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Position Paper 01

Urban Growth in India: Horizontal, Chaotic, and Informal

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Abstract

Mumbai, Delhi, Pune, Bengaluru and various other cities have been the locus of COVID-19 infection in India. Given that these cities also have some of the highest population densities in the country, density is being blamed for the spread of contagion. However, density is not at fault, the management of that density is. Poor urban management has led to chaotic urban expansion in Indian cities which gives rise to various socio-economic challenges. India's urbanisation trajectory is unique. This paper delves deeper into the haphazard and informal growth of urban cities and analyses how urban expansion can be better planned and governed. It starts by analysing the patterns of urban expansion in India and around the world, comparing their similarities and contrasting their differences. It then goes on to examine the causes of the country's disorderly growth and its implications, particularly on housing, transport and public service delivery. The paper concludes by highlighting some key tactics and policy ideas to capitalise on India's growing cities by transforming them into thriving engines of growth.

Key Words:

Urbanisation, Urban Growth, Urban Sprawl, Urban Expansion

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Introduction

In the last several decades, many geographers and economists have demonstrated the vital role of cities in national development. Starting with the Dutch leap to modernity in the 18th century and continuing to the 21st century success story of mainland China, no country has ever developed without urbanising. Why?

Geographers and economists point to the benefits of proximity. As cities grow, they attract businesses and workers. This creates a virtuous cycle; firms gain from agglomeration economies, knowledge spills over, and a diverse labour market that can facilitate growth is created. These terms — agglomeration, spillovers, and the labour market — are elaborations of a simple concept, which is that a higher density of individuals and firms leads to a higher density of interactions. People learn from these interactions — for instance, by changing jobs and learning a new skill or through chance encounters at a sidewalk cafe This learning increases their output, thereby raising productivity. Firms are better off being in cities where they have a lower cost of moving goods to market and access to a bigger pool of workers and trading partners. Workers are better off having access to a bigger pool of jobs.

The productivity benefit of density is limited by congestion, or the inevitable crowding that occurs when a large number of people and firms are trying to occupy the same space at the same time. In other words, congestion effects counteract agglomeration effects. However, all else being equal, places with more people in a smaller area - places that are more dense - are more productive than places with fewer people in a larger area - places that are less dense. The congestion that this density causes can only be ameliorated by appropriate investments in infrastructure.

Planners, environmentalists and geographers have noted, with alarm, that average global urban densities have been declining for several decades and are now roughly 50% below the global average in 1990 (Atlas of Urban Expansion 2016). This global trend holds true in two-thirds of cities around the world; Indian cities are no exception. As density declines, urban areas consume more land per capita. This is of particular concern in Organisation for Economic Co-operation and Development (OECD) countries, where the density in cities is an order of magnitude lower than in developing countries, and the total area occupied by cities is much greater. For example, Springfield MA, USA occupies almost exactly the same urbanised area as Mumbai, India, but has a population of only 500,000 - 1/40th of the population of Mumbai). This has led to calls to contain urban growth and halt density declines in cities around the world, including in India.

The appropriateness of these appeals is a matter of debate. On the one hand, here is no evidence to indicate that declining density in OECD countries is leading to less efficient metropolitan labour markets or less productive cities. Indeed, GDP from cities has grown dramatically even as density has declined, and New York and Los Angeles alone now have a combined GDP that is roughly equivalent to that of India. And the density of Indian cities is already very high by global standards, with Indian cities growing quite rapidly as more people take advantage of agglomeration. In overcrowded cities such as Mumbai, it is clear to any humane observer that most people would be better off consuming more space, not less - whether through vertical growth

or, for those who cannot afford to live in high-rises, the conversion of rural land on the urban periphery into low-cost housing.

On the other hand, larger land areas are costlier to service with basic infrastructure. Studies suggest that it is 30%-50% cheaper to supply public transport, electricity and sewerage networks in densely populated areas (Dobbs et al, 2011). This is because more people and firms can be hooked up to a given trunk line, sharing the cost of that line. Besides, research indicates that developing economies are not as equipped to plan and service large areas as OECD countries.

However, much as the agglomerative yields of density are balanced by the challenge of congestion, the cost savings of providing infrastructure to a dense city are offset by the complexity of managing the provision of that infrastructure to a large group of people. Urban management thus turns out to be the key variable that determines the extent to which a city enjoys the advantages of density. This is because proper management is the only antidote for congestion. Cities that are able to plan for growth and invest in key urban services — transportation, sanitation, clean water — are able to maximise the number of interactions that are possible, and get the most benefit out of their density. Yet, not all cities are able or willing to make these kinds of investments.

In cities in the developing world, poor policymaking and unchecked/unplanned growth have led to urban areas that are still dense by global standards, but difficult to service and traverse. Since cities are still attempting to control their outward expansion, much of the development on the urban periphery is informal, leading to inefficient utilisation of land and a lack of infrastructure. At the same time, Indian cities limit the amount of growth that is allowed to take place in the urban core because of the inability of urban managers to establish adequate infrastructure for high-rise development. This does not prevent densities from increasing, but it does condemn the inhabitants to soaring rents and small spaces. The net effect of simultaneously attempting to block vertical growth and horizontal growth, but without the ability to limit the size of the population, is what we see in Indian cities today, i.e. congestion in the centre, congestion on the edge, and an inability to create truly metropolitan labour markets and realise the benefits of density. This underperformance does not deter migrants from coming to cities, but it does reinforce the cycle of poor urban management by creating isolated neighbourhoods that do not contribute to agglomeration or economic development.

The barriers to managing dense urban areas effectively are especially relevant in the age of COVID-19. In cities that are the locus of infection, such as New York City, London and Mumbai, high population density is being blamed for the pandemic's severity. Some (O'Toodle, 2020) suggest that the answer is urban de-densification, i.e. moving people out of cities and into urban peripheries/suburbs. This proposal is unlikely to work, especially in developing countries where agglomeration economies will continue to be tremendously attractive to businesses and workers. Urbanisation is inevitable and it is essential for productivity. History illustrates that cities have bounced back from previous pandemics: London survived cholera and New York and Mumbai moved on from the Spanish Flu. In fact, the premise of the density argument is flawed. Taipei, Ho Chi Minh City and Hong Kong have higher densities than New York City, London and Mumbai respectively. At the time of writing this paper, these cities were able to effectively manage the crisis.

When it comes to disease transmission, efficient urban management is more important than density. Unfortunately, high density makes the process more difficult. India is at the intersection of two challenges. The tremendous desire of Indians to participate in agglomeration economies has created cities in which even the urban peripheries are denser than some European and American city centres. At the same time, the low quality of city governance in India has translated into poor access to basic services; even handwashing and sanitation is limited to an elite group. This is why COVID-19 is spreading so rapidly. Fortunately, this moment provides an opportunity to rethink urban management in Indian cities, recognising their unique plights and potentials.

