Rapid Transformations of Vernacular Settlements through Urbanizations Around Metropolitan Cities in India: A Review

Anjali Saraswat[1], Satish Pipralia[2] & Ashwani Kumar[3]
[1]Research Scholar, [2]Associate Professor, Department of Architecture & Planning, Malaviya National Institute of Technology Jaipur, India
[3]Associate Professor, Department of Architecture, National Institute of Technology Hamirpur, India
12021rar9007@mnit.ac.in; [2]spipralia.arch@mnit.ac.in; [3]akumar.arch@mnit.ac.in

Abstract

Rapid transformations of rural vernacular settlements to urban areas and peri urban areas to cities happen across the world, driven by economic opportunities leading to profound societal changes. They include increased infrastructure needs and heightened environmental concerns making them to face challenges of infrastructure, housing and resources. These processes are aggravated around metropolitan cities that hold the highest proportion among the cities with millions of people. Invariably, similar trends have imposed immense infrastructural strain on many Indian cities, propelling rural urban transformations. It is assumed that in the future, they will perpetuate even more urban challenges to both urban as well as rural settlements alike. Therefore, planning of cities in India meaningfully is necessary to achieve sustainable rural urban transformations. In this context, this paper offers an examination of the rapid transformation processes prevalent around many Indian metropolitan cities.

This research analyzes 58 research papers related to this issue. It examines the post-Independence evolution of these transformations in India, exposing the strategies adopted across various periods. It discusses these developments through five-year plans, smart city initiatives, organizational advancements and policy formulations.

The paper presents the significance of metropolitan cities as well as the rural villages in determining India's trajectory in the forthcoming decades. Thus, it emphasizes the need for urban planners and decision-makers to focus on these transformations to surmount urban challenges and attain sustainable development of human settlements.

Keywords: India, Metropolitan Cities, Sustainable rural urban transformations, Urbanization, Urban Planning

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

24

Introduction

Urbanization means the movements of people from rural areas to cities leading to rising populations in urban settlements. As an outcome, a region or a country becomes more urban. This transformation inevitably includes economic, social, and cultural changes in urban centers and escalate demographic trends (Carra and Barthelemy, 2019; He, 2013).

However, urban centers are economic hubs with large industrial and commercial setups, offering many job opportunities. Often, people working mainly in agriculture in rural areas move to cities for employment seeking high-wage opportunities. Such migration is influenced largely by urban economic growth and affects regional urbanization rates (Madlener and Sunak, 2011; Sridhar, 2016).

Cities are attractive in many ways. First and foremost, various manufacturing, mining, and service industries offer people in urban areas opportunities to have better standards of living. Developing marketing institutions allows excellent distribution of goods and services, leading to many trade and commercial opportunities for people. Most urban centers consist of development authorities and Municipalities ensuring good physical infrastructure and many social benefits including education and health centers, recreational facilities, and a good quality of life. Moreover, there are also many pulling factors to urban areas, and many pushing factors such as poor living conditions, deteriorated healthcare, unavailability of quality education and lack of employment opportunities in the rural areas. Indeed, they are the main causes of urbanization ((Kumar et al., 2018; Taghi, 2020; Smith et al., 2018). Natural increase in population also makes urban centers dense and escalate urbanization.

In this context, this paper examines the issues associated with rapid urbanization in Indian metropolitan cities and also portrays a timeline of urbanization developments in India. Its aim is to examine the rapid urbanization scenarios in Indian metropolitan cities. Its objectives are:

1) To analyze literature related to urbanization and its associated issues.
2) To recognize the importance of metropolitan cities in achieving sustainable urbanization.
3) To identify trends associated with the evolution of urbanization in India.

