This PDF includes a chapter from the following book:

Installing Automobility
Emerging Politics of Mobility and Streets in Indian Cities

The title-level DOI for this work is:

doi:10.7551/mitpress/12399.001.0001

2   Locating Congestion in Bengaluru

Narrative of a "Congested Bengaluru"

Talk of traffic congestion in the contemporary city of Bengaluru, arguably more than any other city in India, is omnipresent in public discourse and popular culture. What is particularly notable is that this talk is anything but homogeneous. Multiple threads interweave and enrich the narrative of congestion in the city. The heterogeneity of congestion is due not only to multiple forums and venues where a range of people have voiced their interpretation, opinion, expertise and even exasperation regarding the pervasive presence of congestion in Bengaluru city but also to the plurality in the narrative of traffic congestion with its multiple generative bases. By far the dominant base for the narrative of a congested Bengaluru is the enormous growth in automobiles in the city. Other sources, such as lack of interagency coordination, flooding, worker unrest, and the morphological structure of the city, have all contributed to the constitution of the narrative of a congested Bengaluru.

One recent contributor to the automotive population growth thread of the "congested Bengaluru" narrative is IBM, the multinational corporation that most people still associate with personal computers and business automation. IBM seeks to transform itself as a major player that provides management solutions at a planetary scale to governments, cities, and communities. A significant thrust in its corporate strategy has been to employ predictive analytics, collected from a plethora of sensors, to design management solutions for creating what it calls smarter cities. Designing a smarter transportation management network is one key sector for IBM to intervene in order to transform the organization of urban infrastructures of service provision. The exponential growth of vehicular traffic on city roads, IBM suggests, is the pivotal reason behind traffic congestion.[1]

In 2011, IBM conducted the Global Commuter Pain Survey with the aim of advancing its agenda of smart transportation. The study surveyed 8,042

commuters from twenty cities across six continents to gauge their subjective perception of the "emotional and economic toll" of daily travel to work (IBM Corporation 2011).[2] A key finding of the survey was that Bengaluru had the sixth worst commuter pain index among the twenty surveyed cities with an index score of 76. This score compared positively with respect to cities like Mexico City (108) and Beijing (95) but was noticeably inferior to the corresponding indexes for Los Angeles (34), New York (28), and London (23). This particular finding received some attention in local, national, and international news media, with articles confidently stating that residents of Bengaluru, as a result of its explosive and largely unplanned, growth, now suffered the sixth worst commute in the world.[3] The fact that only twenty cities around the world were surveyed and that the survey was subjective in scope was all too often overlooked in the rush to frame a newsworthy story. Thus, *Times of India*'s Bengaluru edition titled the story, "Bangalore Is the 6th Worst City in the World for Commuting."[4] The story interviewed a few car commuters who corroborated the storyline: all roads are packed with cars and there is limited space for parking all these cars in the central business district.

IBM's answer to traffic congestion through a technologically intensive system of traffic management that brings together demand-responsive protocols with interconnected devices finds some resonance in the popular narrative of a congested Bengaluru burgeoning with automobiles. The *Times of India* commissioned the market research agency Synovate to conduct a survey of commuters to inquire about the reason behind traffic congestion, and a quarter of the survey participants saw the need for improved systems of traffic management.[5] The reliance on new technological devices, such as surveillance cameras and intelligent software protocols, as tools to boost the effectiveness of monitoring and decongesting city streets in real time is a recent consideration.[6] These devices for managing traffic congestion were integrated with the involvement of Bengaluru's major software companies into a comprehensive plan (Bangalore Traffic Improvement Project [B-TRAC] 2010) to modernize traffic management in Bengaluru and "to address the issues of traffic congestion caused by spiraling vehicular growth in the city" (Ramanayya and Anantharamaiah 2008).[7] Launched with the objective of reducing traffic congestion in the city by 30 percent, more than half of B-TRAC 2010's budget was earmarked for implementing an intelligent transportation system, including surveillance and enforcement cameras, as well as interconnected traffic signals.

Occasionally other threads, intertwined within the popular discourse of a congested Bengaluru, become visible in the public limelight. One

significant strand of the narrative is a reliance on piecemeal solutions to manage congestion. These may be proposed by any of the multiple state-level bureaucracies that control different aspects of infrastructure development, land use and planning, traffic movement, public transport, and road maintenance. For example, Bangalore Development Authority (BDA), as the local planning and development authority, is tasked with enforcing the city's master plan and with developing housing and infrastructure that conforms to prevailing planning norms. Of late, organizations such as the Directorate of Urban Land Transport and the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) have been tasked with conceiving and implementing infrastructure-based solutions to the problem of traffic congestion. These different actors bring with them a range of preferred solutions: infrastructures such as flyovers and signal-free corridors, incentive schemes such as congestion tax, dedicated lanes for buses or cycles, or policy innovations such as a parking policy. The presence of multiple institutional actors with their varied, often mutually incompatible solutions is yet another facet of the narrative of traffic congestion in contemporary Bengaluru.[8] A related facet of the problem of congestion is the absence of a comprehensive integrated strategy to address the rising tide of traffic blockages.[9] Instead, a piecemeal approach is prevalent, with each actor proposing an innovative solution that addresses the problem as they see it. It is another matter that many of these innovations either remain on the drawing board because they are impractical (conceived with limited citizen input or are not applicable in the local context), or because Bengaluru's civic agencies do not have the funding to implement them. In other situations, innovations are introduced on a limited basis with much popular fanfare but then are rarely scaled up to make any significant impact. A good example was the introduction of bicycle lanes in some residential areas of the city.[10] Despite an enthusiastic start, they ceased to function according to plan for several reasons, such as encroachment by motor vehicles, poor police enforcement, and the absence of coordination among different agencies.[11]

In comparison with these systemic strands in the congested Bengaluru narrative, an episodic aspect is often seen in the city's congestion narrative. Traffic disruptions, often extensive in scope, are triggered by a particular alignment of events: heavy rains, sporadic instances of worker agitation, or the arrival of an extended holiday weekend, for example. Bengaluru's landscape was once studded with man-made lakes (referred to locally as tanks) that were interconnected by water channels. This system of tanks and channels served an important purpose of regulating stormwater flows. With

largely unregulated urbanization, many of these tanks and their intercon-
necting channels have been encroached on or built over, thereby disrupting
routine hydrological flows. As a result, heavy monsoon rains invariably spark
flooding, making several city roads impassable by cars. Flooding is thus one
periodic factor behind instances of congestion and disruption in the city.[12]
Similarly, mass rallies, strikes, and protest marches have also had the effect
of sabotaging fluid flows of traffic, often drawing the ire of middle-class
urban residents whose daily commuting routines face disruption.[13] One
example was the result of a protest organized by nonunionized garment
workers that blocked traffic movement on several arterial roads.[14] Another
feature peculiar to Bengaluru is the incidence of enormous traffic blockages
coinciding with the onset of an extended holiday weekend. Such week-
ends provide opportunities for recent migrants to the city to return to their
extended families living in other parts of the state or in adjoining states.
The result is that the regions surrounding the city railway station and the
intercity bus terminus (popularly referred to as Majestic) are overwhelmed
by vehicles ferrying travelers. These periodic events of traffic congestion are
in many ways related to unique urban attributes of Bengaluru—its structure
where the predominant mobility hubs for intercity rail and road travel are
concentrated close to the historical center of the city and to the administra-
tive and political establishments of Karnataka state.

How do we make sense of the multiple threads woven within the narra-
tive of a congested Bengaluru? What can we understand from a narrative
of congestion that is as varied and differentiated as to encompass the call
for smart transportation systems that will flexibly and in real time reduce
traffic congestion and at the same time include traffic blockages caused by
the episodic flooding of city streets, a result of the widespread illegality in
land use regulation? Historicizing congestion and its many manifestations
in Bengaluru is one way to understand its contemporary significance for
the installation of automobility in the city. Such an inquiry requires us to
broaden the scope of examining congestion purely in instrumental terms
as a response to the ever-increasing (human and vehicular) population in
the city. But this is a challenging venture because historicizing congestion
in ways that unravel its complex sociopolitical genealogy is particularly
difficult given the predominance of linear, technologically determinist,
and internalist accounts of congestion in several fields, such as economics,
engineering, and public policy. Such linear accounts are promising for these
fields because they justify their methods to intervene in cities to rescue
them from the crisis of vehicular congestion. Prior to locating congestion

and Bengaluru in a historical context, therefore, I make a detour into the history of congestion in Western cities in order to identify the particular moment when dehistoricization and instrumentalization became the norm in the efforts to address congestion.

Instrumentalization of Traffic and Congestion

Traffic congestion has become commonplace in cities around the world. But historians have confirmed that urban congestion, and specifically traffic congestion, has a long recorded history going back all the way to the ancient city of Rome in the last century before the Common Era.[15] A far more intense curiosity regarding traffic and congestion is visible among historians of industrializing Western cities between the mid-nineteenth and mid-twentieth centuries, arising largely from the need to explain the extraordinary automobile centricity of contemporary urbanism in these contexts. For most of the nineteenth century, congestion in Western city centers was characterized primarily by a range of nonmotorized vehicles, such as carriages, wagons, horse-drawn omnibuses, and rail-bound horsecars, competing for road space with pedestrians (McShane and Tarr 1997). Despite scientific managerial efforts to transform the urban horse into a living machine (McShane and Tarr 2007), horrific instances of human and animal casualties, not to mention logjam congestion in cities, contributed to a widespread desire to replace the horse as the prime mover of urban mobility. By the first decade of the twentieth century in the United States, internal combustion engine–powered automobiles were fast taking over as the preferred mode for urban travel.[16]

The arrival of the automobile age in the United States and Western Europe, accompanied by the occupation of city streets by cars, historians have noted, was a particular historical achievement made possible in part by powerful social and economic arguments (McShane 1994; C. W. Wells 2012).[17] Despite this, traffic congestion was eventually recast as the excessive concentration of personal automobiles on city streets. Such a characterization was especially convenient for the development and professionalization of measures to control automotive traffic and congestion. Thus:

> The growth of motorization in the 1920s often preceded effective traffic control and management. This led to both chaotic confusion and congestion in many business centers.…These conditions led many cities to (1) establish traffic regulations and controls, (2) remove produce markets from central cities, and (3) increase the width of streets. Chicago, for example, relocated the South Water Market, built two-level Michigan Avenue and Wacker Drive, (4) banned left turns in the "Loop," and

(5) signalized downtown intersections. Other cities also began to manage their traf-
fic, and the field of Traffic Engineering emerged. (Falcocchio and Levinson 2015, 20)

What is apparent from this quotation is the causal emergence of measures
to tackle the rise in traffic congestion in American streets and, with it, the
creation and spread of the field of traffic engineering. It would appear that
as the number of cars increased on the roads, decision makers, engineers,
and city managers acted in a concerted fashion, aided by a compliant pub-
lic, in refashioning roads and cities to the imprint of the automobile. Peter
Norton's 2008 work, *Fighting Traffic: The Dawn of the Motor Age in the Amer-
ican City*, is particularly illuminating because he spotlights the struggles
associated with refashioning the city. He demonstrates how this process
of the takeover of city streets in the United States by the automobile was a
contingent achievement marked by fiercely fought disputes that sought to
alternatively discipline the pedestrian and the driver. The linear, unprob-
lematic emergence of the field of traffic engineering in response to the
growing chaos and congestion of automotive traffic is thus an outcome of
the dehistoricization of a complex political achievement. By dehistoricizing
the contingent achievement of reserving and reforming road space for the
exclusive use of automobiles, the marks of struggle and opposition have
been elided. In its place, instrumental pathways for managing congestion
that were originally outcomes of struggle have become the norm.[18]

The period immediately after World War II witnessed the consolidation
of automobility in European and American cities. New methods of trans-
portation engineering, such as road traffic capacity studies, road design,
and urban planning initiatives such as inner-city freeways, parkways, grade
separators, and underpasses emerged to tackle the headlong growth in
automobiles in Western cities.