The issues facing Indian cities are unique. This paper dismantles the idea that Indian cities should try to prevent growth, focusing instead on how growth can be managed less problematically, what the negative aspects of growth in India are and what is driving the setbacks that Indian cities are facing. It concludes by highlighting key tactics and ideas to transform disorderly growth into better planned cities and suggests what India can and cannot do to similarly improve density management in urban areas. It is important to note that this paper does not focus specifically on the impact of COVID-19 on cities and urban responses to the pandemic. Instead, it addresses the underlying factors that have made Indian cities vulnerable to crises such as this one, as well as how these fissures in the urban fabric have downsides for productivity and quality of life.

What about urban sprawl?

All cities need land to grow, but urban sprawl, as defined by the OECD, is "an urban development pattern characterised by low population density that can be manifested in multiple ways. That is, an urban area may be sprawled because the population density is on average, low" (OECD, 2018). Dieleman and Wegener (2004) understand the phenomenon as the "growth of urban spatial patterns with low densities, large outward expansion and leapfrog urban development". They argue that such urban growth is not conducive to a good quality of life. Ewing et al (2002) identify sprawl as "low density development with residential, shopping and office areas that are rigidly segregated; a lack of thriving activity centres and limited choices in travel routes".

These definitions focus on low density growth as a prime characteristic of sprawl. But low density is not a problem in India. In comparison with the megacities of other countries with the exception of China, Indian cities cannot be said to be sprawling by this metric. With a population of 1.3 billion, most of India is inhabited by a large number of people. To take one example, the metro area of Mumbai has a population density of 278 persons per hectare. That is more than six times the density of London and over ten times the density of Los Angeles (Atlas of Urban Expansion, 2016). In other words, Indian cities face a different problem: how to manage urban land and growth and provide services to all of their residents.

Indian cities are consuming a great deal of peripheral land and are seeing large amounts of leapfrog development. When the country's cities are unable to plan and manage this growth, expansion beyond defined boundaries negatively impacts service delivery, housing supply and demand, traffic and mobility. All these elements cause congestion, and, we now know, enables the spread of disease. These consequences are exacerbated by changes in governance not keeping up

with rates of urbanisation. Thus, India's unique style of urban growth makes it crucial for policymakers to take note of patterns and implications of poor city management, as outlined in the next section. Many Indian planners and leaders fear urban sprawl, but all cities go through periods of horizontal growth as their populations expand. New York increased nine-fold in horizontal area between 1900 and 1930; Paris increased 30-fold since 1800. Even Hong Kong, a dense city by any measure, has grown by 50% in horizontal area since 1990.

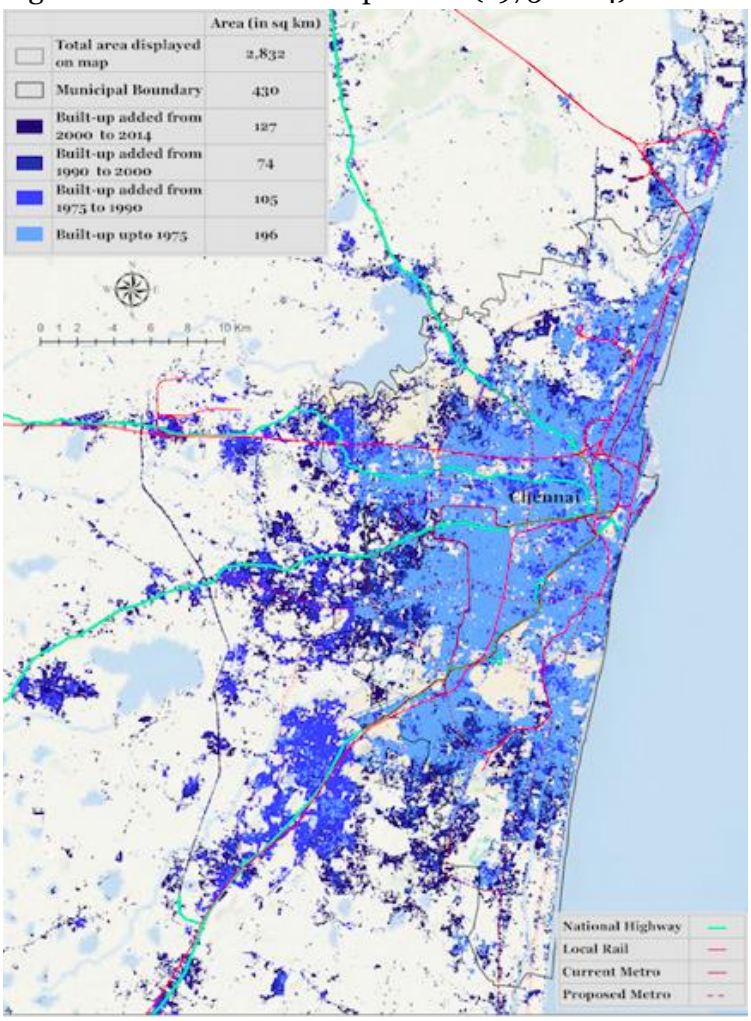
Urban growth in India

Indian cities are struggling to make room for urban development. This pattern is not sustainable. Large new areas of cities are almost entirely unplanned. Where plans do exist, they are often inadequately created and implemented, leading to haphazard development that affects the productivity of cities and urban residents. Further, there is a huge demand for housing in the highly congested urban core. Weak urban management, and density and height restrictions limit the population in formal housing that can be accommodated there. In both peripheral areas and urban cores, development is fragmented and badly connected due to poorly planned road and transport networks, creating long commutes and unending traffic congestion.

Indian cities are growing outside administrative boundaries. Various urban studies use built-up area as a measure of the spatial extent of city growth (Alig and Healy, 1987; Sudhira, 2004; Liu, 2014; Garouani et al, 2017). As seen in Figure 1, settlements in Chennai have extended beyond administrative boundaries and the metropolitan area has expanded. However, some of these areas are still classified as rural and are being governed by Rural Local Bodies (RLBs), not Urban Local Bodies (ULBs) that administer urban areas. As Tandel et al (2019) show, rigid definitional criteria in determining urban and rural areas in India end up misclassifying or undercounting the extent of urbanisation in the country.

The 73rd and 74th amendments to the Indian Constitution delineate the powers and functions given to these bodies. For instance, ULBs are tasked with providing firefighters, sewerage lines and arterial roads, while RLBs are not. This means that misclassified areas (rural classified areas that have the density of urban settlements) do not receive critical services. As of 2014, the Greater Chennai Corporation (GCC) had over 4.5 million urban residents from the metropolitan region under its administration. Additionally, about 3 million were governed by municipalities, town panchayats or Cantonment Boards. Yet, almost a million residents who actually inhabited this urban agglomeration, as per the Census definition, were misgoverned by an RLB. Today, this estimate would be much higher. This pattern of growth is not unique to Chennai, but is prevalent across the country. Estimating its extent will help tackle the issue. The next section discusses the ways in which such growth has been measured across the world and in India.

Figure 1: Chennai Urban Expansion (1975-2014)



Source: IDFC Institute Analysis and Urban Expansion Observatory

Are Indian cities sprawling?

