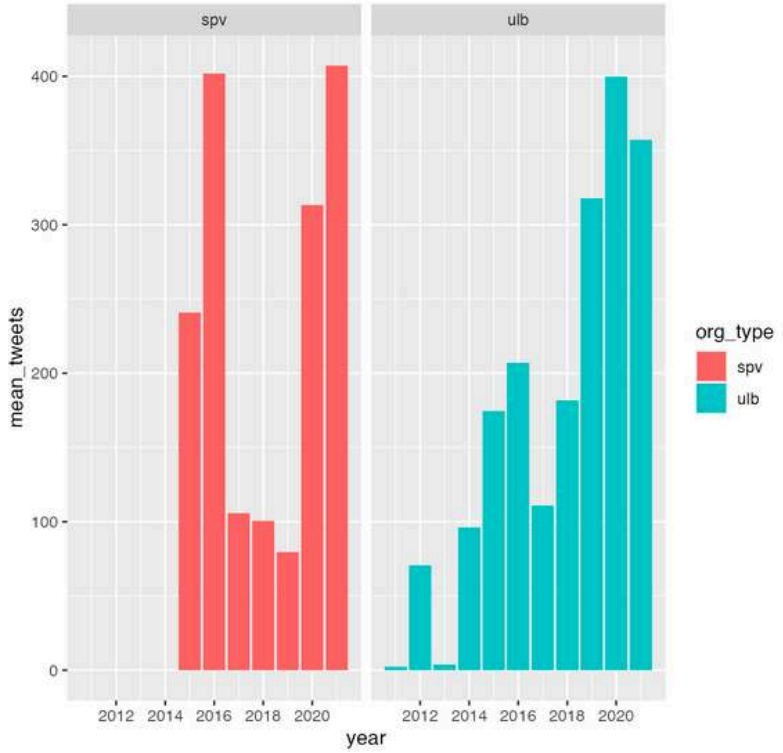
28 In addition to capacity, city population is important. Twitter in India is an urban phenomenon and Indian cities with larger populations tweet more[23] and are more

frequently mentioned by others. These cities were primarily located in western and North Indian states governed by the same political party as the federal government (the Bharatiya Janata Party or BJP) or were part of the wider BJP coalition government. States with the highest number of tweets[24] contain large, and frequently-tweeting cities (Mumbai, Pune, Pimpri-Chinchwad, Nagpur, Ahmedabad, Surat, Lucknow, Bhopal, Indore, Chennai).[25] This is similar to findings in the US that larger cities are more likely to use social media (Stone and Can 2021). Furthermore, a number of cities with a population of around two million are enthusiastic tweeters (Thane, Pimpri-Chinchwad, Bhopal, Vizag, Vadodara, Faridabad, Nagpur, Bhubaneswar), which perhaps reflects competition with larger and more prominent rivals (e.g. Mumbai, Pune, Indore, Delhi). This dovetails with the findings of Blasi, Gobbo, and Sedita (2022) who found that smaller Italian cities had greater municipal social media engagement.

Table 1: Number of SCM city accounts that tweeted at least once a day

	2015	2016	2017	2018	2019	2020	2021
ULB	3	4	6	10	14	30	37
SPV	2	6	2	7	5	16	14

Plot 1: Annual averages of mean monthly tweets by SCM cities (ULB and SPV)