Traffic engineering control methods alone could not keep up with the growing
traffic demands. Congested conditions in cities were eventually alleviated by the
freeway construction associated with the Interstate Highway system. Many cities
built radial freeways with central area freeway loops that diverted through traffic
from city streets. (Falcocchio and Levinson 2015, 24)

Faced with clogging cities, decision makers in many Western cities were
hard-pressed to adopt comprehensive policy prescriptions for ameliorating
the congestion or deconcentrating it. Thus, planners in many cities in the
West, especially in United States, responded by proposing a grid of intracity
urban freeways that diverted traffic away from the congestion in the inner-
city core (contributing in a real way to their postindustrial disemboweling).
New York City, according to Maxwell Lay (2011), demonstrated this shift to

the fullest through the efforts of Roberts Moses, the city's "master builder." In an effort to stay ahead of traffic congestion, Lay notes, "From 1934 to 1968, Moses presided dictatorially over infrastructure construction in New York and built 16 motorways, seven major bridges, and 416 miles (670 km) of parkway" (Lay 2011, 39).[19]

In comparable fashion in the UK, the *Traffic in Towns* report (also known as the Buchanan report), submitted in 1963 to the Ministry of Transport, exemplifies the burgeoning interest in remaking cities in the imprint of the automobile through a hierarchy of distributor roads and highways. But at the same time, the Buchanan report articulated a new dimension in the response to traffic and congestion: restricting automobile use in the interest of safeguarding what it referred to as "environmental capacity." In achieving this goal, the report called for prioritizing collective movement through public transport over those undertaken privately (Ministry of Transport 1964; see also Buchanan 1983). Despite its stated mission to conserve cities in the face of the onslaught of automotive traffic, others have proposed that an overarching imperative of the Buchanan report was to provide for cars, thereby installing driving as a privileged mode of urban mobility (Hillman 1983).[20]

The past hundred years of automobile presence on city streets have been witness to the rise of the fields of transport engineering, traffic studies, and urban transport planning that seek to tackle the presence of congestion on city roads. What is extraordinarily significant about the rise of these fields of traffic management is the subtle erasure of specific social, political, cultural, and spatial acts that together facilitated their growth and establishment. Thus, I argue that the sole identification of the automobile with the experience of traffic congestion is a product of dehistoricizing a specific period of urban change in Western cities.[21] It is this process of dehistoricizing that not only allowed the development of the fields of transport engineering and road design (themselves a product of erasure) but also promoted policy interventions (such as those advocated in the Buchanan report) that paradoxically attempted to untie the bonds that tie together congestion and automobile growth.

In the face of the pervasive dehistoricizing of traffic congestion from spiraling automotive growth, a historically rooted understanding of congestion as a sociopolitical process is very much necessary. Single-dimensional, and often linear, narratives of congestion as automobile growth have translated into a picture of cities being overwhelmed by their vehicular population. These then become the basis for multiple instrumental modalities of intervention into the problem of congestion. In unraveling the evolution of the narrative of congestion in Bengaluru, we adopt a historically embedded

framing of congestion as a complex sociospatial process that possesses different aspects in different time periods. The existence of these aspects has contributed to the constitution of the complex narrative of congestion in contemporary Bengaluru.

Layers of Congestion in Bengaluru

Most historical accounts of Bengaluru begin from the mid-sixteenth century when the city was raised as a fortified market town at the intersection of prominent trade routes in the southern part of the Deccan Plateau (an elevated table land occupying much of peninsular India). Emerging as a stronghold of Kempegowda (1510–1570), a regional chieftain (*palegar*), the city was founded in 1537 by a grant from Achyuta Raya, a king of the Vijayanagara Empire (Hasan 1970, 1; Stein 1987, 83).[22] The settlement of Bengaluru at that time was composed of a fortified stronghold with a cluster of settlements that took root just north of the fort. The fort and settlement together formed the nucleus for the city. Reflecting the variability of the political climate in medieval South India, the settlement (referred to as *peté* or market), similar to the fort, was enclosed within mud walls and surrounded by a thorn-filled moat.

In the past five centuries, Bengaluru has grown from that medieval nucleus into the sprawling metropolis with a vehicular population of more than 7 million. How does one relate the history of five centuries with its specific sociocultural and political economic shifts to the particularly vexatious situation many find themselves in today vis-à-vis congestion? How does one explain the intertwining of different strands in the narrative of congestion in Bengaluru, be it vehicular growth, multiple bureaucratic interventions, flooding, worker unrest, or morphological structure of the city? The means to answer this question is to rely on history as a resource. Colin Divall, a historian of transport and mobility, has enjoined us to create a "usable past" (Divall 2010, 939). History in this understanding (especially its record of generations of social, political, and economic choices) is a context that exerts a powerful shaping influence on restricting how we view contemporary issues, as well as the range of choices available in addressing them.[23] History then becomes an important tool to not only understand how the present (of a congested city) came to be but also reveals how we perceive congestion in a particular way while disregarding other aspects of congestion in plain sight.[24]

Accordingly, I present a layered periodization of the history of congestion in Bengaluru over the past two centuries. But despite this expansive focus, much of the period of interest is on the twentieth century.[25] Table 2.1 presents the periodization of the evolution of congestion in Bengaluru.

This schema recalls similar yet different periodizations of urban change in the city. Pani (2009) presents stages in Bengaluru's emergence as a resource city in different historical phases of globalization: a colonial stage, a garment stage, and an information technology stage. While Pani adopts a predominantly macropolitical economic reading of urban change, Nair's (2013) nuanced understanding of urban change, fostered through the complex interaction of power, spatial intervention, and urban organization, presents a periodization that centers on stages of urban modernization. Thus, Bengaluru's existence as a modern city is constituted through sequential phases of indigenous modern, colonial modern, national modern, and global modern—each with its characteristic urban form and particular techniques of exerting institutional power to make spatial organization.

In table 2.1, I set out four phases of congestion spanning a period of more than two hundred years to historically locate the experience of congestion in Bengaluru. I record four phases of congestion in four sequential periods—native congestion (1799–1881), bacteriological congestion (1881–1949), unplanned congestion (1949–1991), and flow congestion (since 1991). I assess each phase of congestion along four axes: key actors, diagnosis of congestion, spatial intervention, and residues. The first axis lists the actors who in each period have been confronted and provoked by what

Table 2.1
Periodization of Congestion in Bengaluru

Phase of Congestion	Key Actor(s)	Diagnosis of Congestion	Instrumental Intervention	Residues
Disorderly congestion (1799–1881)	Colonial government	Native disorder	Parallel city, "British" municipalization	Colonial enclaves, materialized offices
Unhealthy congestion (1881–1949)	Mysore government	Unhealthy overcrowding	Planned layouts, technological instruments	Sanitary water drains, sociospatial segregation
Unplanned congestion (1949–1991)	Planning bureaucracy and parastatals	Unplanned growth and population increase	Master planning, green belt, satellite townships, industrial dispersion	Pervasive illegalities Parastatal organizations
Blocked congestion (1991-present)	Public private partnership, Special Purpose Vehicles (SPV)	Blockage of flows	Infrastructure—flyovers, expressways	Middle-class aesthetics and land speculation

they see as a debilitating malaise at play in the city. I depict this malaise as a form of congestion, a justifiable leap given the multiple connotations associated with the word "congestion."[26] I rely on the plurality of meanings associated with the term to periodize and diagnose congestion in each phase, even when actors in these phases might not consciously self-identify the malaise as congestion. The perception of this malaise changes in each phase, and I employ the next axis, diagnosis of congestion, to assess how actors have problematized the malaise pervading Bengaluru. A diagnosis of congestion in the city becomes the impetus for the key actors of that phase to intervene in reordering urban space. The next axis catalogs the spatial interventions that have been authored in Bengaluru to address the diagnosis of congestion. The final axis describes the residues or outcomes that have manifested in the long run from the spatial interventions in the city. Spatial interventions to decongest the city often possess consequences that are not immediately evident but instead manifest themselves over time as residues on the social, political, and spatial fabric of Bengaluru. These residues then induce particular manifestations of urban morphology, land use, and infrastructures, which in turn shape the experience of congestion in the city.

Disorderly Congestion (1799–1881)

Soon after its founding in 1530, Bengaluru remained predominantly a regional military and administrative center with the adjoining *peté* housing service castes—weavers, potters, and small merchants—who catered predominantly to the fort and the needs of the immediate region. The region surrounding the inchoate urban cluster was composed of dispersed villages, whose economies were predominantly dependent on small-scale agriculture supplemented by market gardens and orchards. The system of agriculture in the Deccan Plateau (whose antiquity, according to historian Burton Stein, reached back to the first millennium in the present era) hinged on irrigation provided through interconnected networks of tanks (rain-fed storage reservoirs).[27] Indeed, over the next six centuries from the turn of the first millennium, there is almost an unbroken record of tank construction, and related maintenance and irrigation works from the southern Karnataka region surrounding Bengaluru (Dikshit, Kuppuswamy, and Mohan 1993). During that period, this region came to be ruled by several kingdoms: the Cholas, the Hoysalas, and, by the fifteenth century, the Vijayanagara empire.

Bengaluru's founding as a strategic capital for a regional chief in the early sixteenth century was conditioned by a unique pattern of distributed

sovereignty in the Vijayanagara kingdom.[28] Bengaluru, founded by the chieftain Kempegowda, initially as a military encampment (*palayam*), transformed over time into an urban place (Gupta 1991, 129). The weakening and imminent collapse of the Vijayanagara kingdom in the mid-seventeenth century propelled some sweeping economic shifts in peninsular India. First, after the decisive defeat of the Vijayanagara kingdom in 1565 and the sack of the capital at Hampi to the north, interpeninsular trade routes shifted southward, thereby favoring Bengaluru with a locational advantage (Heitzman 2004, 26). Second, the faltering of the empire freed the chieftains of Bengaluru to play a stronger entrepreneurial role in developing their capital as a center of production by developing the *peté*. This they did by inviting weavers and artisans to their town and facilitating conditions for mercantile exchange (Stein 1987, 129).