Many people believe that Indian cities are sprawling simply because they are growing. It can be difficult to distinguish between sustainable urban growth, disorderly growth and urban sprawl. Adding to the complexity, most attempts at quantifying the phenomenon have taken place either in the US or in other OECD countries. USA Today's 2001 sprawl index was the first comprehensive attempt to measure sprawl. This index measured the proportion of the metropolitan population living outside Census-defined urban areas as well as the change in that proportion over the years. To avoid misrepresentation of sprawl with one or two variables, Ewing et al (2002) created a four-factor index.

The first factor analysed was residential density, where lower population density within an urban area is indicative of greater sprawl. Second, the occurrence of sprawl can be measured by calculating the amount of land use segregation; sprawl is often characterised in OECD countries by "Euclidean" zoning, which separates industrial, commercial and residential areas. As the

average distance from a residential area to commercial establishments grows, the area is considered to be more sprawling. The third factor is the concentration of population and jobs in the city's Central Business District (CBD) and in sub-centres. If fewer people and jobs are in these centres, the area is considered to be more sprawling. The last factor is the connectivity of the city's street network. In particular, the authors assert that busy arterial roads fed by residential streets that end in cul-de-sacs (dead ends) are usually indicative of sprawl. In this scenario, the local hierarchy of streets is missing and traffic concentrates on a few routes. This reduces accessibility to residential areas via public transit corridors and increases travel distances. Additionally, loss of agricultural land, open space and ecologically sensitive habitats also characterises sprawl. According to this index, US cities such as Atlanta, Raleigh-Durham and Riverside-San Bernardino were described as sprawling.

This index has been refined in multiple studies. Notably, a 2018 OECD study improves upon the first factor (residential density) of the four-factor index. It states that sprawl can still take place in areas with high average densities if a sizeable part of their urban footprint is low-density, decentralised and scattered (OECD, 2018). The study breaks down residential density into three sub-variables, namely: (1) population-to-density allocation; (2) land use to density allocation; (3) variation in population density[1]. It also adds a factor that measures fragmentation, a metric that quantifies the degree of discontinuity/scattering of urban development. This is quantified by calculating the fragmented urban fabric per square kilometre of built-up area. Given the multifaceted nature of the phenomenon, many academics, including Galster et al (2001), find it "hard to wrestle urban sprawl to the ground". Ultimately, these metrics are a first step towards considering the quality of urban growth and representing it through variables that can be objectively measured.

Referring to the Ewing index, Indian cities are sprawling along three of the four factors.

- First, Indian cities have land use regulations that encourage segregated zoning instead of mixed land use. For instance, Mumbai's Development Plan of 1991 does not allow for mixed land use and instead demarcates residential, commercial and industrial zones to prevent over-commercialisation of areas. Similarly, the Chennai Master Plan of 2006 also segregates land into categories like residential, commercial, industrial, institutional and so on, freezing land that could otherwise be utilised more productively. Freezing vacant land to maintain archaic land use regulations harms the productivity of firms.

- Second, Indian cities are unable to redevelop and densify urban centres, leading to decentralised growth. Since Indian cities usually do not follow a monocentric urban form, functions common to varied industries such as a major transport hub, a compact labour market or even social functions like major universities and schools tend to be dispersed across multiple centres. In cities like Atlanta where transportation is efficient and rapid, this is an externalised problem that shows up in the form of higher emissions. In India, where the street network is small and poorly planned, and traffic is a major problem,

[1] Population-to-density allocation is the share of the population living below a defined minimum threshold. Land use to density allocation is the amount of land utilised in areas that have a population below a minimum threshold. Lastly, they measure how much population density varies across a city.

people simply cannot access sub-centres that are far away, thereby negatively impacting productivity. As a result, both CBDs and sub-centres have fewer residents and jobs than they would have otherwise.

- Finally, the street network has poor connectivity, with many dead ends. Ad hoc approvals for the construction of buildings that ignore the larger urban form of a city leave little room for planning an efficient street network. In some cases, this causes street networks to be unplanned, narrow and running at full capacity. Patel (2019) estimates the share of land in public open spaces, private open spaces, streets and building footprints. He examines Lower Parel, a CBD in Mumbai, and finds that public open space (including parks and streets) forms just 12% of total land. The share of land in buildings is 49%, while 39% is wasted on privately owned legally mandated set back areas. This area is a classic example of the confusing high density of buildings that is not commensurate with high density of people. The former provides a false sense of lack of space. Lower Parel faces an artificial scarcity of land because of vacant mill land being locked up as a consequence of a tedious and expensive land use change process. Redevelopment by freeing up land for mixed land use or for improvements of the street network is, thus, effectively impossible in Indian cities. Hence, basic urban infrastructure is crumbling under the pressure of congestion and is inadequate to sustain future expansion.
- With regard to the density measure, Indian cities are unique. For some urban regions, we analyse data on population and built-up area from WorldPop and Atlas of Urban Expansion and observe interesting trends. Between 1990 and 2014, the share of total population growth on the peripheries of cities like Mumbai, Hyderabad and Kolkata was 53%, 89% and 91% respectively. This would seem to indicate sprawl. However, from a total gain of about 7.9 million people, while the peripheries of Mumbai added 4.2 million people, the core has also gained 3.7 million people. The rate of growth of population on the peripheries may be higher but the actual number of people in the centre is even more so. This growth took place at high densities when compared to cities in the West. Thus, by the OECD definition which focuses on density as the major indicator of sprawl, Indian cities are not sprawling. But this may not mean that Indian cities are growing in a healthy way.

Are Indian cities sprawling? When comparing Indian cities to those in the West, urban areas are expanding differently. A unique index to measure and characterise growth in the cities of high density developing countries could help create a more local and precise depiction of conditions in India. What is clear is that Indian cities are dominated by informality, and that growth is both unplanned and unmanaged in terms of the level of infrastructure and the urban layouts.

Informality can be difficult to quantify. One study that emulated the City Prosperity Index of UN Habitat measured informality by identifying subdivided land that did not follow land subdivision regulations of regular plot dimensions, paved roads, pavements and streetlights. Although the plot sizes may be different, they are more or less laid out along straight roads with regular intersections and standard widths. As per their data from 17 Indian cities, on average, 33% of residential areas were built in informal land subdivisions in the area of cities that grew up to 1990 (Atlas of Urban Expansion, 2016). That share has gone up to 50% between 1990 and 2010.

Similarly, the data on residential areas in formal land divisions showed a drop from 27% on average to a mere 8% over the same period. This is a global trend, but more developed cities still adhere to formal land subdivisions. The average share of residential areas built in informal land subdivisions went up from 0% to 1% for American cities, 1% to 10% for Japanese cities and 4% to 14% for European cities between 1990 and 2010. The average share of residential areas built in formal land subdivisions still remains 73%, 59% and 73% for American, Japanese and European cities respectively.

These are not the characteristics of sprawl, but instead paint a picture of necessary but disorderly growth. To tackle these issues at their origin, we must analyse the causes of disorderly growth in Indian cities.

Why are Indian cities growing so chaotically?