Theoretical Framework
Urbanization

. Urbanization is a layered process that inhibits easy categorization due to its multifaceted nature. A region engaging in activities other than agriculture is a benchmark most commonly used to describe urbanization but it fails to reflect the complexities of the urbanization process (Liu et al., 2021; Wagner and Growe, 2019). Urbanization encompasses not only patterns of employment but also elements like population density, stratification of society, access to amenities, and development of infrastructure. The transition from agricultural societies to a range of economic endeavors influences urbanization, leading to cities that differ in scope, function, and character. terminological vocabulary of urbanization adds to its complexity, and ambiguity is produced by the interchangeability of terminology like "city," "urban agglomeration," and "metropolitan" (Dhanush and Devakumar, 2019; Putnam et al., 2014). Each word encompasses several facets of urban development frequently influenced by administrative, economic, and topographical considerations.

According to Potere and Schneider (2007), urbanization can be defined in term of the spatial distribution of land and focuses on creating urban land taxonomy through rigorous assessments to map the land extent of urban areas. This results in incorporating the ecological and social consequences of rapid urbanization. Theisen (2013) in contrast defines urbanisation as a social process associating it with human development and progress. He emphasizes the benchmarking of urbanization standards on socio-economic conditions to enhance the health of urban dwellers. Streule (2020) adopts the concept of Popular urbanization wherein the role of the people resulting in a variety of spatial outcomes and temporal trajectories is emphasized. He describes it as an urban strategy through which the

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

25

people produce, transform, and appropriate an urban territory. Cristiano (2020) proposes Urbanization, in terms of systems thinking, and emphasizes tracking material flows to attain resilience and sustainability in cities. Hence, urbanization is understood through varied perspectives of land distribution, social aspects, demography, spatial factors and health, etc.

Urbanization as a phenomenon is thus not just associated with only demographic changes but manifests also in terms of people's desires to have a better quality of life (Murayama and Estoque, 2020). Flourishing economies of cities is driven by innovative efforts in technology and infrastructure, which, when not adequately guided by planning efforts, results in spatial, environmental, social, and sustainable challenges for cities (Johnson et al., 2011; Kalantari et al., 2019).

An array of problems is inevitable in cities induced by the growth characteristics of urbanization. The 2018 Revision report highlights the concerns arising with the increase in world urban population from 30% in 1950 to 55% in 2018 and states that a large number of urban residents are facing its repercussions in terms of environmental degradation, rise in poverty, inadequate housing and lack of education and healthcare facilities. Amongst the rising urban population, the maximum share of the population lies in the metropolitan cities, having a population between 10 to 50 lakhs, and so they are centers of a maximum number of urban challenges (Hoole et al., 2019; Mondal et al., 2018). Thus, the focus of planning efforts must be directed towards metropolitan cities to address the many challenges they face and ensure well-planned economic and spatial development.

Research Methodology

The Scopus database was accessed to find appropriate peer-reviewed literature. Books, thesis, and various gray literature were excluded from the results, and only Scopus-indexed peer-reviewed journal articles were included. This allowed methodological filtering of a large number of articles. A search string as follows was formulated based on the keywords of the paper title and its associated terms:

(Urbanization OR India Urbanization OR Metropolitan cities) AND (Sustainable Urbanization OR Sustainable Cities OR Urban Sustainability)

Table 1: Keywords and its associated terms
Source: Author

Keywords	Associated Terms
Urbanization	Urban growth, Urban sprawl, Urban environment, Urbanization trends
Metropolitan cities	Megacities, Infrastructure development, Population density, Economic hubs, Transportation networks
Urban	Built environment, green space, landscape
Planning	Urban development, urban planning, landscape planning, sustainable development
Sustainability	Sustainab*, sustainability assessment, sustainability indicators, sustainable development

After developing the search string, it was tested in the SCOPUS database and finally 58 articles were included in the systematic literature review. Bibliometric analysis was performed on the articles to view the overall scenario and trends associated with the publications, countries, and keywords. The research papers written in the last ten years from 2013 to 2023 were reviewed.