By the late eighteenth century, the *peté* was a thriving center of economic production, with its success arising primarily from textile manufacture. Textile production in the city was specialized into three streams of manufacturing—export-oriented products such as silk, fine products to meet the demand of local elites, and coarse weaves for the poor (Pani, Anand, and Vyasulu 1985, 5). The demise of the Vijayanagara empire and the resulting economic changes thus created an opportunity for Bengaluru to transform from a predominantly strategic military encampment into a vital node in economic production and emporia trade (Nair 2005, 28; Gupta 1991, 125). During this period, Bengaluru *peté* retained its medieval form as a teardrop-shaped walled settlement perforated by four portals in the cardinal directions. A dense hive of streets, lanes, and tracks branched off into the quadrants formed by two intersecting avenues (one north-south and other east-west) that connected opposing sets of gates. Following a native idiom of land configuration, different quarters were allotted to different caste communities. This allocation is reflected in the *peté* by identifying localities with particular commodities or particular castes.[29] This occupational and caste-based allocation of urban space infused communities with the autonomy to organize and put their shares to use for productive, communal, ritual, or residential purposes in relative independence. The intermingling and juxtaposition of multiple everyday activities, each in intimate proximity of the other, spoke of the prevalence of a particular urban form and planning. Nair describes the early *peté* thus:

> The roads were largely meant for pedestrian traffic. … It was more likely that the street was what was left after the houses had been built. … Indeed the street was an extension of the home, with jagalis (raised platforms) flanking the entrance to the home where women often sat and worked or rested. … Other homes opened

> into small private courtyards, a space for domestic chores, or sometimes places
> where skeins of silk were dyed in vats of colour. (Nair 2005, 46)

By the beginning of the nineteenth century, at the conclusion of the protracted Anglo-Mysore Wars, the Mysore kingdom and Bengaluru (which by that time was a part of the kingdom) had come under British colonial rule (figure 2.1 is a map of Mysore within peninsular India before the last Anglo-Mysore War of 1799).

In a move that had profound significance for the future of the city, the British in 1807 decided that they would permanently station their occupying forces in Bengaluru. British troops (including their native complement) came to be located about two miles northeast of the Bengaluru *peté*, separated from it by a broad swath of parkland and dense stands of trees. Here, British military planners had the opportunity to design a settlement (the Bangalore cantonment) distinct from the native idiom of land configuration in the *peté*. Nair (2005, 46) notes that British colonizers had very little patience for the spatial organization of the *peté* and purposely designed the cantonment to serve the needs of an administrative and military colonial elite. The physical separation between the *peté* and the cantonment was deliberate: to develop the cantonment as an alternate urban nucleus separate from the *peté* and distinct enough to prevent the gradual seeping of native ideas in use of space into the fabric of the cantonment (Pani 2010, 61). This move was reinforced by a native population (predominantly Tamils from Madras, the major English colonial outpost in South India) that was ethnically and linguistically different from the Kannada-speaking population in the *peté*.[30] Anthony King has described the urban settlement of the cantonment (like similar counterparts around India) as inscribed with specific functional, symbolic, and pedagogical motivations that reinforced the power structure of the colonial order (King 1980, 1990). At a functional level, the cantonment housed the upper echelons of the military and administrative apparatus of the British colonizers. The symbolic and pedagogical aspect of the British settlement more often than not reinforced the cantonment's functional role. Particular ideas of spatial morphology prevalent in the metropolitan society were imported and implanted in the cantonment to afford both colonizers and natives with an urban landscape and a visual experience that heightened the dominance of the colonials.

Designed primarily to service its English residents and the needs of the military personnel stationed there, the economy of the cantonment was overwhelmingly dominated by service-oriented activities, with very little productive capacity in the form of factories or artisan manufacturing.
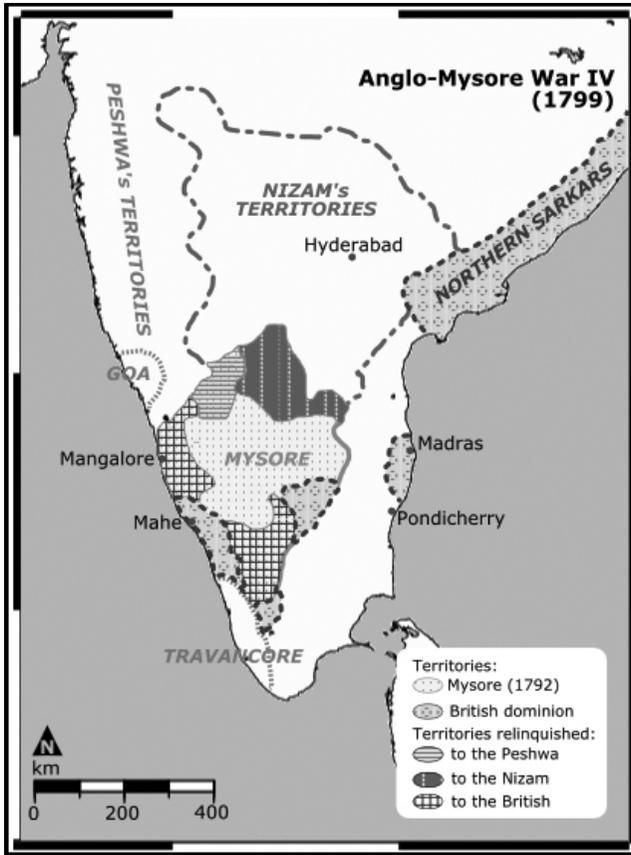
Figure 2.1
Map of Mysore in 1799 (source: Wikimedia commons).

Economic activities were confided to strictly zoned commercial and market spaces, such as Commercial Street and the General Bazaar. European homes, largely bungalows set within well-tended gardens and enclosed compounds, were similarly restricted to residential "towns," such as Cleveland Town, Pottery Town, and Langford Town.[31] In contrast, native inhabitants of the cantonment, many of whom provided domestic labor or household services, lived in densely packed settlements, often in the vicinity of European areas. At the heart of the cantonment were the barracks, administrative offices, churches, and parade grounds for English and native troops, all strung together by broad and straight tree-lined avenues built for wheeled carriages and processional marches.

For much of the nineteenth century, the key actor in the making of Bengaluru was the colonial government.[32] Starting with the establishment of the cantonment in 1807 and then continuing more directly after 1831, when the British assumed direct control over the administration of the kingdom of Mysore, the colonial government sought to intervene in urban development by introducing a radically different vocabulary and organization.[33] In Bengaluru, their effort was motivated in part by what they perceived as the disorder of the native city. A Wesleyan priest in 1840 recorded the contrast eloquently:

> Within the gate [of the peté] a scene opens, strongly contrasting with the broad avenues, the military groups, the intermingling of lawns, gardens, and villas, which grace the adjoining cantonment.…You see a long, moderately narrow street, with houses of one low story, flat-roofed, whitewashed, and windowless.…On turning into the bazaar…your disappointment will be woeful. Instead of grand buildings and glittering display…there is the same long narrow, low street. (Williams 2010, 85)

These scenes of perceived disorder were the ammunition the colonial government needed to intervene in the city. Between 1834 and 1870, two British commissioners, Sir Mark Cubbon and Lewin Bowring, played an indelible role in intervening in the disorderly congestion of the native city. They did so through attempts to incorporate a "British order" into the administration, which, some suggest, "transformed Bangalore from a medieval township to a modern city" (Hasan 1970, 138). The achievement of administrative reforms was manifested through the development of an impersonalized system of administration and the related location of the administrative apparatus within a centralized office housed in public administrative buildings. Administration under the commissioners was marked by the decisive shift away from the segmented system of caste leaders acting as judicio-political authorities for their respective castes toward an impersonal and unified system based on universalist principles articulated by a bureaucrat. Pani and others note some novel means adopted by the administration, ranging from caste rotation, community representation, and candidate selection, to consciously delink selection of administrators from endogamous caste monopoly. For instance, "the British adopted a policy of rotation of castes for important administrative positions in the Bangalore Cussbah [the *peté* and adjoining areas]" (Pani et al. 1985, 18).

Yet another shift was from the spatially distributed decision making within the various occupational and caste pockets in the *peté* toward its materialization within specific spaces. These spaces materialized as *cutcheries*, where

the reformed administration was carried out and natives selected on the basis of social representation were invited to decide on the public affairs of the *peté* and the province at large:

> Instead, an organised Panchayat system was established throughout Mysore, and Bangalore was made the highest centre of judicial authority. This helped to establish Bangalore's supremacy as the judicial centre and therefore the inhabitants of the petteh (had to go) to various cutcheries to act as Panchayatdars there. (Pani et al. 1985, 17)

With the British assuming control over the administration of Mysore in 1831, Bengaluru became the heart of their administration. One of the first tasks to occupy their energies was to locate office spaces suitable for lodging their administration. The only buildings they identified were those located inside the fort—the palace and administrative buildings of Bengaluru's erstwhile ruler, Tipu Sultan.[34] Until 1865 at least, these offices were located in the public administrative buildings in the fort. With the resulting growth in administrative offices, the fort proved inadequate and so the Attara Katcheri (also referred to as the Old Public Office building (1867) and the new public administration buildings (1865–1866) were constructed on the parkland that separated the *peté* and the cantonment. The familiar cycle of growth in administrative capacity, resulting insufficiency in existing office space, followed by the search for newer office accommodation, and then subsequent construction of newer buildings in the urban space, has its origins in this period and was, I might add, a precursor of the congestion in the administrative center in the city.[35] During this period, the reform of native disorder in Bengaluru achieved through the process of office materialization and impersonalized administration culminated in the municipalization of the *peté* and the cantonment.[36] In 1862, the *peté* as a precolonial urban settlement with its caste-segregated warrens was transformed into a legible entity governed henceforth by an impersonal administrative apparatus as the Bangalore City Municipal Board and subsequently as the Bangalore City Municipality. The city's municipal office was located in the fort and then later shifted to the district office in the emerging administrative quarter of the city. This move marked a radical break from a native organization composed of caste-specific modes of urban governance and place-making to an impersonal and universalistic municipal organization. A majority of these administrative offices came to be located in the neutral zone separating the *peté* and the cantonment.

The disordered congestion phase, initiated within the confines of colonial contact, was predicated on a diagnosis of "native disorder." The *peté*,

forged in the political economic turmoil of the late Vijayanagara period, with its spatially segmented and organizationally involuted structure was, in the minds of ruling colonials, symptomatic of congested disorder. Their solution paradoxically was marked by both disengagement and intervention. In the cantonment, they created a rival pole to the *peté* where they demonstrated an alternative vocabulary to organizing and restructuring land and social relations. Not satisfied with their urban withdrawal, in the period following 1831, the colonials intervened in the municipalization of the *peté*. This colonial strategy of decongesting Bengaluru signals the launch of instrumental approaches to managing congestion in the city. With each phase, newer instrumental approaches are inaugurated. The municipalization of Bengaluru's *peté* and cantonment with its impersonalized administrative bureaucracy and materialized offices is a legacy of decongestion from this period.