A combination of factors has caused sprawl in OECD countries: growing affluence, changing lifestyles, reduced investment in public transportation in some countries and a rise in ownership of personal automobiles leading to car dependency. In Triumph of the City (2011), Glaeser demonstrates this through the example of the city of Houston, Texas. First, rising income levels in the US led the middle class to demand more spacious living areas. Restrictions on mortgage financing made it difficult to develop these areas in city centres, but it was easy to do so in the suburbs. Second, the emergence of automobiles changed middle class lifestyles by increasing personal mobility[2]. It thus became easier to reside further away from jobs at the city centre, leading to a residential emigration to cheaper areas at the outskirts of the city. Additionally, policymakers unintentionally worsened this situation by building highways to accommodate and encourage the demand for personal vehicles and limiting transportation funding for public transportation.

Urban sprawl can also be made worse by having many competing municipal governments within a metropolitan area. In the metro area of Detroit, Michigan for example, residents of outlying municipalities successfully worked to attract businesses to their areas, causing vast fragmentation and lack of centrality, and leading to urban sprawl. From the 1960s onwards, the government built more ring roads to accommodate this suburbanisation, and in the process, it bankrupted the city's urban core (Jacobs, 2003). At the same time, these new suburbs prohibited the construction of apartment buildings and other higher density dwellings, locking in low density growth.

Like cities in OECD countries, cities in developing countries have grown due to "economic drivers, such as the lower cost of land around the urban periphery or tax policies that favour single-family dwellings" (Glaeser, 2011). As this growth has taken place, a lack of proper regional planning has locked cities into a disorderly pattern that is hard to get out of.

The drivers of sprawl in American and other global cities apply to urban India as well. There are also additional causes distinct to Indian cities. India's urban population has been growing at an

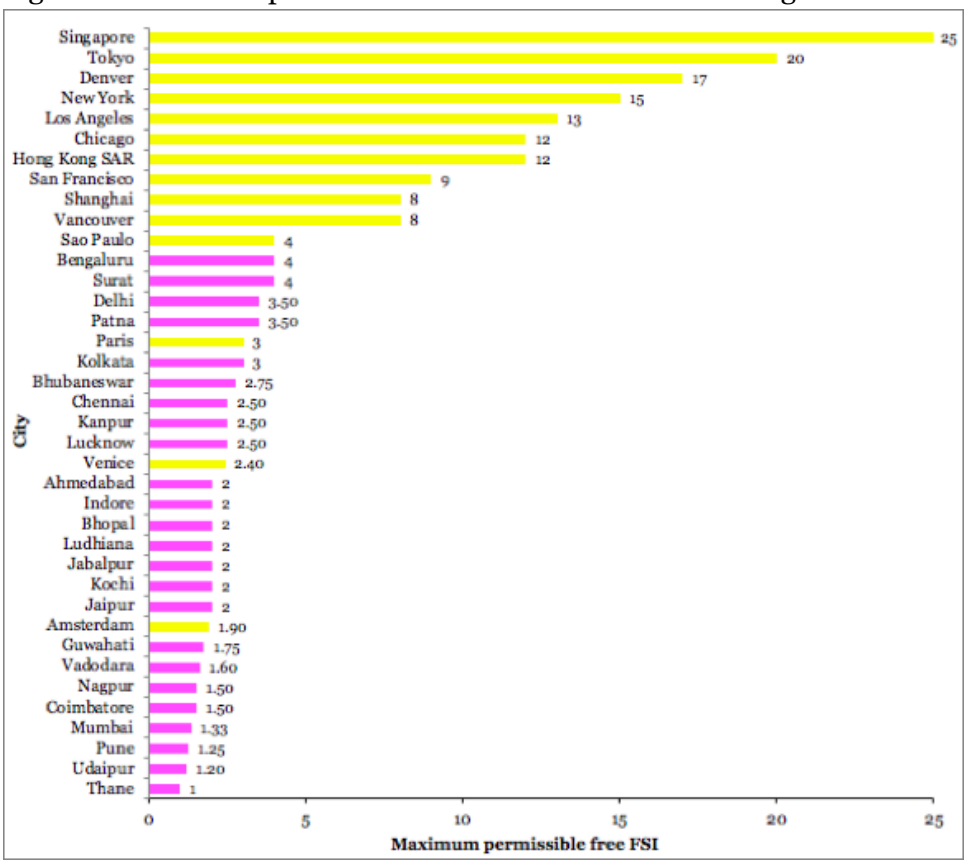
[2] This was unique to the middle class since megacities such as New York provided adequate infrastructure for the high-income and low-income classes. The rich could afford the housing prices of such a city whereas the presence of public transit allowed cheaper mobility for the poor.

average of 2.59% per year, well above the world urban population growth rate of 2.18% in the past two decades (World Development Indicators, 2018). However, that global average masks a lot of variation, as several parts of the world (OECD countries in particular) have already largely urbanised. For instance, in 1890, 35% of America's population lived in urban areas, versus 82% today. According to the 2011 Census, 31% of India's population lived in urban areas. Hence, we may be comparing a rapid rate with a fairly stable one.

Every minute, 25-30 people migrate to Indian cities from rural areas (Pranav, 2018). This rapid pace of migration contributes immensely to the rising urban population. Such an influx demands either an increase in building floorspace in the centre of cities, or tolerance for growth on the edge. City governments, who do not want the logistical and financial hassles of managing more people, have tried to use Floor Space Index (FSI) — the amount of floor area that can be built on a given plot of land — to restrict construction and prevent people from moving by denying them space. This tactic of limiting the area available for construction has, inevitably, failed to prevent people from moving to cities. Urban population growth has continued to rise significantly; regardless of low FSI, people will go where the economic opportunities are. Hence, these policies have not prevented the population from rising, but have decreased the availability of space for construction, raising land and housing prices in the urban core. Yet, enforcement is piecemeal and new residents are still able to settle in peripheral areas (many of which have developed informally) that are more affordable, but poorly connected to jobs and services.

In addition to mandating some of the lowest FSI globally (as shown in Figure 2), Indian cities have uniform FSI rules, whereas places like New York and Singapore have adopted granular FSI i.e. greater FSI in CBDs and lower FSI as one moves towards residential areas. Uniform and low FSI is meant to reduce or limit population densities in the centre of cities, but it ignores the fact that demand is higher in the centre; the policy likely confuses higher density of buildings with a higher population density. Consequently, artificial scarcity of space as a result of stringent FSI caps has led to greater density of buildings. Instead of relieving central city congestion, it has led to a large number of short buildings in urban cores that are still very crowded. This, in turn, has left little to no space available per person at the city centre, thereby making housing unaffordable. Ultimately, regressive FSI restrictions have caused peripheral growth instead of compact growth in urban centres and this is very costly.