Plot 2: Twitter mentions of SPV and ULB handles 2011–22

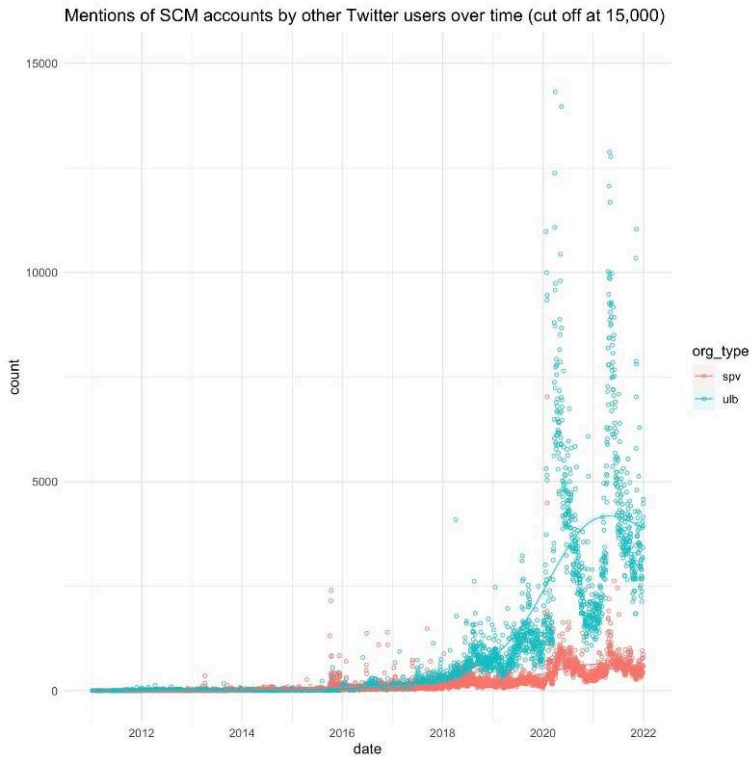


Table 2: Tweets by SCM round

Round	Round Winners Announced	Tweets	Cities	Accounts	Mean Tweets Account	Mean Tweets City	Ulb Spv Account Ratio
I	2016-01-28	94816	20	36	2633.78	4740.8	0.56
FT	2016-05-24	30555	13	22	1388.86	2350.38	0.59
II	2016-09-20	85345	27	44	1939.66	3160.93	0.61
III	2017-06-23	51079	27	42	1216.17	1891.81	0.64
IV	2018-01-19	3679	9	13	283	408.78	0.69
V	2018-06-20	4	1	1	4	4	1

III.3. Quality-of-life campaigns

29 We conducted analysis of word frequencies and networks, sentiments (i.e., the emotional register of content) and topic modelling (to group similar content). From this, we observe that while both sets of accounts are characterized largely by the relay of central government campaigns, SPV handles could be characterized as more concerned with "civic storytelling." These are dominated by positive sentiments through a promotion of local "quality-of-life" initiatives. ULB use tends towards the mundane realities of local government including a relatively negative emotional tone

reflecting the challenges of urban service delivery. For example, Bhubaneswar's SPV tweets can be grouped into seven topics: a local celebration of the city; quality-of-life survey; training initiatives for citizens; men's hockey at Kalinga stadium; girls' leadership and awareness raising in slums; play spaces in public parks; and the promotion of cycling. Bhubaneswar's ULB tweets, on the other hand fall into eleven topics: evictions in *basti*[26] encroachments; vaccinations; water and plastic campaigns; online bill payment services; ward management; Covid-19 case detection; garbage collection and civic cleanliness; food safety; and health awareness.

30 In our network analysis of ULB retweets, the Swachh Bharat handle is central in the ULB network indicating that it is the account retweeted by the largest number of ULB accounts. The handle for Swachh Bharat was mentioned 7,818 times by ULB accounts, nearly twice as often as the next most frequent handle (@nagarvikasup, 4,726 times). This supports the idea that ULB Twitter accounts are strongly connected to the federal government's Swachh Bharat Mission. The Ministry of Housing and Urban Affairs and Ministry of Health and Family Welfare are also widely retweeted. In the SPV retweets network, SmartCities_HUA, MoHUA_India and Secretary_MoHUA are all widely retweeted, although the SPV handles Bhopal_bscdcl, SmartCityPatna and SmartPune are more frequently retweeted.