Unhealthy Congestion (1881–1949)

In 1881, the British formally transferred administrative authority to the kingdom of Mysore and its new monarch, Chamarajendra Wodeyar X, with an appointed *dewan* (prime minister) heading the kingdom's administrative machinery. Although this was a hard-fought victory for the royal family, the terms of the transfer evoked a continuing sense of anxiety (prevalent for most of this period) in the minds of the ruling elite with regard to the longevity of the kingdom. Given that the kingdom's political autonomy was entirely a British construction, which could be revoked by the colonial overlords at the slightest provocation, the ruling elite's anxiety was quite legitimate.[37] This ongoing insecurity combined with the burden of the subsidy payment to the colonial government of India generated a strategy of state-led transformation that had important consequences for the shaping of urban space. The most critical aspect was to visibly maintain continuity with the judicial, revenue, and public management systems of British administration instituted during the previous fifty years of British commissioner rule (1831–1881) in the province. This continuity was so vital to the maintenance of political autonomy that it became a constitution of sorts for a program of state action that emphasized governance while marginalizing politics or power sharing (Manor 1977; Nair 2011).[38] A second aspect of the process of state-led transformation was the fabrication of a discourse of development that undergirded the state's actions. This paradigm of development, Gowda has lucidly demonstrated, was constructed to "include the certitudes of mercantilism, social evolutionism, and orientalism" (C. Gowda

2010, 90) as conceptual bases. According to Gowda (2010), this particular construction of development was based on two contradistinctive notions. First, the Indian is, for a variety of cultural and religious reasons, backward when compared with the industrious European. The ruling elite in the kingdom operated on the assumption that it governed a people who were victims of a cultural malaise—the absence of industriousness and initiative. Thus, while addressing engineers in Mysore in 1910, engineer-turned-statesman M. Visvesvaraya (1860–1962), then *dewan* of Mysore, notes:

> There is a similar disproportion in the working and earning capacity of the two races [Indian and European] in every grade of life and in every sphere of activity.…An Englishmen, unless asleep, feels an invisible compulsion to be doing something, to consider time of some importance. With us [Indians], according to custom and tradition, the charm of life consists in ease—ease from the absence of compulsion to do anything.…Slackness is the worst curse of the country. (Visvesaraya 1917, 11)

The characterization of the Indian as slack and indolent in contrast with the industrious European is a trope that was widely shared (and rued) by the ruling elite of the kingdom. Such a bleak characterization of the Indian could not have been productive if it was not accompanied by a strategy to redress this unsatisfactory situation. The Mysore elite proposed a second notion to redress the cultural disadvantage of the indolent Indian. According to them, this disadvantage could be corrected by charting a course of state interventions. In their understanding, the development of modern scientific and technological capacity, harnessed in the service of industrial capital and more generally toward socioeconomic progress, becomes the means for realizing the transition in the archetypal Indian. Thus, addressing graduates at a university convocation in 1919, Krishnaraja Wadiyar, the maharaja of Mysore, observed that

> the modern age is characterised by knowledge and cultivation of the physical sciences and by their increasing application to the methods of economic life. Scientific knowledge and economic progress go hand in hand and form the very foundations of national life, and unless we achieve both, we are bound to fall behind in the march of progress. (Wadiyar Bahadur 1921, 250–251)

Born from its founding angst to maintain political autonomy in a colonial context, this particular discourse of development in the colonial Mysore state had a profound influence on the elaboration of processes of deliberate change constituted as a "development regime" (Ludden 2005). A development regime comes to include, as articulated by Ludden, "institutions of education, research, media, technology, science, and intellectual influence,"

which wield power and authority in society far in excess of the government alone because it resides also within "physical instruments of power over nature" and "cultural instruments of authority over people's minds and morality" (Ludden 2005, 4043). By incorporating and embedding science and technology within statecraft, development regimes indicate their predilection for furthering particular political projects. This was particularly true of the British colonial regime in India. As historians of science and technology have conclusively shown, for the British in India, science and technology were pliable instruments of power in the construction and maintenance of the colonial enterprise and in reinforcing the civilizing mission of the late colonial state in India (see Adas 1990; Arnold 2000). Struggling with the exigencies of conserving a modicum of autonomy in the context of indirect colonial rule, the state of Mysore sought to employ science and technology to further colonial recognition, which, governing elites reasoned, was the strongest insurance against political takeover of the kingdom.

Bengaluru, as the largest city[39] as well as the administrative and commercial center of Mysore, emerged as a crucial site for this development regime for gaining colonial recognition. Over seventy years (1881–1949), one sees the steady accretion of a backbone of scientific and technological capacity, which arose from the synergies of locating producers and consumers of institutionalized science and technology in close proximity within the city. Thus, public institutions of higher education in science and engineering, research institutes, and administrative offices jostled with a growing cluster of modern industrial enterprises. Producers and consumers of science and technology, the kingdom's elites were convinced, would collectively engender an orientation toward a scientized process of social and economic change. Textile mills were frontrunners in this process in Bengaluru. Early landmarks included the opening of the Maharaja of Mysore Spinning and Manufacturing Mills in 1884, followed by the Bangalore Woolen, Cotton, and Silk (known later as Binny) Mills in 1887 (Singh 1964, 51). The pace of industrialization accelerated with the inauguration of the Kaveri Electric Power Scheme in 1900 and the subsequent expansion in electricity generation and distribution.[40] Private entrepreneurs launched new mills in 1919, 1922, and 1925. In the absence of wider private investment, the Mysore government pioneered industrialization in the interwar period by nurturing both government-owned industries, such as the Government Soap Factory in 1917, Government Porcelain Factory in 1930, and Government Electric Factory in 1935, as well as state-supported private enterprises, such as Mysore Lamp Works in 1937, Mysore Chrome Tanning Company in 1935, and Mysore Stoneware Pipes and Potteries in 1937.[41]

In the meantime, the thickening of Bengaluru as a node for technoscientific education, research, and for its utilization in statecraft was well underway. This was realized through the founding of educational and research institutions, the presence of a critical mass of government administrative establishments, and the existence of networks for the circulation of ideas between educational enterprises and administrative decision makers. The ruling elites surmised that through such actions, it would be possible to raise a citizenry that was not just engaged with Mysore's developmental project but also possessed a rational and scientific temper to intervene effectively in reshaping Bengaluru and, ultimately, the Mysore kingdom. In this administrative enterprise, the Mysore monarch was aided by *dewans* who embodied a rational outlook to the fullest. Imbued with enormous utilitarian zeal, Visvesvaraya an engineer who served as *dewan* of Mysore from 1912 to 1917, epitomized this perspective. In a speech to Central College in 1912, he clarifies that education divorced of the objective of urban social reform is not a goal worth aspiring for:

> It is not in the glory of Bangalore as a seat of learning that we are interested. What intimately concerns us is the equipment of the city for developing the intellectual ability and executive power of our citizens and for the training it should afford to prepare future manufacturers, merchants, business men, economists, lawyers, sanitarians, engineers, statesmen, etc. (Visvesvaraya, 1917, 27)

This strong reform-inflected vision for the goal of learning, analyzing, and intervening, underlies many of the Mysore regime's showpieces—its newly established colleges, technical schools, and research laboratories. This is exemplified in the founding of the Indian Institute of Research, an institute for research and learning in both theoretical and applied technology and sciences. The foundation of this institute was laid in 1911 by the maharaja with the express purpose of contributing to an industrial renaissance and to "develop the Arts and Industries on scientific lines" (Wadiyar Bahadur 1921, 124). Yet another step in the direction of technological literacy was met with the establishment of an engineering college in 1917. The college, a constituent of the University of Mysore, granted its students degrees in civil or mechanical engineering. Wider technical literacy at the operational level was provided through industrial schools such as the Mechanical Engineering School in 1913, the Government Weaving Institute in 1912, and the Krishnarajendra Silver Jubilee Technological Institute in 1938.[42]

Both the ideas and trained persons produced by Bengaluru's educational establishments of science found a ready home within the growing administrative apparatus of the kingdom housed in the city and centered around

the Attara Katcheri. In addition to other administrative departments, this is where the *dewan*'s office was located (Hasan 1972, 143). With the Attara Katcheri as hub, the expansion of administrative capacity was marked by a creeping occupation of the parkland (the contemporary Cubbon Park) that formed the axis linking the city and the Civil and Municipal Station (Nair 2002, 1205). Numerous offices of the Mysore government, district and subdivisional offices, the police headquarters, city magistrate courts, the revenue office, the Bangalore jail, and the British Residency radiated out from the Attara Katcheri.[43]

The concentration of the administrative apparatus in the heart of the city made a vital contribution to the circulation of a rational discourse in the city. In addition to injecting ideas of rationality and development into public discourse, the government played an equally important role as a consumer of products, processes, and systems of technoscience. Thus, the Government Central Industrial Workshop was developed in 1897 for "manufacturing general engineering equipment such as trusses, tanks, and castings…, undertaking repairs, and supplying spare parts to [different government departments] such as PWD [public works department], and Sanitary and Electrical departments" (Government of Karnataka 1990, 269). Similarly, the Mysore Industrial and Testing Laboratory was established in 1931 to test products or processes to be purchased by the government. Such entities realized the role of incorporating technoscience within the daily job of running the administration.

Multiple quasi-governmental and private networks arose at this time to facilitate the circulation and maintenance of a rational discourse that advanced socioeconomic development and scientific advances as critical to comprehensive social transformation. Mysore's pioneering deliberative bodies, the Representative Assembly (established in 1881) and the Legislative Council (established in 1907), performed a salutary role in enjoining citizens to engage with the government-modulated development discourse.[44] The Mysore Economic Conference, founded in 1911 as a specialized deliberative body, which by providing an ongoing interface for the official bureaucracy with "men of enlightenment, public-spirited citizens, prominent agriculturists, merchants etc." (C. H. Rao 1929a, 1), extended an additional avenue for mobilizing a rational developmental discourse.[45]

Within Bengaluru itself, the construction and circulation of this powerful discourse of improvement aided by a technoscientific backbone of industries and educational institutions had the effect of categorizing the city as congested and in need of urban reform. Congestion in Bengaluru during this period was predicated on a complex absence of well-being. This lack

was understood in a manner that surfaced interconnected spatial, social, biomedical, and technical aspects. The remedies proposed to counter this debilitating condition accordingly manifested spatial, social, biomedical, and technical features. I refer to the recognition of complex impairment in Bengaluru's condition during this period as an unhealthy congestion. In doing so, I am echoing Ranganathan's observation that "colonial administrators [in Bengaluru] felt compelled to create a modern bacteriological city cleansed of social and physical ills, an adjunct to capitalist urbanization, by laying a sewerage network for the city" (Ranganathan 2015, 1309).[46] Bengaluru, as host to an unhealthy congestion, was the arena for a range of interventions that resulted in a dramatic shift in its spatial, technological, and social constitution. The government of Mysore, with its strongly interventionist discourse and technological instruments, was the key actor in addressing the unhealthy congestion.