Figure 2: Maximum permissible free FSI for Indian cities vs global cities



Source: India Infrastructure Report 2018: Making Housing Affordable, IDFC Institute; Data source: Development Control Regulations for different cities

Another cause of sprawl in Indian cities is the static nature of city development plans. Such plans affect the city's form of growth and feed into its spatial economy. ULBs are mandated by state governments to prepare a land use plan for cities, demarcating land for residential, commercial or industrial purposes, and in many cases not allowing mixed uses. This strategy intended to prevent over-commercialisation of residential areas. However, India's dynamic economic transformation means land use requirements are constantly changing. Agriculture, a shrinking sector, now mainly operates in rural areas whereas the expanding services sector clusters in urban centres. Manufacturing firms, on the other hand, function best in peri-urban regions due to lower land costs, but also derive scale benefits from being in urban metro area.

Altering land use plans after they are approved requires permission from the Municipal Corporation. This is a difficult process and the land use plans remain largely static, at odds with the economic dynamism. As a result, unauthorised land use streets have developed in a haphazard way. We thus see cases like a highly congested and barely accessible area — such as Lower Parel in Mumbai — where demand for land is very large, but the plan does not allow vacant land to be recycled, does not acknowledge the current economic uses and infrastructure is not correctly provisioned. For example, as mentioned earlier, it is common knowledge that textile mills in Lower Parel have shut down and are unlikely to see any revival in the near future. The area, being a prominent CBD, desperately needs more space for commercial purposes and residential

apartments. However, the land use plan continues to reserve space for the mills and limits space for businesses and residences. In the limited space available, firms still set up shop, but people travel back and forth from their homes in the suburbs or peri-urban regions. This enforces monocentric development and increases travel distances – both characteristics of sprawl, with major implications for cities that are outlined in the following section.

Implications of disorderly growth

Cities must grow, and it is clear that allowing urban development has several positive advantages such as catalysing the power of agglomeration and fostering economies of scale (Kahn, 2006). Among other things, permitting urban growth guarantees an adequate land supply for business and housing. The wealth of cities in the US and Europe shows that these effects can be quite powerful, but the negative effects of growth can also be severe if it is not well planned or well managed. Poor management and bad planning make cities less habitable and costlier to operate. This has impacts on four key areas: housing, public service delivery, mobility and air quality. All of these have detrimental consequences on quality of life and economic activity.

Housing

When urban growth is unplanned, housing quality can suffer as homes are developed in informal areas. Around the world, nearly one billion people in urban areas live in informal settlements on the periphery of cities. Most of the time, these makeshift homes (often small rooms occupied by large families) lack security of tenure, access to clean water and sanitation, and safety. They also compel their occupants to depend on corrupt middlemen. The 2011 Census reports that 17% of urban households or 13.8 million households in Indian cities live in informal settlements or slums[3]. This figure is up from 10.2 million households in 2001. Moreover, the lack of orderly growth in central areas and the lack of flexible growth plans have constrained availability of land, causing the prices of homes to skyrocket, forcing people to move even further out.

Public Service Delivery

Bad planning and management also affect the efficient functioning of public service delivery. This ties into governance. Hiranandani (2018) calculated that an urban settlement governed by a ULB rather than an RLB (due to mis governance) could benefit from a 147% increase in road length per square kilometre, a 128% increase in water storage capacity in kilolitres per capita, a 25% increase in the probability of establishing a higher education institution and an 11% increase in hospital beds per capita. Hence, people living in misclassified areas are less likely to access infrastructure, education and healthcare.

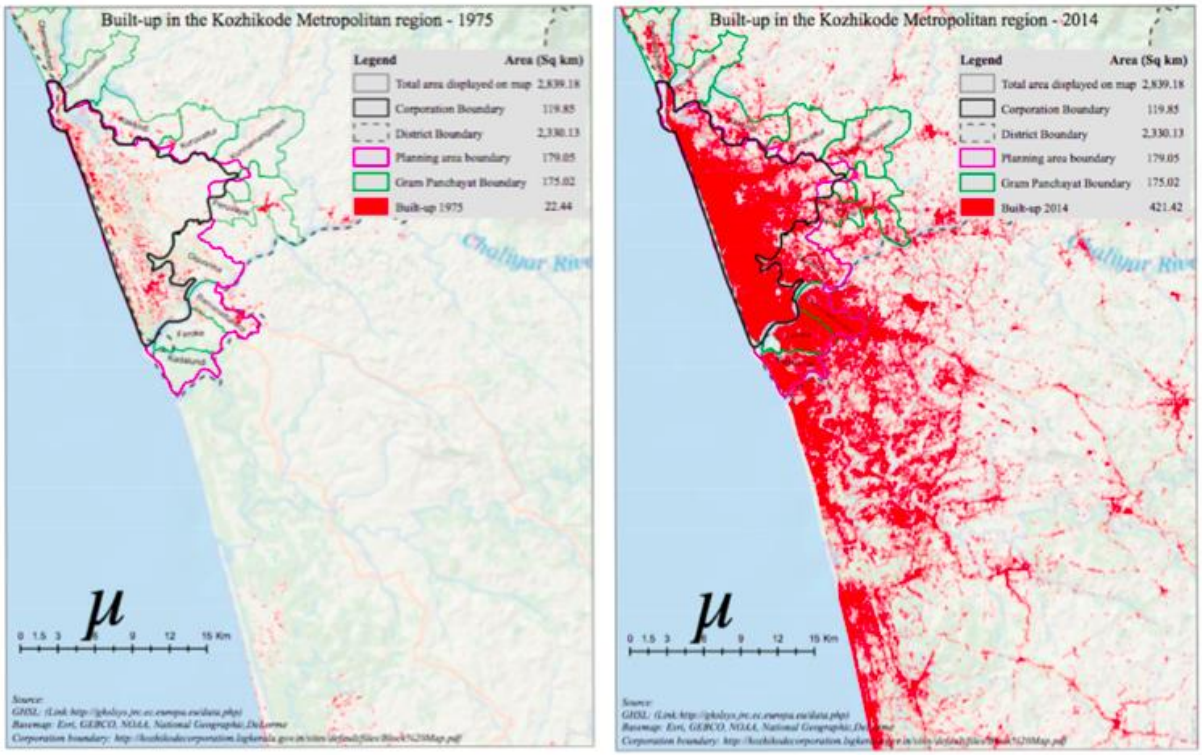
Figure 3 depicts growth in Kozhikode, Kerala, from 1975 to 2014. In the figure, areas such as Kakkodi and Kuruvattur are demarcated by a green border, implying that they are governed by an RLB. However, since they are situated side-by-side, they could in fact be under one urban administration. Solutions entail addressing several governance issues such as redrawing

[3] This number could be higher as the Census only counts 'Identified Slums' in statutory towns, not Census towns.

administrative boundaries. To do this well, urban growth will need to be contextualised and understood uniquely in every Indian city.