The Context: Metropolitan cities

Vigilant efforts to be aware of the concurrent demographic trends in metropolitan cities allow urban governance and management officials to meet the impending urbanization challenges. The World Cities in 2018 Data Booklet by the United Nations reports the present share of Metropolitan cities in the world population to be 12%, which will increase by 2030 to 14% (see figure below). The share by Metropolitan cities is the highest amongst the share of cities with million-plus people worldwide (see Table 2 below). Amongst the world's ten

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

26

largest cities in 2018, are two Indian cities: Delhi (28 million) and Mumbai (19 million). They hold the account, and this count is predicted to elevate in the future due to the rise of the Indian metropolitan city population. The infrastructural pressure created on Indian cities is a massive reason for rapid urbanization and it is predicted to continue to contribute to a number of urban challenges in the future as well (Arha et al., 2014; Swain et al., 2016). Between 2018 and 2050, three countries together namely, China, India and Nigeria will contribute to 35% of urban population in the world as predicted by the World Urbanization Prospects: 2018 Revision report. With the rise in Indian urban population to 416 million, the readiness to handle these imminent challenges is constantly questioned.
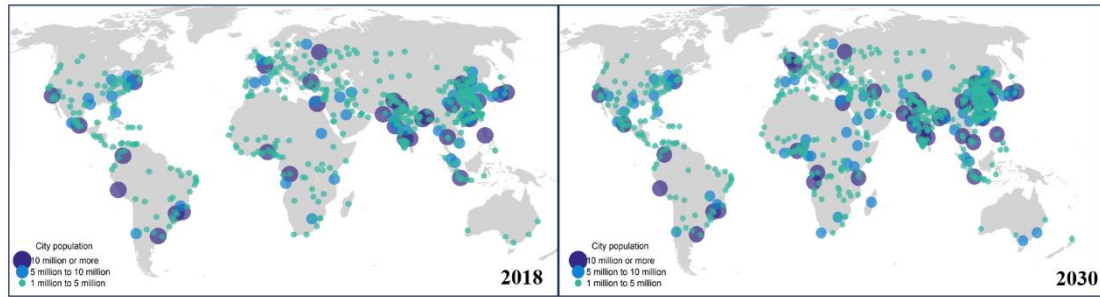

Fig. 1: Cities with 1 million inhabitants or more, 2018 and 2030
Source: The World's Cities in 2018, United Nations

Table 2: World's population by size class of settlement, 2018 and 2030
Source: The World's Cities in 2018, United Nations

Size class	2018			2030		
	Number of settlements	Population (millions)	Percentage of world population	Number of settlements	Population (millions)	Percentage of world population
Urban	-	4220	55.3	-	5167	60.4
10 million or more	33	529	6.9	43	752	8.8
5 to 10 million	48	325	4.3	66	448	5.2
1 to 5 million	467	926	12.1	597	1183	13.8
5,00,000 to 1 million	598	415	5.4	710	494	5.8
Fewer than 5,00,000	-	2025	26.5	-	2291	26.8
Rural	-	3413	44.7	-	3384	39.6

The overwhelming impact of data often results in ignoring the significant elements in the momentum leading to urbanization. The need of the hour is to augment urban planning-related efforts in the direction that necessitates most attention. Sustainable urbanization will only be possible if sustainable models of planning metropolitan cities are built because they are the fastest-growing cities and inhabit the maximum number of people (Shahidehpour et al., 2018; Yang, 2017). Prioritizing them in urban planning policy is essential for their planned growth and sustainable development.

Findings: Part 1
Literature Review
82% have been written in the last four years. They provide evidence that the integration of ecosystems approach in urban planning is a relatively new and expanding field of research. Figure 2 below demonstrates the publication trends of the research papers on

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

27

Ecosystems approach to urban planning from 2007 to 2021. It shows that ecosystems approach to urban planning have been emerging as a relevant study in urban planning with increasing focus being given on the subject over the years.

As reported, 58 publications were uncovered. Among them, Majumder (2023) points out the importance of urban management efforts for metropolitan cities. He highlights the strong association between the rise in population and the decline in the quality of life in urban areas. Kaufman (2016) strengthens the idea that metropolitan cities in the USA have been experiencing much higher cases of deteriorated overall quality of life, primarily because of increased air pollution, rise in slum population, etc. Indian cities are no exception to this trend. Metropolitan cities like New Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad etc are becoming centers of worst environmental conditions year by year. Thus, they argue that emphasis on planning efforts for metropolitan cities is essential for sustainable urbanization.