31 Network analysis of ULB hashtags shows that they are dominated by Swachh Bharat and civic cleanliness and, later, Covid: #MyCleanIndia (6,832 uses across 38 accounts), #Covid19 (4,321 uses across 48 accounts), #SwachhBharatMission (3,383 uses across 24 accounts) and #SwachhBharat (3,282 uses across 44 accounts). SPV hashtags have a broader range of topics. The most common are #smartcity (3,599 uses across 46 accounts), #covid19 (2,929 uses across 32 accounts), and #mycitymypride (1,134 uses across 28 accounts). City-branding was prominent in SPV accounts with a focus on hashtags promoting cycling, open streets, healthy living, fitness, civic pride, road safety, and anti-plastic. Government departments and Covid-related tags are also evident. In the SPV hashtags, #smartcitiesmission was the 16th most frequent hashtag, #cycles4change is 6th most popular. "Cycles" or "cycling" are in the top 25 words for Chandigarh, Goa, Himachal, Jharkand, Lakshdweep, Madhya Pradesh, Nagaland, Odisha, Rajasthan, Telengana, and Uttarkhand.

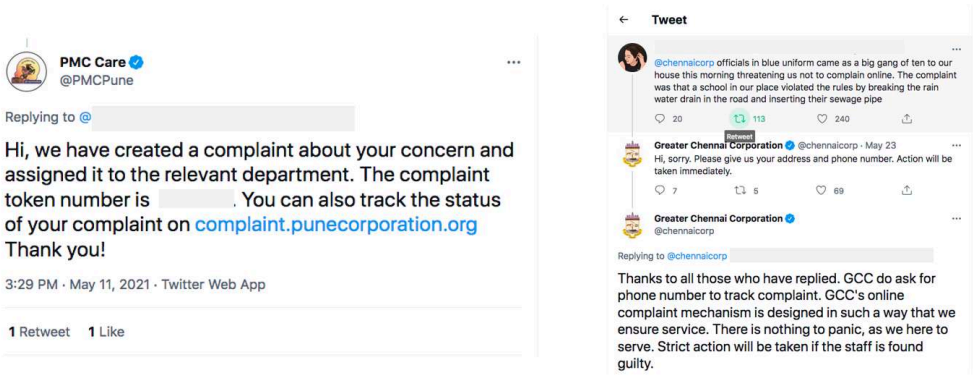
III.4. Complaints and civic engagement

32 Public participation through Twitter relies on interaction on the platform. As noted, interactive use of Twitter by Indian smart cities, particularly SPVs, appears to be relatively limited. Network analysis of mentions (@username) by smart city ULB and SPVs shows that federal government ministries are most frequently retweeted, quoted and mentioned. This is partly a function of aggregate analysis—each city has a specific range of quality-of-life or place branding initiatives that are apparent in individual analysis. However, we interpret the prominence of federal government campaigns in the data as reflecting a performance of participation, in the sense that smart cities are expected to use social media accounts for federal government public communications, and this has value independently of reception, or indeed, engagement with, local residents. That said, in some cities, there is evidence that Twitter has been increasingly adopted over time to channel complaint, satire and protest against smart city aspirations.

33 In India, tweets by other users *to* smart city handles show a high frequency use of the words "roads," "water," "waste" and "garbage." Other very common words, include "please," "action" and "help," suggesting that many tweets are complaints; indeed "complaint" is one of the most commonly used substantive words.[27] One in every fifteen tweets by ULBs and SPVs mentions complaints, one in seventeen tweets *to* SPVs mentions complaints, and 1/100 tweets *to* ULBs mention complaints (there are five times as many tweets to ULBs). The frequency of the word "complaints" in tweets *from* smart city ULB and SPVs shows a marked rise after 2018.[28] The move to accept complaints through social media appears to be a strategy adopted particularly strongly by certain cities, including Ahmedabad, Chennai, Pune and Thane (Dave 2017; Lopez 2022).

34 Beyond complaints, we also found online citizen mobilization against the discourse of city improvement. In Rajkot a campaign against a flyover displacing an Ambedkar statue, a focal point for caste tensions in the city, resulted in large spikes of tweets to smartcityrajkot (the ULB): 9,120 on May 16, 2020 and 31,736 on May 20, 2020. The next biggest spike is 30,124 tweets on June 5 of the same year directed at the Gujarat ULBs of Ahmedabad, Vadodara, Surat, Rajkot and Gandhinagar in protest against outsourcing of municipal services. Thus, interaction between citizens and cities on Twitter has potential for interaction beyond city branding and public relations. Municipal bodies, SPVs and (mostly higher income) residents use Twitter as a novel means to communicate with state functionaries and politicians who may previously have been hard to reach. In this way, Twitter opens a new informal, institutionally and legally ambiguous channel of communication between individuals and agencies, that is in some ways faster and more public than official and offline procedures.