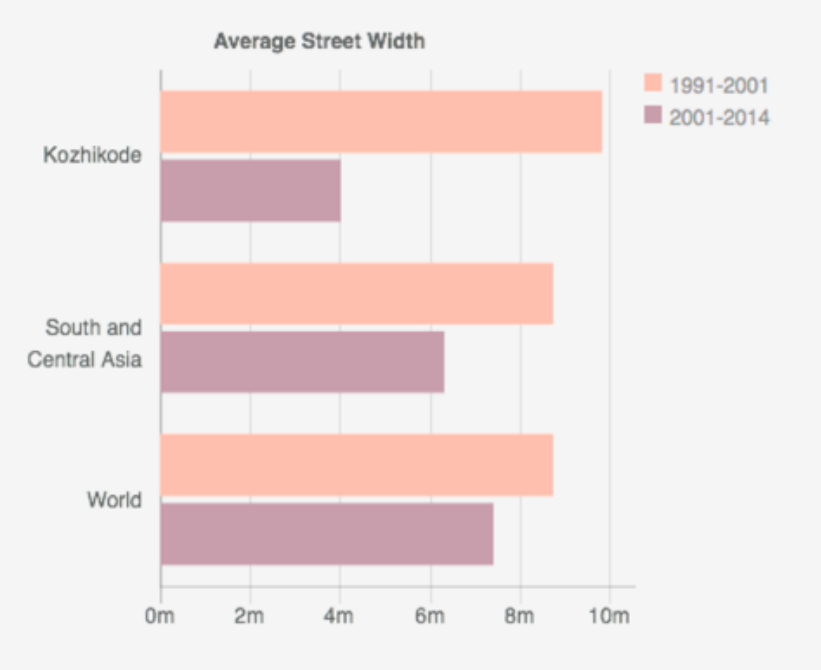
In Kozhikode, with such vast built-up growth, people travel distances of 20–40 kilometres or more when commuting from the periphery. These distances would be considered quite short in an OECD city with an intra-urban expressway network. But in Kozhikode, the average road width in the 1990-2014 expansion area was 4.03 meters, compared to 9.84 meters in its pre-1990 area (Figure 4). The share of built-up area in Kozhikode occupied by roads in the 1990-2014 expansion area was 10% compared to 19% in the pre-1990 area (Atlas of Urban Expansion, 2016). This temporal discrepancy is because people began settling outside previously defined boundaries as Kozikhode sprawled, but jobs and employment hubs remained in city centres. People living on the outskirts travelled narrow roads which are not accessible to public transport to get to areas in the city centre. This makes travel time-consuming, expensive and dangerous. A higher share of roads would allow for greater mobility and for ease of movement across what appears to be a unified labour market.

Figure 3: Built-up area in Kozhikode (1975-2014)



Source: IDFC Institute Analysis and Urban Expansion Observatory

Figure 4: Kozhikode: average street width (1991-2014)



Source: Atlas of Urban Expansion, 2016

Mobility

The 2019 TomTom Travel Index ranked Bengaluru the most congested city in the world with a congestion level of 71% (i.e. the measured amount of extra travel time experienced by drivers is 71% more than that in uncongested conditions). Congestion costs from unplanned urban growth negatively impact efficiency gains in the long run. In his book, *Order Without Design*, Alain Bertaud notes that workers are typically unwilling to travel more than one hour each way. Once commutes become longer than 60 minutes, worker satisfaction decreases. This, in turn, artificially constrains the size of the labour market, limiting productivity. Dhar et al (2019) showcase such a situation in Mumbai: the average commute on the city's major routes is longer than an hour, more than double the averages of Singapore and Hong Kong. Further, they find that every petrol-fuelled daily commute between the northern residential areas of Mumbai and some of the city's CBDs cost more than INR 350 due to congestion. This implies that residents of North Mumbai are unlikely to seek jobs in those CBDs, a demonstration of a fragmented labour market that hampers economic productivity.

Air Quality

Air pollution, as noted by Spears (2019), "causes more than 10% of all worldwide deaths in a year". India accounts for a large portion of this estimate since it is the third highest emitter of Greenhouse Gases (GHGs) in the world, and the fourth highest emitter of carbon dioxide. Moreover, seven of the ten most polluted cities of the world are in India (Thornton, 2019).

Such levels of pollution reduce the productivity of Indian cities. For example, the environmental cost of congestion on Mumbai's major routes ranges from INR 6 to 60 (Dhar et al, 2019). The

fumes emitted by vehicles raise air pollution levels. In 2018, New Delhi did not have a single day where the air quality was classified as 'good' according to the Air Quality Index (AQI). To curb such air pollution, New Delhi policymakers in 2016 introduced an 'Odd-Even Policy' where on the days assigned odd, those with number plates ending in even numbers were not allowed to take their cars out, and vice-versa. However, this well-intentioned policy became easy to flout. Wealthier people had multiple cars and other citizens could easily purchase number plates and change them according to the day.

The implications of poor planning and poor urban management are most prominent in housing, mobility, air quality and public service delivery. Other consequences include high energy consumption, encroachment/degradation of natural resources, stress on water supply and so on. Planned and orderly growth can mitigate many of these problems.

Navigating Urban Growth

There are many principles of proper urban planning that should be applied in Indian cities. For this paper, the most relevant are the critical political economy factors needed to reform urban governance, and the policy lens that should be used when doing so. Drawing on the information outlined above, we arrive at the following key observations:

1. Policies cannot be implemented in isolation, they need to be thought out in conjunction with the development circumstances of the cities in which they are being implemented.

This principle is backed by the experience of policymakers in Addis Ababa, Ethiopia where they implemented isolated policies resulting in negative consequences. In particular, the city government invested in promoting compact growth, i.e. upward growth, by converting the city into a building site. Further, they built a light rail system that runs through the entire city. The intention was to create an incentive for the city's middle-class — those most prone to move to the suburbs — to live in the skyscrapers constructed near stations. This, in turn, was meant to reduce their demand for personal cars as the policymakers sought to avoid OECD-style sprawl.

In practice, this programme consumed large amounts of government resources in order to benefit an already privileged group. New housing was constructed in areas that were seized from lower income residents. These areas were low-rise with small units and high plot coverage. The new housing was high-rise, but with big apartments and lots of space between the buildings, and they ultimately had lower density than what they replaced. Meanwhile, vehicle ownership has continued to increase and the light rail is regarded as slow and overcrowded. At the same time, the government neglected the provision of land for urban development on the fringe and has seen higher amounts of informality.

In India itself, as highlighted in Figures 1 and 3, outward, as opposed to upward, growth has been rampant. This is both necessary and appropriate as more land is needed for residential, commercial and industrial development. If policymakers deny or seek to minimise this growth, and neglect planning and urban management, it will be detrimental to the productivity of the city as well as the quality of life of its residents.

Coordinated efforts at planning do exist at the city level, but in fragmented pockets. The National Capital Region (NCR) encompasses the country's capital, Delhi, and surrounding areas from the states of Uttar Pradesh, Haryana and Rajasthan. A unified body, the National Capital Region Planning Board, has been set up to look into interstate synchronisation of urban design, right from holistic development plans to resource allocation. This does not have to be unique to the NCR. Any combination of states (or districts/wards within a state) can adopt regional plans to target city issues. To take an example from 2013 China, government bodies in Beijing and its neighbouring regions Tianjin and Hebei came together to coordinate their approach to reducing air pollution via regional action plans. In 2017, their policies appear to have paid off and particulate matter (PM) 2.5 levels reduced in this area by ~30%. Hence, coordinated policies rather than isolated ones can be more effective.