As early as 1894, Bengaluru, especially the environs of the city (previously called the *peté*) and the native bazaar in the civil and military station, were being referred to as overcrowded and congested areas where houses were constructed in close proximity with inadequate light and ventilation and roads were too narrow. Rice in the *Mysore Gazetteer* notes,

> Owing to the circumstances of its origin, the rapid growth of the town and the various hands through which it has passed, the streets in the old parts are often narrow and mostly irregular in appearance.… Bangalore, however, presents the lively aspect of a Hindu town, the main streets being generally crowded, with pedestrians, among whom vehicles of all kinds, from the carriage or brougham of the high official to the rude jatka of the merchant trader and the slow and heavy-laden bullock cart, thread their difficult way through dint of vociferous shout.… The peculiar odours of the eastern bazaar pervade the streets…and the universal babel gives evidence of the out-door life of the people. (Rice 1897, 44–45)

While Rice was content referring to the "peculiar odours" encountered, the famous writer R. K. Narayan was more direct. For him, the old part of the city was not only congested in appearance but was a cesspool that breeds vermin and was therefore ripe for reordering:

> And here we have closely packed houses, abutting shop fronts, narrow winding roads, and a perfect jam of pedestrians and vehicles; and behind all this is a dizzying network of lanes and by-lanes. The Municipality has a great deal to do here. It should be an up-hill task to…straighten the roads…and clear away, choking, vermin-breeding buildings. (Narayan 1944, 70)

These impressionistic views of congestion and overcrowding noted by visitors to the city were often corroborated in official reports that located the

old city or the native settlements in the civil and military station as primary loci for epidemic outbreaks.[47] Compounding the congestion on the streets, the arrangements for proper flows of human waste emissions from within the domestic confines to the exurb were subject to frequent disruption, which resulted in their mixing with and overwhelming other flows that coursed through Bengaluru. Prior to 1896, when the city started receiving piped water supply, most residents were dependent on water from the Dharmambudhi and the Sampangi tanks for their daily needs. The water from these tanks was distributed around the city through open-air supply channels to a system of troughs (or *karanjis*) from where inhabitants could draw water (Srinivas 2013a, 11).

This system of water conveyance was particularly susceptible to fouling on account of several factors. First, wastewater exiting households followed open-air drains that during periods of excess flow (such as during rains) intermingled with water flows in the supply channels. Second, during summer, when the Dharmambudhi tank was dry, it was not unusual for the dry tank bed and supply channels to find alternate use as a latrine. Srinivas notes that "as a result when the rains came all the filth was deposited into the tank and it emitted an offensive smell" (Srinivas 2013a, 11). Finally, prior to 1882, most people in the city relied on cesspit latrines, which deposited human excrement within pits that required periodic emptying by the municipal "scavenger." Given the cheek-by-jowl nature of dwellings in the city, there was usually no alternative access (by means of, say, a conservancy lane) for the scavenger to evacuate the latrine other than entering the resident's home. But the act of entering the home was considered a major transgression within the caste-segregated arrangements of dwelling prevalent in the city at the time. Thus, in many cases, latrines were evacuated only every two or three years. Extended periods for discharge of latrine pits made them particularly vulnerable to overflow onto streets and drains, contributing further to the unsanitary constitution of the city.[48]

The multiple mingling of metabolic flows in the streets of the old city and native bazaar was particularly problematic for a new breed of sanitary engineers and public health inspectors who made their entry in Bengaluru from the 1880s.[49] From 1892 on, Mysore organized a separate sanitary department as part of the government's public works department with the express purpose of designing and executing water supply, drainage, and conservancy works throughout the kingdom (C. H. Rao 1929b, 358). A sanitary engineer headed this department. At the municipal level, sanitation emerged as a priority in both the city and the civil and military station by 1862 when a conservancy tax (*kachara terige*), related to the size

of the dwelling, was levied on residents (Government of Karnataka 1990, 650). In 1882, the Bangalore city municipality decreed a municipal bylaw requiring daily evacuation of latrines by municipal workers.[50] That sanitation occupied considerable energy in the municipality is evident in the size of municipal expenditures devoted to conservancy work. Conservancy accounted for 18,035 rupees out of a net municipal expenditure of 157,207 rupees in 1893–1894 (Rice 1897, 50), which then rose to 35,000 rupees from a net municipal expenditure of 250,000 rupees in 1903–1904 (Meyer et al. 1908, 368).

The declining reliance on tanks for providing water supply and on open air water supply channels and stormwater channels to ferry water to residents and then to downstream tanks precipitated a shift in the alignment of the social, spatial, and technological facets of the city's hydrological infrastructure. Malini Ranganathan documents "the recasting of 'stormwater drains' as 'sanitary water drains' was set in motion by the colonial project of improvement" (Ranganathan 2015, 1309). She patches together a story of multiple coincidences. First, changing technological paradigms of municipalization happening elsewhere in the world, in the context of the politics of colonial recognition in Mysore, led to the installation of piped and treated water supplies in the late nineteenth century in Bengaluru. This prompted the progressive disuse of tanks and open-air water channels as sources of water. Second, the characterization of native modes of inhabiting the city as environmentally unsanitary and morally inferior prompted a process of overhauling the waste management regime in the city. Stormwater channels for discharging urban wastes earlier, maintained through community efforts, became locations for an incipient sewer network. The shift in the physical reality of these channels was accompanied by a terminological shift with these channels being recast as receptacles for the filth and refuse of urbanization. The residues(!) of this shift, as Ranganathan points out, exist to the present day, with channels that at one time conveyed water now carrying a potent sludge of sewer pipes, untreated sewage, industrial wastes, and solid wastes, thereby elevating the risk of flooding in the city.[51]

Although a major spatial intervention, the reconstitution of stormwater channels wasn't the only intrusion on urban space in the city. This period also bore witness to the initiation, tentatively at first and then with deliberate energy, of planned residential divisions that incorporated new norms of modern hygiene and sanitation, while at the same time explicitly retaining primeval social norms of caste and hierarchy. Between 1898 and 1899, Bangalore's predominantly native residents—in both the city and the civil and military station—struggled with an epidemic of the bubonic plague.[52] Even

as the disease wrought havoc on residents, with about ten thousand deaths reported in Bengaluru and the surrounding district alone (Heitzman 2004, 33), a quarter of the residents deserted the city, precipitating the collapse of city commerce. The outbreak of the disease proved to be a watershed for efforts to sanitize and decongest the city. In addition to some near-term measures directed at decontaminating the city,[53] several longer-term actions sought to employ epidemic prevention as a motivation to dramatically alter the sociospatial organization in the city and, more important, rejig the relation between residents and urban space. One of the first actions undertaken by the Mysore government was to employ the plague as a pretext to decongest the old quarter of the city. Hundreds of houses, deserted on account of death or infection, were demolished. A joint executive committee formed by the city as well as the civil and military station gave special attention to standards of sanitation, building occupation, and provision of light and ventilation. And as drains in the city were repaired and cleaned, houses were regularly inspected to assess their standards of sanitation. About 651 houses were considered unfit for occupation and were demolished. With a view to easing overcrowding, the extremely congested old Tharagupet locality was partially demolished and a new Tharagupet developed to accommodate the spillover. A further 893 houses were "marked under the Land Acquisition Act for opening new roads and lanes in the congested part of the city" (Government of Karnataka 1990, 90).[54]

Plague infestation in Bengaluru evoked a more systemic response beyond these reactionary instances of dealing with congestion. Both municipalities, the city as well as the civil and military station, undertook to plan, with some urgency, the expansion of the city and the provision of well-spaced and well-drained housing sites.[55] These planned extensions to both municipalities were conceived of by special town improvement committees, which the Mysore government constituted periodically. According to town and country planning norms, extensions were "laid out in gridiron or chess-board plan. [These extensions] were rectangular with boundary roads running north and south and east and west" (C. H. Rao 1929b, 113). Two extensions to the city in 1898 can be traced to the immediate postplague urban scenario. Malleshwaram (291 acres) and Basavangudi (404 acres) were laid out in the north and south of the city as model suburbs that offered an alternative hygienic lifestyle to the crowded and congested old quarter.[56] Both extensions set new standards of sanitation. Conservancy lanes, dedicated to channeling waste flows through underground sewers and open drains, ran behind houses in these extensions. The hermetic separation of metabolic flows promised by the extensions offered such elevated levels of

sanitation that planners spoke of these extensions as "plague-proof towns" that were not just improved ways of living but were also pedagogical in the sense that there can "be no going back to the Indian method of constructing abutting buildings with no voids between them" (Stephens 1922, 238).[57]

The Bangalore Town Improvement Committee was reconstituted multiple times (in 1908, 1913, and 1922) after the plague to plan and organize new extensions to the city that gave concrete form to decongesting and sanitizing the city. The city and civil and military station together assembled nearly thirty extensions during this period. However, even as they operated with sanitary zeal, planners and engineers took scrupulous care to ensure that these planned layouts conformed closely to the implicit caste-based segregated hierarchy. Brahmins overwhelmingly monopolized multiple fields of Bengaluru's social, economic, and political action during this period. Until 1920 at least, Brahmin men dominated almost the entire senior administration of Mysore's government. Even while acquiring modernist aspirations, nascent news and media organizations, leading lights of the modernist *Navya* literary movement in Kannada, as well as budding theater, music, and film societies, were nevertheless managed almost entirely by Brahmins. In a society where Brahmins almost exclusively dictated social order, spatial order in the new extensions could not but have been reflective of it. Nair is incisive in her comments:

> Within these layouts, hierarchies revolved around caste … so that the largest and best-placed sites were for the Brahmin community … [and] the five principal divisions for the different castes were limited by cross roads. … Physical distance between homes thus considerably diminished the possibility of undesirable social contact. … Malleshwaram similarly had eight blocks, one for each "particular section of the people." (Nair 2005, 51)

Addressing unhealthy congestion in Bengaluru was aided by the simultaneous circulation and accretion of multiple facets—a discourse of improvement born out of a foundational anxiety among Mysore's governing elites; reliance on a technoscientific logic for articulating the developmental discourse; a zeal for sanitizing the city from pathogens and cultural ways of inhabiting; and a scrupulous attention to maintaining the hierarchical social order. This particular patterning of unhealthy congestion in Bengaluru cast some long-lasting residues within the urban fabric. A technoscientific logic to development, the recasting of waterways as waste channels, the characterization of native modes of urban living as unhygienic, and caste-based spatial orders have been manifestations of decongestive efforts since this time.

Unplanned Congestion (1949–1991)

A defining start to this period occurred in 1949 with the union of the munici-palities of Bangalore City and the Bangalore civil and military station into the Bangalore City Corporation (known in Kannada as the Bengaluru Mahanag-ara Palike, or BMP; Heitzman 2004, 41). The amalgamation of the two munici-pal entities into the BMP, happening as it did in the first years after India's independence in August 1947, was an occasion for the inauguration of a dra-matically altered apparatus for governing processes of spatial planning, land acquisition, and infrastructure planning. This apparatus was at least explicitly motivated by an imaginary of congestion in cities. Congestion is imagined in this phase as the result of two moments: the increase in an urban population classed primarily as workers employed in industrial establishments and the unplanned expansion of the city to meet the needs of this inflow.