Figure 1: Twitter complaint registration



35 Examining our data set in combination with census data (2011), we notice a strong relationship between Twitter use, income and gender. As noted, we collected around 4.3 million tweets where Twitter users mentioned SCM usernames between 2011 and 2021. In multiple regression analysis[29] of this data, population size,[30] combined with percentage of high-income population (annual income above INR 300,000) had a large and significant positive effect on mentions[31] while population combined with low-income population percentage (annual income below INR 150,000) had a large and significant negative effect.[32] This relationship holds with narrower income bands.[33] In addition, the proportion of male to female residents had a persistent effect; cities with

higher proportions of male residents had lower numbers of total mentions.[34] These four variables (population, high-income, low-income, and sex ratio) demonstrated significant relationships to city mentions, while other variables including state, literacy (general, male, female), graduate percentages (general, male, female), Scheduled Caste or Scheduled Tribe percentage of population, agricultural employment, population below 29 years or over 50 years did not show any significant relationship to quantity of mentions. When analyzed for individual years, over time general literacy appears to replace graduate percentage as a predictor of smart city mentions, but further research is needed to confirm these trends.[35]

36 With the emergence of Covid-19, there was a shift towards sharing information on the pandemic.[36] We think about participation with municipal and parastatal bodies on Twitter as following three stages. First, SCM cities on Twitter appear to be largely tweeting announcements in a one-way government to citizen communication style. This is followed by a second stage around 2018 as some cities introduce complaint-handling via Twitter (and other social media), moving social media into an e-governance function. An essential aspect of government is handed over to a global corporate platform where communication is necessarily public and partially outside government control. Adverse effects are possible. For example, a Chennai Twitter user reported a visit by "threatening" city officials who asked them not to complain about the municipality online (image above). A third stage of this process is the practice of citizens enthusiastically taking to Twitter to puncture local government aspirations to smart city status—a move from complaint to critique. A manual search for almost any smart city handle will reveal tweets publicly interrogating "smart city" claims in cities with obvious infrastructural and service delivery issues (Figure 2). Thus, similar to the situation in the United States noted by Epstein et al., Twitter is a popular channel for unofficial, as well as official, articulations of dissatisfaction (Epstein et al. 2021).

37 The pandemic impacted the use of Twitter by city governments and the smart city parastatal bodies and prompted a resurgence of tweeting by SCM accounts, especially SPV handles (that reduced tweeting after an initial post-account creation spike). Finally, the relationship between tweets, gender and education changed as more people began tweeting to municipal and SPV handles to get information from or critique the authorities during the pandemic. In 2020–21, travel bans and mandatory work from home regulations became the norm before being arbitrarily changed as regional and local governments sought to "return to normal" and were then caught up in new waves of the pandemic. Consequently, people often turned to Twitter for information on how far and where they could travel, vaccine and testing requirements, and medical facilities. Thus, while initially Twitter was used as one-way communication for city-branding and federal schemes public relations, around 2018, certain cities moved official complaint handling onto social media. Although public response to this was initially limited, as use increased during the pandemic, smart city handles were forced to become more participatory through a deluge of complaints. This is the point, we argue, when participation on Twitter moves from an invited space to an invented space, albeit elite dominated.

IV. Conclusion

38 This paper analyzed social media use to intervene in the debate on social media, participation and accountability. We provided a context for studying government social media use as e-governance by demonstrating that government authorities are actively involved on various social media platforms. Drawing on sociological texts on participation and critical work on digital and social media to move beyond "digital positivism," we situate computational study of smart city social media use within a broader critical understanding of society. While our paper uses digital data, we contextualize it within broader structural inequalities, such as the widespread digital divide as well as legal and executive government decisions that restrict access to the internet and freedom of expression. Social media in India, in relation to civic participation, should be understood against the changing landscape of e-governance, particularly the tension between increased focus on digital governance, reducing internet freedom and increasing the disparity of power between state and citizen.