At the same time, authorities managing such efforts need to be empowered. For instance, to improve the administration and coordination of different kinds of mobility providers, authorities should work on ensuring that regulations followed by individual agencies are compatible with each other. To this end, organisations, such as a Unified Metropolitan Transport Agency (UMTA), that set rules and coordinate between different operators have been established in a few cities such as Mumbai. However, these bodies are often honorary in nature without much empowered authority. Ultimately, it is critical that such agencies are provided real powers to encourage more efficient urban mobility across different modes of transport in the longer run. Only then can they institute adequate infrastructure in areas of growth, support good governance and streamline public service delivery[4].

2. Urban growth and urban informality are the pressing social and economic issues, and they should be pressing public policy issues as well

Reading newspapers in India, one finds little mention of the massive informality that characterises the peripheries of Indian cities. There is less still to be found when it comes to proactive solutions from policymakers. However, a simple visit to urban peripheries shows that, from the perspective of ordinary Indian citizens, urban growth and urban informality are tightly entwined. The mechanisms that address their basic needs — shelter, public services and access to gainful employment — are largely informal and haphazard. Policymakers' neglect of these issues reflects both a lack of incentive and a failure to envision the negative consequences of their inaction.

Public service delivery in particular is an important socioeconomic issue as effective provision of goods and essentials — education, transportation, sanitation, electricity and so on — create a ladder to prosperity for people who are migrating to cities. When cities fail to use planning and urban management to make room for these new migrants, poor services can retard their upward mobility for generations. Dwellings that crop up randomly on urban peripheries without a robust transport system connecting them to key business districts offer limited job opportunities to those

[4] Such infrastructure includes: A network of arterial roads, a network of public open spaces, affordable transit options that allow ease of mobility and access to affordable housing (i.e. ownership and renting options) that allow migrants to access job opportunities that the city provides.

living in these areas. Within the urban core, unplanned growth results in cities becoming roadblocked and filled with polluted air. This can be seen in Indian cities, many of which now rank amongst the most congested and polluted cities globally. All these factors have social and economic consequences for the productivity and growth of citizens and the city.

One way to boost service delivery is by viewing urban and rural spaces as a continuum, not a dichotomy. Instead of demarcating responsibilities in urban-rural governance structures, there is a need to shift to a sliding scale, i.e. ascertaining benchmarks of service provision based on neutral criteria such as population density. Areas could then be given access to amenities depending on where they fall on the spectrum of the identified measures. For instance, regardless of rural/urban categorisation, if a settlement has a certain density, it would gain from a well-equipped hospital rather than a single physician clinic. Using objective metrics like density, urban expansion could benefit from better service provision.

As Indian cities expand, tackling air pollution also requires viewing the city and the surrounding peri-urban spaces as a continuum when creating pollution action plans. At the moment, most Indian cities do not adequately collect granular, real-time information on air quality. This needs to be the first step for quantifying overall air pollution as well as targeting areas within the city with the highest emission signatures. Next, policies like phasing out older vehicles and providing economic disincentives to use private vehicles should be implemented. An example of this is the Environmental Compensatory Charge (ECC) implemented in New Delhi, i.e. a 'green tax' on vehicles that enter the city. The ECC acts as a 'feebate' mechanism and also generates funds for pollution control measures. Finally, policies like higher land use diversity to ensure more urban green spaces should also be encouraged since they play a major role in reducing the adverse effect of vehicular emissions.

In addition to the reforms required to accommodate the varying needs of residents in urban and rural areas, contextual solutions are also required to cater to the uniqueness of Indian cities with their ever-expanding informal growth. Indian urban agglomerations are informal not only in the quality and pattern of growth but also in housing structures, businesses and consequently employment. While the urban planning issues need to be resolved to formalise urban layouts, short to medium term changes can be made to formalise existing informal housing. Regularisation of informal housing would allow owners to invest in maintenance and improvements as the risk of demolition or expropriation diminishes.

At a fundamental level, the reforms in building norms would better not only the availability of land but also the availability of formal affordable housing. Raising FSI increases the built-up area and in effect the space available per person. This triggers a fall in land prices while also reducing the density of buildings as construction takes place vertically and not horizontally. More space means more flexibility to maintain land subdivision regulations such as regular plot dimensions, paved roads, streetlights or sidewalks, along with space for public open spaces. Higher FSI would allow more people to live in the city centre closer to their workplaces while not being relegated to poor living conditions in informal housing settlements or slums. Addressing informality is economically viable for cities as well as for residents.

Facilitating ease of movement within rapidly urbanising Indian cities is also crucial for their long-term productivity and to minimise sprawl. An effective way to augment mobility is to invest in and increase the usage of public transit within the city. However, given the high cost of building mass transit, city officials should first determine the thresholds that will help determine whether or not to invest in public transit. Such a 'transit-supportive density threshold' can be calculated based on pre-existing population and employment densities as well as current modal split. This exercise will assist city officials in assessing the performance of transport networks as well as in informing future public transit investments (Guerra & Cervero, 2011).

Based on the above exercise, there may be many smaller Indian cities that have a low share of public transit and need large public transit investments. Such cities should employ Transit-Oriented Development (TOD), a common solution adopted by rapidly urbanising cities to avoid sprawl. TOD combines elements of regional planning, renewal/revitalisation of urban areas, and walkable neighbourhoods to foster more vibrant and sustainable cities. Emulating Curitiba and raising FSI in areas that are adjacent to transit would be key to implementing TOD in rapidly urbanising Indian cities. This concept also recommends areas use mixed land use policies around public transport corridors as can be seen in the cases of Johannesburg and Seoul. In Johannesburg, South Africa, the city government assessed that the majority of its citizens lived in formal townships; this prevented the government from building an integrated city, as in the case of Addis Ababa. They identified major urban development centres and invested in public transit to link these centres with each other. This allowed ease of mobility, boosting residential and employment densities in such hotspots.

According to the 2016 America THINKS survey by HNTB, 57% of Americans surveyed held the view that TOD would reduce dependence on driving, 37% felt that it would provide access to better jobs, and 43% believed that it would lead to a higher quality of life. TOD's emphasis on last mile connectivity, which is a significant challenge in sprawling cities, fuels this optimism. When people live far away from the city centre, they are not always serviced by regular transport systems. TOD makes it a point to encompass these areas, widening public transit networks. Hence in addition to tackling issues stemming from sprawl, TOD can also reduce carbon footprints and negative environmental impacts of urban growth.

While many Indian cities do need to make massive investments in public transit, a majority of the residents in some megacities like New Delhi already use public transit to commute. Here and in many other Indian cities, the last mile connectivity problem is not so much of an issue. However, in such cities, transit authorities need to work on harmonising the formal and informal transportation systems that currently run in parallel. Doing so will give residents more options for efficiently switching between different modes when commuting, thereby improving overall mobility.