The footing for this apparatus of urban planning has roots within the broader national Nehruvian discourse on socialist-style planning of the economy and society in independent India, which heavily prioritized a scientific approach to state-led intervention (B. Chakrabarty 1992).[58] The insertion of this interventionist discourse of development onto processes of spatial reordering in Bengaluru was aided by the parallel presence of strong impulses for improving urban space in postcolonial Mysore.[59].We saw in the previous section that Bangalore town improvement committees were periodically constituted to plan and develop residential extensions. By 1945, this process had congealed into permanence with the passage of the Bangalore City Improvement Act of 1945, which brought into being the Bangalore City Improvement Trust (BCIT) as a permanent body. The BCIT was tasked with "(i) Extensions of residential areas to relieve the congestion in the city; (ii) Construction of houses for middle and lower middle class people; (iii) Location of industrial suburbs for large and small industries; (iv) Laying out of industrial housing areas" (Singh 1964, 110). The notable difference between its objectives and its earlier manifestation as the town improvement committee was in the priority given to industrial planning. This priority was a reflection of the emergence of Bengaluru by the early 1950s as a growing nucleus for massive public sector enterprises that pro-vided employment to thousands of workers.[60] Rapid industrialization and related housing and servicing needs over the next decades only escalated the strident demand for planning instruments to manage this process.

With independent India's swing toward import substitution policies that privileged the development of indigenous manufacturing capacity shel-tered within state-owned enterprises, publicly owned industries emerged as

favored pathways for industrialization. In Bengaluru, four large public sector units (PSU)—Hindustan Aircraft Ltd., Indian Telephone Industries, Bharat Electronics Ltd., and Hindustan Machine Tools—were established on the western and northern outskirts of Bengaluru.[61] These units became important anchors for an industrial ecosystem composed of ancillary small and medium industries and informal repair and tooling workshops that sprang up and depended on these larger units for subcontracting opportunities (Heitzman 1999, PE-3).[62] With employment in these units ranging between five thousand and fifty thousand, these units collectively accounted for more than eighty thousand jobs in the city even as late as 1991, when the era of public sector enterprises was in irrevocable decline. Many thousands more depended on these units indirectly for their employment. Both Nair and Heitzman in their histories of the city document the role of these public sector units as a powerful engine not only for demographic growth but also for the urban economy. Heitzman, specifically notes:

> The addition of 30,000 public sector manufacturing jobs on the outskirts of the city within a period of less than twenty years helped drive the metropolitan population to 1,207,000 in 1961 and significantly increased the pressure on infrastructure. It also irrevocably shifted the economic balance of the area around the city. In 1951, 71 percent of the workers in Bangalore District still worked in agriculture; by 1961, this had declined to 50 per cent, and by 1971, to 40 per cent. (Heitzman 2004, 45)

The combined economic and demographic shift, orchestrated by Bengaluru's PSUs, were significant drivers in the reordering of the city.[63] Starting in 1961 with the passage of the Mysore (now Karnataka) Town and Country Planning Act (KTCP), the state of Karnataka inaugurated "a process architecture that embeds not only the rationality to plan a 'good' urban form but also possesses technologies of control (backed by the full force of law) to prescribe, govern, and proscribe certain kinds of urban land-use" (Sundaresan, 2013, 120–122).[64] The KTCP legislated into reality the Bangalore Local Planning Area, the territory over which the Bangalore Local Planning Authority (constituted in August 1967) had exclusive jurisdiction to ordain the mosaic of land use in the city (Ravindra 1996, 92).[65] The instrument for achieving this goal was the development plan or the master plan. Development plans for Bengaluru, legitimized by formal legislative authority, begin with the interim Outline Development Plan (ODP) of 1972 followed by the Comprehensive Development Plan (CDP) of 1984.[66] Given its legal base in the KTCP, the planning authority for the city as the executor of the CDP commands absolute authority over land use and the process of land use change in the city. Land use change that does not conform to the proposals

for land categorization and zoning contained in the CDP stand in violation of its KTCP mandate and is illegal and therefore penalizable by law.

The creation of a planning apparatus in Bengaluru was paralleled by a momentous shift toward professionalizing Karnataka's public administration. Up to the 1960s, line departments of the state governments, staffed by full-time generalist bureaucrats, conducted much of the administration in Mysore state. By the 1960s, several new demands for growth and development created new imperatives for bureaucratic capacity. For one, advancing private industrial growth could no longer be limited to providing a favorable policy environment; instead, governments were increasingly required to nurture the industrial sector by ordering advantageous factors of production, such as land, capital, and training. This form of intensive state involvement called for agencies that accomplished specialized tasks. Furthermore, rapid population growth in cities like Bengaluru became the prompt for an enhanced capacity to deliver essential services like water supply and sewerage, transport, and electricity.

This capacity was especially required to execute more sophisticated technical projects, for example, to pipe water from distant sources. In Bengaluru's case, by the 1960s, it was evident to the Mysore government that the city's need for water could not be met by local sources like the CRS waterworks at Tippagondanahalli. Instead, water would have to be pumped uphill over 100 kilometers from the Cauvery River. Executing the project with its numerous technical, administrative, and jurisdictional challenges was far beyond the capacity of the city government.[67] Spearheading social and economic development in the 1960s therefore prefigured a new architecture of public management that not only possessed specialized technical and administrative capacity but also entailed the political space within which to operate unhindered. Statutory entities (also referred to as parastatal bodies), constituted through an act of the state legislature, arose as a vehicle of choice to achieve these objectives.[68] Since then, the state has extensively used the possibility of constituting parastatal bodies for achieving particular tasks. A commentator on the state's administration suggests that these organizations contribute to the systemic undermining of local democracy:

> Karnataka has a large number of parastatal bodies. … Boards and corporations are parastatal bodies. They are single-purpose organizations which, while being part of the government enjoy a certain amount of autonomy, as they are incorporated bodies. As such they are independent from normal government functioning regarding such matters as appointments, raising of loans from banks, expenditure etc. And yet, the state government often stands guarantee for loans taken by them. (Chandrashekhar 2011, 68–69)

In response to the specter of population and economic growth and associated social, economic, and technical challenges looming over Bengaluru, the state instituted numerous single-purpose parastatal bodies centered on the city. The task of purveying urban infrastructure, given its technical challenges, was readily parceled out to the Karnataka State Road Transport Corporation (constituted in 1961 with the Bangalore Transport Service as a division to service intracity travel) and Bangalore Water Supply and Sewerage Board in 1964. Constructing affordable housing for low-income groups, especially those living in informal settlements, was assigned to the Karnataka Housing Board (established in 1962) and the Karnataka Slum Clearance Board (in 1973). The financing of industrial development was farmed out to the Karnataka Industrial Investment and Development Corporation (in 1964), while the Karnataka Industrial Area Development Board (in 1966) assumed the contentious role of land acquisition agent for individual industrial ventures and industrial enclaves.

Karnataka government's preference for professionalizing public administration had its ripples in Bengaluru's planning apparatus. Up to the mid-1970s, the Bangalore Local Planning Authority developed proposals for land use planning, while the City Improvement Trust developed residential layouts and sites to house the city's growing population. The presence of these two agencies operating under dissimilar legal frameworks and the resulting absence of coordination between the planning and development aspects of land use in the city became the pretext for establishing a single entity that would integrate and professionally manage Bengaluru's land control. In 1976, the state government established the BDA as a statutory parastatal body to incorporate, within one organization, both planning and development functions. The BDA is vested with enormous planning and executive powers to accomplish its legislative mandate. In exerting its mandate, BDA is also armed with powers to penalize inappropriate land development in the city, regulate construction activity, and acquire private land to develop housing and commercial complexes in the public interest.

This institutional structure of planning and development for Bengaluru is undergirded by two intentions. First, planning is a practice of state intervention, which rectifies the congestion caused by unplanned growth by promoting a dispersed and therefore healthier urban settlement. The objectives of the KTCP Act of 1964 clarify this purpose by proposing "(i) to create conditions favorable for planning … with a view to providing full civic and social amenities for people in the state … (iv) to direct the future growth of populated areas in the state with a view to ensuring desirable standards of health and hygiene" (Government of Karnataka 1963, 65). From the act's

objectives, it is clear that the planned growth of cities will contribute to relieving the ill effects of congestion. Second, professional public management of the planning process is essential to fully realize the social benefits of rectifying unplanned urban growth. The BDA Act of 1976 that brought the BDA into being specifies that "haphazard and irregular growth would continue unless checked by the Development Authority and it may not be possible to rectify or correct mistakes in the future" (Government of Karnataka 1976, 103). Born from this surety of purpose, the planning apparatus deploys some specific techniques, mechanisms, and measures to ensure a planned and otherwise dispersed settlement pattern.

One planning technique for gauging and shaping urban settlements is by relying on the categorization of land use into parcels identified as, for example, residential, commercial, open spaces, transportation, or agricultural. This technique forms the basis for most forms of planning instruments. Land use classification paves the way for at least two pathways to dictate the spread and dispersal of settlement patterns in the city and thereby alter patterns of congestion. First, at an aggregate urban level, land use categorization is a means of conceiving the desirable city that has the optimum amount of land dedicated to particular kinds of permitted uses. Ravindra suggests that Bengaluru's CDP of 1985 was influenced by the norms for optimum land use ratios in a city laid down by the national Town and Country Planning Organisation (TCPO; Ravindra 1996, 100). The TCPO suggests that good land use patterns required metropolitan cities to aspire toward reserving 35 to 40 percent of their land to residential use, 12 to 14 percent for industrial use, and 4 to 5 percent for commercial use (Ministry of Urban Affairs and Employment 1996, 147). Such a normative pattern of land use is ultimately derived from the requirement to ensure that population densities in large and metropolitan cities in the country remain within one hundred to two hundred persons per hectare (146). The subtext being that the denser cities are, the more congested, unhealthy, and unproductive they become. The desirable pattern of land use also forms the basis for a normative structure for processes of urbanization at work in the city. This structure needs to reconcile concentrative and deconcentrative thrusts of urban growth. Thus, mechanisms are introduced within the planning framework to nudge processes of urbanization toward desirable ends. For example, mechanisms such as growth boundaries or green belts are fundamentally concentrative by preventing expansion beyond a limit, while satellite townships and growth poles attempt to siphon growth away from centers of concentration by dispersing growth. The planning processes in Bengaluru, be it BDA's CDP of 1985 or the metropolitan region's structure plan of 1995 incorporated both these mechanisms.[69]

Second, categorization prescribes or proscribes particular forms of land use within broad classifications. Thus, the planning instrument permits only a narrowly specified list of uses within each category, be they residential, commercial, industrial, or something else. For example, BDA's zoning regulation C1 within the commercial category permits, among other things, minor shops or milk booths, and tutorial centers not exceeding fifty square meters. Regulation I1 within the industrial category permits such uses as the manufacture of aerated water and food beverages, bedding material, printing, and publishing, while T1 in the transport category allows multilevel car parking, bus shelters, or gas stations (BDA 2007, 12–15). The mix of commercial (C1, C2, C3, C4, or C5), industrial (I1, I2, I3, I4, or I5), transportation (T1, T2, T3, T4), and urban amenities (U1, U2, U3 or U4) categories that are permissible within the confines of a particular locality is strictly limited and controlled by the zoning regulations.