39 Our empirical reading of Twitter-use by the municipal and parastatal bodies of 100 SCM cities in India argued that it is primarily driven by federal campaigns and later the Covid-19 pandemic, with strong promotion of government messaging. This continued beyond initial engagement during the pandemic.[37] ULB handles were more popular, responsive, and (relatively) more inclusive with a greater focus on local issues while SPV handles were more likely to retweet and amplify federal government schemes and communication. Municipal governments are more active and show greater attempted engagement with users than SPVs, who primarily project positive messaging around quality-of-life initiatives, which we refer to as "civic storytelling." While governmental social media guidelines promote social media for public participation, we find primarily government campaigns and city branding (Degen and Rose 2022), particularly for SPV handles. However, while Twitter interactions by smart city handles began as one-way communication (Gil, Cortés-Cediel, and Cantador 2019; Bennett and Manoharan 2016), or tokenistic participation (Arnstein 1969), online public complaints moved these interactions towards "invented" participatory spaces.

40 We locate these processes through an exploration of changing patterns of social media use (Epstein et al. 2021; Mergel and Bretschneider 2013). We argue that it is imperative to acknowledge not only what the digital data demonstrates but what legal and political processes allow. This paper provides a baseline reading of digital communication by Indian smart cities; empirical research on this topic can support a rights-based and reciprocal system of communication for citizen engagement with government. We suggest further study of government social media use to create, not just a more participatory e-governance, but deeper democratic processes to hold government agencies accountable and widen internet freedoms.

Appendices

41 Table 3: SCM cities and Twitter handles

Rank	city	round	state	spv_tweets	ulb_tweets

1	Bhubaneswar	I	Odisha	1754	7265
2	Pune	I	Maharashtra	6542	8758
3	Jaipur	I	Rajasthan	590	1066
4	Surat	I	Gujarat	1543	8542
5	Kochi	I	Kerala	118	98
6	Ahmedabad	I	Gujarat	171	11775
7	Jabalpur	I	Madhya Pradesh	779	39
8	Vishakhapatnam	I	Andhra Pradesh	1144	10949
9	Solapur	I	Maharashtra	115	671
10	Davangere	I	Karnataka	1	38
11	Indore	I	Madhya Pradesh	1378	Not available (NA)
12	Delhi (NDMC)	I	Delhi	110	3650
13	Coimbatore	I	Tamil Nadu	41	1833
14	Kakinada	I	Andhra Pradesh	176	311
15	Belagavi	I	Karnataka	18	NA
16	Udaipur	I	Rajasthan	174	NA
17	Guwahati	I	Assam	1	1127
18	Chennai	I	Tamil Nadu	1294	9363
19	Ludhiana	I	Punjab	114	NA
20	Bhopal	I	Madhya Pradesh	8328	4940
21	Lucknow	FT	Uttar Pradesh	6017	5725
22	Greater Warangal	FT	Telangana	118	1488
23	Dharamsala	FT	Himachal Pradesh	283	NA
24	Chandigarh	FT	Chandigarh	295	1058
25	Raipur	FT	Chhattisgarh	4939	5
26	New Town Kolkata	FT	West Bengal	582	452
27	Bhagalpur	FT	Bihar	153	75

28	Panaji	FT	Goa	69	NA
29	Port Blair	FT	Andaman and Nicobar Islands	3	1500
30	Imphal	FT	Manipur	9	NA
31	Ranchi	FT	Jharkhand	489	NA
32	Agartala	FT	Tripura	529	584
33	Faridabad	FT	Haryana	1729	4453
34	Amritsar	II	Punjab	288	335
35	Kalyan-Dombivali	II	Maharashtra	51	1825
36	Ujjain	II	Madhya Pradesh	1540	2421
37	Tirupati	II	Andhra Pradesh	655	453
38	Nagpur	II	Maharashtra	442	9538
39	Mangaluru	II	Karnataka	282	NA
40	Vellore	II	Tamil Nadu	198	NA
41	Thane	II	Maharashtra	30	19210
42	Gwalior	II	Madhya Pradesh	5621	NA
43	Agra	II	Uttar Pradesh	1484	1168
44	Nashik	II	Maharashtra	1	4887
45	Rourkela	II	Odisha	926	2186
46	Kanpur	II	Uttar Pradesh	91	6675
47	Madurai	II	Tamil Nadu	NA	839
48	Tumakuru	II	Karnataka	1234	NA
49	Kota	II	Rajasthan	78	62
50	Thanjavur	II	Tamil Nadu	19	NA
51	Namchi	II	Sikkim	4	NA
52	Jalandhar	II	Punjab	224	918
53	Shivamogga	II	Karnataka	348	NA
54	Salem	II	Tamil Nadu	115	175