From a governance standpoint, it is important for empowered city level political leaders to take decisions that either retrofit public transport or make pre-existing systems run better and prevent sprawl. However, for this to work, policy changes must have an easier approval process. In Indian cities, the jurisdiction of multiple departments and parastatals for urban planning, housing,

infrastructure and public service delivery overlap, making coordination between multiple levels of authority along with empowered local leaders essential.

3. Indian cities should not simply emulate the policies and practices of OECD cities; in fact, even the goals may be different.

Indian cities are distinctly different from cities in OECD countries. This is not a nationalistic rejection of international best practices, it is an empirical fact. Cities in India are 10x to 20x denser and occupy 1/10th to 1/20th the area for a given population. They have dramatically more variation in internal density as well, with wealthy areas that are comparable in density and land use patterns to small North American cities, and impoverished areas that are rivalled in crowding by few places in the world.

Indian cities have different needs and require a different pace. In OECD cities, the lag between the beginning of industrialisation and the full provision of basic services was 50-100 years. In New York, which began industrialising in the 1830s, as late as 1937, 165,000 families still lacked access to indoor toilets. In London, slum clearance and concerted government efforts to improve slum areas did not begin in earnest until the passage of the Housing Act of 1930 — and that measure was mainly punitive, leading local councils to demolish large chunks of inner-city slums.

This cripplingly slow pace of change — four generations living in slums — need not be the case in India, especially in light of the risk of inaction highlighted by the COVID-19 pandemic. OECD cities were stymied in their efforts partly by public indifference and inadequate systems of public management, but mainly by extremely high urban growth rates. The improvements that were made in the early 20th century were facilitated by growing wealth (there were more people who were able to purchase good quality housing), but also by slowing growth.

At the same time that they were failing to provide basic services, OECD cities were leaders in the development and implementation of long-term plans. New York is a famous example, with its 1811 plan that laid out the roads and public spaces for 100 years of growth in Manhattan. This was followed by the less famous 1900 plan, which laid out the rest of the area of the city - Queens, Brooklyn, the Bronx and Staten Island. These plans encompassed large vacant tracts of land and organised it simply, without extensive regulations. Sometimes the growth that took place was slum growth, other times it was formal growth, but in both cases, developers were made to conform to the street and road plan. With the exception of Ahmedabad and a handful of other places, Indian cities do not use this simplified planning strategy, and urban areas are fragmented and have poor connectivity.

In these and other ways, Indian cities of today are unlike OECD cities of today. Mumbai will not become Copenhagen or Singapore, and it should not try to. However, Mumbai does have much to learn from the lessons of the industrial cities and fast-growing cities of the early 20th century, and it should take the time to do so. Key to successful policymaking in this case is the distinction between strategy and tactics. The tactics must be local. If the goal is to reduce traffic congestion, or improve access to clean water or fight crime, Mumbai and other cities should study the approaches used in cities outside of India, but it should not replicate them.

Many major cities have implemented policies to attempt to control urban growth. For example, during a period of military dictatorship, the Mayor of Seoul, Park Won-soon, attempted to control urban growth by refusing to build a new ring road after the earlier eight-lane main highway was dismantled. His logic was that "Seoul is for people, not cars" (Swilling, 2016). This led more citizens to use public transport rather than cars. The city of Portland adopted a similar longer-term solution by introducing an urban growth boundary for the city in 1973 to promote compact growth. This growth boundary defined the area in which urban development is permitted. Outside it, only agricultural structures were allowed. The boundary was updated over the years, leading to more compact growth as well as an increase in usage of public transport by over 60% (Dieleman and Wegener, 2004).

In both Seoul and Portland, however, the consequence of containing urban development without making room for urban population growth was a loss of affordability, displacing the poor and middle class. In both cities, urban development eventually shifted to nearby jurisdictions with less restrictive regulations, creating longer commutes and more decentralised development. City leaders had a desire to contain the growth of the city, but failed to balance this with citizens' need for housing.

Cities such as Ahmedabad, Bengaluru and Chandigarh have also tried to implement urban growth boundaries — but implementation has been poor and the boundaries were encroached upon. Importantly, both Seoul and Portland had already attained 50% of their current populations when they implemented the boundaries, meaning growth was occurring at a much slower, manageable rate than in these Indian cities.

Conclusion and Future Work

COVID-19 has thrown the discourse around urbanisation into further disarray. As of October 2020, about 53% of coronavirus cases in India came from just 10 cities[5]. In addition to health burdens, the pandemic has also put a strain on employment, housing, transport and public service delivery. Reverse migration, where several migrants fled cities and returned home to their villages/smaller towns, sparked fears of them not coming back, which would have ripple effects on the economic productivity of cities. For instance, delays in construction will likely impact the real estate sector. City lockdowns and travel restrictions, some of which are in place even today, halted economic activity, and restricted the movement of people and public goods provision. However, the crisis presents a window of opportunity.

With plummeting economic growth and an urban form that makes it very costly to control the spread of disease, policymakers can find a clear and present danger that should encourage them to attempt to rectify land use issues such as archaic FSI restrictions and static city development plans. Since Indian cities and their governance are complex, it is imperative to not only use solutions that work in other developing countries, as opposed to those from developed countries,

[5] The Hindustan Times COVID-19 dashboard calculates the share of cases in cities. It last updated its numbers in July, 2020 - https://www.hindustantimes.com/india-news/10-cities-account-for-half-of-india-s-active-infections/story-jA9UvWLUfC2hzBoZkytaaP.html

but also to tailor them to the country context. For instance, FSI should be relaxed in Indian cities, but this needs to be done in combination with policies to promote public transportation, widen public streets and improve the efficiency of urban governance and management.

Despite the short- and medium-term consequences of COVID-19, in the long term, urban areas will continue to flourish. As Indian cities grow, their density must be managed well, so that they avoid falling into the trap of unplanned, constrained, informal urban growth. If this continues, we will likely experience a substandard quality of life and potentially lower economic productivity, not to mention be prey to future health emergencies. Policymakers must develop means of ensuring that cities can make room for growth within their existing urban centres and that growth on the periphery is orderly, well-serviced and sustainable.

The cost of these mistakes can be significant. In the United States, Hsieh and Moretti estimated that poorly implemented policies to contain growth have reduced per capita GDP by almost 50% from 1964 to 2009. India, a nation with almost 270 million (MOSPI, 2017) people living in poverty, cannot afford to make such a mistake.

The suggestions outlined in this paper are preliminary, and more research is needed in order to quantify the benefits, risks, and even the magnitude of the problem of haphazard urban expansion and its management. Given that India is one of three countries expected to contribute to a global urban population growth of over 37% by 2050 (NCE, 2018), it is crucial that Indian policymakers grapple with this issue, particularly in light of the finding that several Indian cities are already highly informal and disorderly. As next steps, we propose to quantify this problem by measuring the extent of urban sprawl across the country. We aim to achieve this by conducting research to develop a 'sprawl index' that is appropriate for Indian cities. Identifying ground realities will enable us to provide contextual and granular recommendations to improve the form of urban growth in India.

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