A development technique that seeks to deconcentrate the built-up area is through building bylaws that intervene at the level of individual structures and plots. These bylaws specify the relation between a building and the plot of land on which it is constructed. In this way, new construction is adequately spaced and ventilated, and the densities of inhabitation are reduced. Bengaluru's building laws specify four measures to control the concentration of inhabitation: maximum plot coverage (as a percent of plot area), floor-area ratio (FAR), setbacks, and maximum height (Ravindra 1996, 109). By varying the allowable limits of these measures across the city, planners exert a clear preference for the nature of the built environment in the city. The 1984 CDP demarcates the city into three zones: A—intensely populated areas, B—the central administrative area and its surroundings, and C—all other areas within the conurbation (Ravindra 1996). Within each of these zones, the permissible magnitude of each measure is altered to reflect the plan's preference for spacing and separation.

The institutionalization of this elaborate apparatus for land control, despite its grounding within an extensive legal framework composed of laws, rules, measures, and enforcement mechanisms, has engendered pervasive illegality by the state and citizens in the use of land and the construction of buildings. Based on anecdotal evidence, Sundaresan records that 50 to 75 percent of the buildings in Bengaluru are constructed in violation of planning norms (Sundaresan 2013, 19). These violations in planning guidelines are not quite this easily categorizable, however. The imprint of violations includes multiple social groups and locations. A diversity of structures such as private apartment complexes, upper-middle-class bungalows, lower-middle-class revenue layouts (privately designed housing

subdivisions), and urban poor settlements are implicated in a vast net-work of illegal transactions involving the use of land. Illegality is produced not only through covert actions undertaken under the cover of darkness or through stealth, as when a home owner violates zoning laws to rent a portion of his or her home to a commercial enterprise, but also through overt and everyday actions. Thus, the affluent homeowner who occupies the sidewalk in front of his house to construct a private garden or the local community that builds a shrine on the sidewalk are both in contraven-tion of the law. State actors are equally implicated in using land in con-travention of their own laws. Thus, bus termini, stadiums, or public office buildings have been built either by encroaching on tanks or in violation of zoning laws such as the green belt (Nair 2005; Sundaresan 2013). Not all of this illegality has attracted similar levels of scrutiny or concern, which leads Rosario and Liang (2006, 20) to conclude that land use possesses differential degrees of illegality. Often illegality by the state or by propertied middle classes is easily regularized by newer redefinitions of public purpose or by new iterations of the law.[70] Land uses by the urban poor through arrange-ments of squatting, for example, are more often than not perceived by the state as threatening and therefore become targets of evictions, bulldozing, and other forms of forced displacement.

The institutionalization of a sophisticated apparatus of master planning in this period was founded on a diagnosis of congestion in the modern-izing Bengaluru. This diagnosis characterized population growth without planning as the problem. Master planning by specialized instruments, such as zoning laws and building bylaws could curb congestion in the rapidly expanding city. But the reliance on instruments of master planning to order the city has spawned multiple illegal transactions in how land is used. The pervasive illegality of master planning highlights the partialness of the decongestive thrust of this period.

Flow Congestion (1991–Present)

A watershed year in the constitution of the most recent phase of urban change and congestion in Bengaluru was 1991.[71] Riding on the national wave of economic liberalization, the year marks a decisive break in the understanding (among decision makers, middle classes, and elite corporate groups) of the role of the city. The planned city and its spatial interven-tions were inspired by the desire to minimize the congestion brought on by unplanned growth. In the period following 1991, although these motiva-tions persisted, they were eclipsed by interventions rooted within a new

construction of congestion understood as the blockage of metabolic flows coursing through the "body politic" (Harvey 2003) of the city.

The intense association that developed between the city and the imaginary of "Bengaluru as India's Silicon Valley" was the impetus for the constitution of this new understanding of congestion. "Bengaluru as India's Silicon Valley" was itself triggered by a diverse and rapidly expanding cluster of information and communication technology (ICT) enterprises in the city (Manimala 2008, 117), itself the product of an evolving policy, institutional, and industry landscape from the mid-1980s to the mid-1990s. Presaging the shift toward greater liberalization in 1991, the policy and institutional environment extended by the national government for the growth of ICT shifted with the predominantly restrictive "demiurge and custodial" interventions prior to the mid-1980s giving way to "midwifery and husbandry" modes of state action that encouraged private entrepreneurialism (Evans 1995, 210). Instances of liberal policies—for example, the Computer Import Policy of 1984 and the Software Export, Development and Training Policy of 1986—provided the foundation for the nascent software industry in India.[72] While the early growth of the industry on account of the supportive policy setting in the 1980s was largely driven by the overseas placement of 'bodyshopped' professionals within client organizations, growth by the early 1990s was largely being fueled by offshore turnkey contracts that overwhelmingly came to be located in Bengaluru (Parthasarathy 2004, 672; 2010; Saxenian 2002). This shift toward clustering and then the agglomeration of the IT industry in Bengaluru was a key turning point that subsequently resulted in the acquisition of the "Silicon Valley of India" designation. It was fueled by such factors as the location of the country's first software technology park, with its provision of dedicated infrastructure and communication facilities for tech entrepreneurs, and the critical presence of a technically qualified labor force in public sector units and numerous engineering colleges in the vicinity (Parthasarathy 2004; Heitzman 2001; Thatchenkery, Kash, and Stough 2004).[73]

Bengaluru's emergence as a node for IT enterprises and becoming the Silicon Valley of India was the outcome of a deliberate strategy of casting the IT industry (and allied knowledge-based productive enterprises) as a key vehicle for ushering prosperity into the country. Thus, the success of the IT industry, as indicated by its explosive growth in terms of the number of enterprises, the number of people employed, and the revenue generated, became the symbol for market-led growth within the post-1991 liberalized economic setting, which not only provided for Indians but also raised their economic status (Upadhya 2009). This industry thereby became a public

justification for the national economic strategy. Champions of the IT industry with their ethical and responsible business practices and their educated middle-class roots were portrayed as icons of reform (Upadhya 2004). Corporate leaders such as N. R. Narayana Murthy and Nandan Nilekani of Infosys and Azim Premji of Wipro were contemporary India's pedagogues who could teach other Indians how best to achieve a successful presence in the globalizing world. Their insight into the contemporary global economy contained lessons for multiple social, cultural, and political arenas. Riding on this construction of a pedagogical role for the software industry starting in the 1990s, the footprint of the industry expanded across a range of urban domains, from corporate work and workplace organization and middle-class lifestyles and aesthetics, to the built environment, and, most notable, urban governance.[74]

Innovations in workplace culture and organization were a response to the high volatility in the labor market for IT professionals. They were manifested in the pervasive flexibilization of labor expressed through a range of flexible working arrangements, work timings, contracts, and locations, complemented by technological flexibility in the ability of employees to work on multiple software platforms, work routines, and technologies (Upadhya 2010). The imprint of the software industry and its personnel has been particularly foundational in the articulation of new forms of middle-class lifestyles and aesthetics.[75] As a key locus for the industry, Bengaluru has been a favored site for the expression of a middle-class public discourse. This discourse, visible in mainstream media, advertisements, and street-side billboards, constructs a desired landscape composed of malls, shopping complexes, and gated housing developments that integrate residential, commercial, leisure, and service activities with high-rise apartment complexes, all strung together seamlessly by urban infrastructures geared toward establishing and maintaining global consumerist lifestyles. This discursive landscape in the city is presented as an aspirational goal for the new middle classes to consume in their pursuit of a lifestyle indistinguishable from other global nodes.[76] A key element of this discourse is embodied within an aesthetic of the urban built environment marked by gleaming glass and steel facades, granite foyers, and manicured lawns. Stallmeyer documents how corporate ICT and real estate developers in Bengaluru profoundly impelled the emerging configurations of spatial and built form in the city toward a recognizably global or international image (though informed by local interpretations) marked most notably by what he calls "software glass":

> The role of architects in the CBD, Electronics City and the future IT Corridor is, or will be, dictated in large part by the demands of ICT corporates and real-estate developers. The demands of ICT corporates and real-estate developers dictate the need for flexible interior spaces that can house the maximum number of worker cubicles, and the need for recognizably "global" and "international" imagery. (Stallmeyer 2006, 327)

Possibly the most intrusive pedagogical role adopted by the IT industry was to insert their corporate and techno-managerial acumen within urban governance in Bengaluru. Often proposed as experiments to increase the intelligence of urban management, a range of ventures led by what Solomon Benjamin calls "corporate-outsourced NGOs (CONGOs)" (Benjamin 2010, 104) came to mediate the state-citizen interface starting from 2000. These ventures ranged from formal (and more enduring) public-private platforms and planning task forces to (often sporadic) private interest groups, unofficial panels, and private consultative entities. Although distinct in their internal dynamics, two themes resonated across the new civil society organizations assembled in the city since about 2000. First, the existing infrastructure base was not only inadequate to service Bengaluru's rapid population expansion but was of inferior quality to fulfill its global ambitions. Second, there existed across the multiple participants (both public and private) in these ventures a growing sense of exasperation with the status quo on infrastructure development and services in the city. The underlying argument was that if Bengaluru's decision makers were serious about making the city a global hub, they would have to radically alter how infrastructures are conceived, executed, and used. The presence of new civil society organizations, combined with their targeted interventions in Bengaluru's infrastructure governance, are constitutive of an "elite policy circuit" in the city (Benjamin and Bhuvaneshwari 2006). This circuit, comprising a diversity of individuals, was drawn from the state's political and administrative elite, as well as chief executives of Bengaluru's infrastructure utilities and corporate leaders from the IT and allied industries.

The Bangalore Agenda Task Force (BATF), founded in 2000, was a pioneering and, in many ways, most intrusive new civil society organization.[77] It had ten members, half drawn from the corporate sector. Established with official sanction through a government order (G.O. UDD/400/MNY/99), the BATF envisioned a collaborative platform for corporate citizens to work with the city's civic stakeholders: city government (BMP), Bangalore Development Authority (BDA), police, and major utilities, such as water, electricity, and public transport. The objective was "to enable [civic] stakeholders to upgrade

standards through focused capacity building" in order to "recommend appro-priate technology and measures of service levels; adopt best-in-class practices; identify internal champions per project; [and implement] strategic financial interventions" (BATF 2000, 3). Despite its very broad objectives, the BATF operated within a relatively circumscribed domain of intervention, limited to physical infrastructures, especially those that had a visible presence on the urban landscape and therefore contributed directly to the image of the city:[78]

> The language, activities, and partner service providers of the BATF alongside the initiatives of the Krishna-led government promoted an overall urban develop-ment agenda centred on the provision and management of physical infrastruc-ture without comparable emphasis on social and economic requirements of the city. (Ghosh 2005, 4916)

Interventions were directed toward infrastructures such as public toilets, road design, bus shelters, traffic signage, and street furniture (see Gopaku-mar 2009 for details about BATF's Nirmala Bangalore toilets). In each of these cases, BATF designed and piloted models that were to be exemplars of design processes, type of materials, and execution processes, which civic stakeholders could then replicate in the city. In 2004, Krishna was voted out of power for his aggressive Bangalore-centric policies, and the new government, nervous about voter disapproval, did not renew (something no successive government has attempted to do) the mandate of the BATF (Gopakumar 2009).