55	Ajmer	II	Rajasthan	467	150
56	Varanasi	II	Uttar Pradesh	1995	4811
57	Kohima	II	Nagaland	247	NA
58	Hubballi-Dharwad	II	Karnataka	368	1341
59	Aurangabad	II	Maharashtra	360	NA
60	Vadodara	II	Gujarat	11	11272
61	Thiruvananthapuram	III	Kerala	251	NA
62	Naya Raipur	III	Chhattisgarh	NA	2809
63	Rajkot	III	Gujarat	22	5567
64	Amravati	III	Andhra Pradesh	NA	1785
65	Patna	III	Bihar	2054	1842
66	Karimnagar	III	Telangana	93	NA
67	Muzaffarpur	III	Bihar	554	NA
68	Puducherry	III	Puducherry	NA	NA
69	Gandhinagar	III	Gujarat	NA	682
70	Srinagar	III	Jammu and Kashmir	389	1322
71	Sagar	III	Madhya Pradesh	1901	341
72	Karnal	III	Haryana	789	1131
73	Satna	III	Madhya Pradesh	707	732
74	Bengaluru	III	Karnataka	NA	NA
75	Shimla	III	Himachal Pradesh	20	5
76	Dehradun	III	Uttarakhand	280	210
77	Tiruppur	III	Tamil Nadu	37	1538
78	Pimpri Chinchwad	III	Maharashtra	9169	4666
79	Bilaspur	III	Chhattisgarh	1039	2
80	Pasighat	III	Arunachal Pradesh	1	NA
81	Jammu	III	Jammu and Kashmir	346	1700

82	Dahod	III	Gujarat	56	NA
83	Tirunelveli	III	Tamil Nadu	529	353
84	Thoothukudi	III	Tamil Nadu	NA	1336
85	Tiruchirappalli	III	Tamil Nadu	26	622
86	Jhansi	III	Uttar Pradesh	114	2830
87	Aizawl	III	Mizoram	81	NA
88	Allahabad	III	Uttar Pradesh	NA	848
89	Aligarh	III	Uttar Pradesh	NA	2300
90	Gangtok	III	Sikkim	NA	NA
91	Silvassa	IV	Dadra and Nagar Haveli	15	1371
92	Erode	IV	Tamil Nadu	4	NA
93	Diu	IV	Daman and Diu	7	101
94	Biharsharif	IV	Bihar	131	NA
95	Bareilly	IV	Uttar Pradesh	115	NA
96	Itanagar	IV	Arunachal Pradesh	9	49
97	Moradabad	IV	Uttar Pradesh	6	563
98	Saharanpur	IV	Uttar Pradesh	NA	1266
99	Kavaratti	IV	Lakshwadeep	42	NA
100	Shillong	V	Meghalaya	4	NA

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NOTES

1. There are several markers of inequality in India, however at a basic level India is 131st out of 189 countries on the Human Development Index and the top 10% of the Indian population holds 77% of the total national wealth, while around 10% of the nation's population live on less than $1.90 (US dollar) a day. (BBC N.d.; Oxfam N.d.)

2. The digital micro-blogging platform, Twitter, was renamed "X" on July 23 2023.

3. Parastatal agencies that are government owned but have "a market orientation in their financial discretion, internal organizational flexibility, and lower levels of citizen participation and accountability" (Balakrishnan 2013:786)

4. Other social media use by platform: WhatsApp 81.2%, Instagram 76.5%, Facebook 74.7%, Telegram 56.9% and Facebook Messenger 49.3% (Kemp, we are social, and Kepios 2022:54)

5. Facebook changed research access after the Cambridge Analytica scandal, meaning that we were unable to computationally access Indian Smart City Facebook presences.

6. We searched for profiles containing the English words "India OR {NAMES OF 28 STATES} AND Government OR Ministry OR Member Parliament OR Member Legislative Assembly OR Member Municipal OR Corporator OR Councillor OR municipal" and then screened the data to remove false positives. We assume the actual number to be higher.

7. For example, "SmartCityFbad" appeared to be an official account, but was subsequently suspended, while "smartcityfbd" is the official Faridabad SPV account. "GVMC_VISAKHA" is the official ULB account for Visakhapatnam, while "GVMC_OFFICIAL" was, we think, the Mayor's account. GVMC_OFFICIAL is now no longer available, but was still mentioned by federal government ministries

8. Requirements, which include active use and a link to an official government website in profile, are described at https://help.twitter.com/en/managing-your-account/about-twitter-verified-acounts

9. Other R packages that made this research possible include: ggplot2 (Kassambara 2020), ggraph (Pedersen 2021), igraph (Csardi and Nepusz 2006), janitor (Firke 2021), knitr (Xie 2015), reactable (Lin 2020), ragg (Pedersen and Shemanarev 2021), rtweet (Kearney 2019), sjPlot (Lüdecke 2021), SnowballC (Bouchet-Valat 2020), stopwords (Benoit, Muhr, and Watanabe 2021), Syuzhet (Jockers 2015), tidygraph (Pedersen 2020), tidytext (Silge and Robinson 2016), tidyverse (Wickham et al. 2019), tm (Feinerer, Hornik, and Meyer 2008), topicmodels (Grün and Hornik 2011), Twitmo (Buchmueller et al 2023)

10. Tweets posted by the PunePMC account prior to January 2021 are no longer accessible

11. Two greenfield cities (Amravati and Naya Raipur) are not included in 2011 Census data

12. We searched for "USERNAME," not "@USERNAME," because we wanted to include "sub-tweets" where the username is referred to in a tweet without being alerted to the discussion by Twitter.

13. Compare the push for, adoption of and transformation of open data by government agencies (Barns 2016)

14. 33.7% of SPVs had posted fewer than 108 tweets, the lowest quartile of tweets by volume, compared to 14.1% of ULBs.

15. ULB followers: minimum 24, median 3,848, mean 19,528, maximum 241,241; SPV followers: minimum 11, median 650, mean 2,917, maximum 67,501. 45 SPV accounts had fewer than 500 followers while only 18 municipal handles had fewer than 500 followers. Profiles data was collected December 15, 2021 and updated on May 25, 2022 and May 30, 2022.

16. Number of followers: Ahmedabad ULB 221,759; Bhubaneswar ULB 218,263; Chennai ULB 178,595; Pune ULB 132,610; Thane ULB 64,695; Nagpur ULB 49,098. These ULB typically followed under 100 accounts.

17. This is higher than in some other contexts (Cho and Melisa 2021).

18. 30% median, 36% mean

19. 0.06% median, 17% mean

20. $p < 0.001$

21. Eight ULBs created their Twitter handles prior the launch of Swachh Bharat Mission in October 2014

22. These accounts changed from year to year, not all 30 ULB accounts that tweeted at least once a day in 2020, are present in the 37 accounts that tweeted once a day in 2021. This was also true for SPV handles. The number of consistently tweeting SPV handles decreased between 2020 and 2021

23. Tweets from smart cities: Pearson correlation between population and tweet volumes, rho = 0.52, p = <0.01; Pearson correlations between mentions by other users and tweet volumes 2018: rho = 0.29, p = <0.01; mentions 2021: rho = 0.26, p = <0.05. The relationship holds when accounts are split by organisation type but is stronger for ULBs: Tweets from ULBs: Pearson correlations: ULB rho = 0.49, p = <0.01; SPV rho = 0.28, p = <0.01. Mentions 2018: ULB rho = 0.5, p = <0.01; SPV rho = 0.29, p = <0.05. Mentions 2021: ULB rho = 0.42, p = <0.01; SPV rho = 0.15, p = 0.23 (not significant)