The dissolution of the BATF became the occasion for the IT industry to bring considerable pressure to bear on the government to demonstrate its seriousness in resolving infrastructure problems in Bengaluru. Prominent IT leaders such as Murthy and Premji spoke publicly against the sorry state of infrastructure in the city and how it was hindering corporate perfor-mance. Matters came to a head when the IT industry decided to boycott the state government's annual fair for the industry: BangaloreIT.com.[79] While the boycott was later reconsidered, tensions over infrastructure in the city between the government and the IT industry have been long-standing and have drawn responses from both sides. In 2008, the government of chief minister B. S. Yediyurappa created yet another infrastructure task force: the Agenda for Bengaluru Infrastructure and Development (ABIDe). Unwilling to replicate BATF's executive authority in infrastructure, ABIDe was consti-tuted as a planning initiative that would provide a report for several civic domains, such as water supply, transportation, and governance. In January 2010, the task force produced the Plan Bengaluru 2020 report that, while focusing on infrastructure, also included allied sectors, such as heritage,

the urban poor, public health, and education. In the meantime, the Bangalore City Connect Foundation (BCCF) was launched in 2007 as a private consultative body comprising industry volunteers who offered their technical and managerial expertise to support infrastructure managers. BCCF was cosponsored by the Confederation of Indian Industry (an industry lobbying group) and the Janaagraha Centre for Citizenship and Democracy.[80] Two initiatives that arose from the partnership between BCCF and government agencies were the Bangalore Traffic and Transport Initiative and Tender SURE, the latter an especially controversial effort offered a design manual to guide the process of constructing roads in the city.[81] In addition to these collaborative ventures, independent initiatives of the IT industry in association with industry associations and media have articulated urban visions, such as the Agenda for Bangalore proposed by the Bangalore Political Action Committee (BPAC) or the Bangalore–High Point in a Flat World proposed by the Bangalore Chamber of Industry and Commerce–Economic Times panel discussion.

The IT industry, with its acquisition of the Silicon Valley of India image and its resulting escalating interest in remaking the city (especially into one that prioritizes the easing of blocks to attaining world-class-city status), although a powerful influence, is not the sole performer. Public spending on infrastructure, undertaken as a means to make the city world class, routed through a parade of targeted nationally funded programs and administered by specialized infrastructure authorities in the state, reinforced this characterization of the period.

The inauguration of the process of economic liberalization in 1991 was followed by a gradual shift at the national level toward incorporating a reform agenda within public spending for urban development. Since 1991, the agenda for spending by the national government in urban development has been dominated by reforming how state and city governments directed and used funding to develop their cities. This period saw a succession of programs starting from the Mega Cities scheme and including massive programs such as the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). In common across these disparate programs was a thrust toward infrastructure development and, more significant, financial sustainability. Accounting for cost recovery in infrastructure development involved instituting complex arrangements for managing infrastructure projects. State governments responded to these shifts by establishing dedicated managers. Karnataka founded the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) in 1993 as the nodal agency for planning, financing, and executing infrastructure projects. Since its founding, KUIDFC

has become the managing agency for implementing programs of the union and state governments, as well as several projects sponsored by international funding agencies such as the World Bank and Asian Development Bank.

One of the first infrastructure programs that KUIDFC managed was the megacities scheme, initiated in 1993–1994 "to develop city-wide infrastructure in mega cities by adopting cost recovery measures to build a 'Revolving Fund' for undertaking infrastructure projects on a self-sustained basis" (KUIDFC 2006, 3-1). Under the program, various civic agencies in Bengaluru (such as BDA or BMP) executed infrastructure projects.[82] However, in the absence of a coherent plan that tied the different projects together, a key shortcoming was the inability of the projects to realize benefits at the city level (KUIDFC 2006, 3–15). In 2006, funding under this program (and other nationally sponsored urban reform programs such as City Challenge Fund and Urban Reform Incentive Fund) were subsumed within the flagship JNNURM program (2006–2015), which attempted to address the shortcoming by establishing a mandatory strategic framework for project proposals.[83] Bengaluru's city development plan's initial vision statement identifies infrastructure as the primary descriptor of a world-class city: "To transform Bangalore as world-class metropolis providing its citizens a high-quality of life in a sustainable environment, with *state-of-the-art infrastructure*, service delivery, and connectivity" (iDeCK 2006, 65; emphasis added). It then goes on to propose that one of the main reasons the city is "under stress" is the congestion in the road and transport system. The plan proposes a comprehensive mobility plan to "resolve issues pertaining to congestion in traffic and lack of transport infrastructure in the city" (iDECK 2006, 108) by nurturing public transportation and nonmotorized forms of transport, along with active discouragement of private modes. Despite this progressive strategy, a majority of the twenty projects (including twelve grade separators and underpasses) that received funding from JNNURM were designed to ease the movement of automotive (predominantly privately owned) traffic at key intersections in the city. Fed by national funding priorities, state decision makers and project managers have arrived at infrastructure as the predominant pathway to shape a world-class Bengaluru by eliminating flow congestion in the city.

One key shift in national priorities toward infrastructure in the postliberalization phase has been toward commercialization (Ministry of Finance 1996).[84] Karnataka's powerful bureaucracy has been a "thought leader" that facilitates the development of commercialized infrastructure consistent with the latest trends proposed by international agencies or the national government. One example of such leadership has been the swing away

from government as an infrastructure provider toward government as a participant within a policy ecosystem composed of parastatal entities, private firms, and consultants. In 2000, the government launched the Infrastructure Development Corporation of Karnataka (iDeCK) with the purpose of establishing an institutional mechanism to leverage private investment in infrastructure. Unlike its predecessor, KUIDFC, an infrastructure project manager for the government, iDeCK positions itself as an infrastructure consultant that simultaneously engages private firms and government agencies in order to successfully propel partnership ventures. As such, KUIDFC and iDeCK have assumed a significant role in the emerging infrastructure scenario following JNNURM's thrust toward greater private participation. While KUIDFC was the nodal state agency that evaluated infrastructure projects, iDeCK authored key strategic plans such as the city development plan for Bengaluru, as well as project reports for solid waste management and transit centers in the city. Together, these entities have introduced a new architecture for infrastructure projects in the city. Whereas in the past, infrastructure planners or utilities conceived, designed, and executed infrastructures in their entirety, the heightened scrutiny of infrastructure by the IT industry in this period coincided with the entry of new entities that seek to insert private energy in terms of capacity and finances into the process. These new entities have shoehorned new architectures of the public-private partnership, such as special-purpose vehicles and infrastructure consortia, into Bengaluru.[85]

Assembling infrastructure corridors is yet another recent mechanism for public-private partnerships in infrastructure for Bengaluru. Infrastructure corridors, usually anchored on a single large-scale infrastructure, attempt to spearhead a wider socioeconomic transition within the globalized setting. Such efforts have been principally occupied with the identification, assembly, and repurposing of large parcels of land. The Bangalore International Airport (28 square kilometers), Bangalore-Mysore Infrastructure Corridor (117 square kilometers), and the IT Corridor (113 square kilometers), for example, have acquired a significant footprint on the urban periphery.[86] However, the process of repurposing land has been far from transparent or even democratically legitimate. In fact, the process has been largely opaque in part because of technocratic oversight (exerted by parastatal bodies) and the near-complete absence of any consultative or democratic thrust. The opacity of the process has played a role in making land use planning inaccessible to the majority of the population (Ghosh 2006, 691). The assembling of large parcels of land through a process with limited local political legitimacy into corridors far in excess of the immediate needs of the project has raised the speculative intent underlying these actions (Goldman 2011) whereby the

land development machinery of the government appears to be requisitioned to further private projects. Since the government of Karnataka is empowered by legal instruments to acquire private land to further public purposes, the extensive routing of land for these privately executed infrastructure projects has posed questions regarding the underlying public intent. Indeed, Nair suggests that

> now the growing clamour for "infrastructure" reflects and serves the speculative intent, where highways and corridors are intended to engender urban growth rather than service them….As a consequence, these new modes of production "bypass" the city as we know it. (Nair 2015, 56)

Against this backdrop, the city has emerged since 1991 as an arena for the prioritization and reinterpretation of infrastructures to minimize flow blockages in the circulation of not only traffic but also global capital, world-class city norms, and elite and middle-class discourses on lifestyle and modernity. Bengaluru's emerging identity as India's Silicon Valley or a putative world-class city has contributed to the redefinition of infrastructure as a means to support and further economic, informational, and human flows. In this context of heightened attention to infrastructure, congestion is blockage that could potentially disrupt these vital economic flows. Thus, road and traffic congestion, pervasive on Bengaluru's roads, is perceived against a matrix of decisions and processes that frames infrastructure in particular ways and proposes solutions to problems affecting them.

Conclusion

With more than 7 million vehicles crawling on its streets, congestion on Bengaluru's roads is very real. At first glance, the popular narrative of Bengaluru as a congested city (that one finds circulating in the popular media or in polite conversation) appears to be overwhelmingly dominated by the explosive growth in vehicles. But digging a little deeper into the narrative of a congested Bengaluru, one finds some discordant threads that point to congestion from a variety of reasons, as disparate as street flooding from an evening downpour, lack of administrative coordination, protests by workers, or even the start of a long weekend. How do we reconcile the presence of these multiple strands in the narrative of congestion in Bengaluru? Are these strands minor distractions in the context of the predominant story of automobile growth?

Examining the historical record in Western cities is instructive, given that the experience of congestion in the context of spiraling automobile

growth was experienced as early as the middle of the twentieth century in these settings. The danger of interpreting congestion solely in terms of rising vehicular population leads to an instrumental reading of congestion that in Western cities has led to advances in traffic engineering, economics, and management. But these advances, riding on a thoroughgoing dehistoricization of congestion, have had consequences for their cities that are only now trying desperately to climb out of the hole that the deep embedding of autocentricity has rendered to their urban fabric. Arguing for locating congestion within a historical evolution, I propose a periodization of how, from the nineteenth century to the present time, questions of congestion in Bengaluru have been framed in particular ways and have evoked particular instrumental responses. These actions were motivated by specific political agendas and compulsions, and they have left spatial residues that now collectively shape the experience of congestion in the city.

Acknowledging the historic location of the experience of congestion is an effort to realize the limitations of an instrumental reading of congestion in Bengaluru. The problem of congestion on the roads is far more multidimensional than we choose to recognize. Instead, an instrumental assessment of automobile growth has become the predominant motivation behind interventions in urban space to address the issue of congestion on Bengaluru's roads. As we shall see in subsequent chapters, such an instrumental intervention has intertwined with particular political interests, social agendas, and technological pathways to generate and locate the constellation of automobility on Bengaluru's roads. In the next chapter, we consider the assembly of a technopolitical regime that governs the reordering of streets in the city to facilitate the greater circulation of automobiles.