24. Total SCM city tweets by state: Maharashtra (66,265), Gujarat (36,641), Uttar Pradesh (36,008), Madhya Pradesh (28,727), Tamil Nadu (18,322)

25. State was not a significant predictor of tweet volumes when city population was included in multiple regression

26. Self-built low-income settlements which do not comply with planning regulations.

27. One of the top 25 words per city per year; 26 times, with 23,164 uses

28. In tweets by SCM cities, "complain" is used 48 times in 2017; 349 times in 2018; 3,081 times in 2019; 5,124 times in 2020; 14,561 times in 2021.

29. Multiple linear regression was used to determine whether demographic variables from census data significantly predicted total volume of Twitter use mentioning SCM city accounts. The fitted regression model was *mentions ~ population + percentage of population with annual income over INR300,000 + percentage of population with annual income below INR150,000 + male percentage of population.* The overall regression was statistically significant ($R^2 = 0.66$, F-statistic: 33.90 on 4 and 70 DF, p-value: <0.001, adj. $R^2 = 0.64$).

30. coefficient = 0.08, p = <0.001

31. coefficient = 5.37e+07, p = 0.027

32. coefficient = -6.90e+07, p = 0.045

33. above INR 545,000, p = 0.034; below INR 45,000, p = 0.086

34. coefficient = -1.82e+06, p = 0.002

35. In 2016, the percentage of graduates in the population is a significant predictor of SCM city (ULB and SPV) mentions (coefficient = 30,293, p = 0.016). In 2017, graduate percentage is also significant for smart city mentions (coefficient = 70,054, p = 0.004), while ULB mentions are negatvely related to SC population (p = 0.011) and SPV mentions are positively related to female graduates (p = 0.09). In 2018, however, graduate percentage is no longer significant. Once again in 2019, mentions show a significant relationship to graduate percentage (coefficient = 57,133, p = 0.089), while ULB mentions show a significant relationship to population (p = <0.001), male literacy (coefficient = 790.74, p = 0.07) and female literacy (coefficient = -751.41, p = 0.05); SPV mentions show no relationships to these variables. By 2020, the graduate percentage is not significant and ULB mentions are only significantly related to population (coefficient = 0.01, p = <0.001), male literacy (coefficient = 1,627, p = 0.136) and female literacy (coefficient = -1,224, p = 0.19). In 2021 as well, the graduate percentage is not significant and mentions for ULB and SPV only show a significant relationship to population.

36. ULB hashtags are dominated by Swachh Bharat and civic cleanliness and, later, Covid. Similarly, SPV hashtags promote smart city campaigns and later focus on Covid. Thus, the city-

branding prominent in SPV accounts is most obvious in pre-2020 data due to the rise in tweets related to the pandemic.

37. In final stages of writing this paper, we gathered smart city tweet data for 2022. There were 130,981 tweets, equivalent to 49% of smart city tweets 2011–21 and a 130% increase on 2021. This suggests that changes in Twitter use prompted by the pandemic have continued post-Covid.

ABSTRACTS

The place of social media in democratic governance is contested. Advocates suggest that it increases institutional accountability and/or public participation, while critics see it as promotional and polarizing. Research on social media use by city governments finds both citizen engagement and city branding, however, little is known about the digital lives of urban governments in India. Here we examine social media use amongst India's 100 Smart City Mission cities against the wider context of uneven and precarious internet access. We focus on Twitter, a platform routinely used by Indian governments and politicians, through an original dataset of over 4.5 million tweets over ten years—including full timelines for 97 smart cities—to explore social media behaviors and public responses. We argue that 1) while municipal bodies and smart city parastatal entities have different patterns of Twitter use they both work within a framework of city marketing and "civic storytelling"; and 2) although participation initially falls within a performance of tokenistic one-way government to citizen communication, we can trace an evolution of social media use driven by online complaints prompting government response.

INDEX

Keywords: India, social media, urban, governance, branding, participation, technology, Twitter

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