According to literature, Indian metropolitan cities have a multidimensional nature of urbanization going beyond mere physical development. They are intricate webs of interconnected systems that encompass the architectural and spatial aspects and complex social, cultural, economic, and technological dynamics (Chatterjee and Chattopadhyay, 2020; Haque and Patel, 2018). According to them, the spatial and architectural design of Indian metropolitan cities is just one facet of a much larger framework. The physical infrastructure, road networks, skyscrapers, and public spaces constitute a visual representation of urbanization. However, these physical elements are intertwined with a range of other systems.

Sharma et al., (2022) and Saini et al. (2022) point out that demographic change occurring due to urbanization in India entails a profound socio-cultural transformation. As rural migrants flock to cities for better livelihoods and opportunities, they bring diverse cultural backgrounds, languages, traditions, and ways of life. This diversity enriches the social fabric of metropolitan cities, fostering a cultural amalgamation that shapes the city's identity. In this connection, Balland et al. (2018) and Sadler et al. (2020) show that eventually, the economic landscape undergoes a substantial shift in metropolitan areas as they often serve as hubs of economic activity, attracting businesses, industries, and investments. They further point out that the presence of a highly skilled and educated workforce, along with advanced infrastructure, contributes to the growth of various sectors such as technology, finance, and services. The economic dynamics influence the city's prosperity and contribute to regional and national economic development.

Sridhar (2017) draws attention to the fact that transformation of Indian metropolitan cities goes beyond physical expansion, encompassing social, cultural, economic, and technological dimensions. India entered the era of fast urbanization with the commencement of the 20th century.

In India, the population living within the urban areas grew from 11% in 1901 to 31% in 2011 (see Table below). The number of towns became 7935 in 2011 from 1827 in 1901. The population living within the urban areas grew from 11% to 28% between 1901 and 2001. The count of urban agglomeration also became 4386 in 2001, from 1827 to 1901. Including both statutory and census towns, the 2011 Census reveals the count of cities to be 7933. With a 3.83 percent annual growth rate, 1981 has seen the highest level of urbanization.

Within this urban population, one-fourth of people have been living in slums accredited to the high cost of living and lack of diverse employment options are essential causes of economic unsustainability. In recent years, white-collar jobs have accounted for most jobs in cities. However, despite the apparent socio-economic gap, Indian cities now contribute the most to GDP.

Table 3: Percentage of urban population and number of towns in India
Source: Census of India

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

28

S.No.	Year	Total population of India (in million)	Urban population of India (in million)	Percentage of urban population	Number of towns
1	1901	238	26	11	1827
2	1911	252	26	10	1815
3	1921	251	28	11	1949
4	1931	279	34	12	2072
5	1941	319	44	14	2250
6	1951	361	62	17	2843
7	1961	439	79	18	2365
8	1971	548	109	20	2590
9	1981	683	159	23	3378
10	1991	846	218	26	3768
11	2001	1027	285	28	5161
12	2011	1210	377	31	7935

In terms of spatial assessment of Indian cities, they are divided into eight classes based on their population size (see Table below). Class I to VI incorporate populations ranging below 5000 to 1 lakh, and metropolitan and megacities have populations ranging from 10 to 50 lakh and more than 50 lakhs, respectively. Observing the population trends from class I to VI cities reveals that from 1901 to 1951, more than 80% of the urban population has been confined to class IV, V, and VI cities, which have reduced to 55% between 1961 and 2011 (see Figure below). On the other hand, a rising share of the population in higher-order cities, including class I, II, and III, from 1951 to 2011 implies that many lower-order cities grew in population and became higher order. Thu, accredited to a rapid rise in population, higher order cities require more urban planning attention to serve people's infrastructure and service needs.

Table 4: Class of Cities
Source: Census of India

S.No.	Category	Population
1	Mega cities	More than 50 lakh
2	Metropolitan cities	10 to 50 lakhs
3	Class I	More than 1 lakh
4	Class II	50000 to 1 lakh
5	Class III	20000 to 50000
6	Class IV	10000 to 20000
7	Class V	5000-10000
8	Class VI	Below 5000
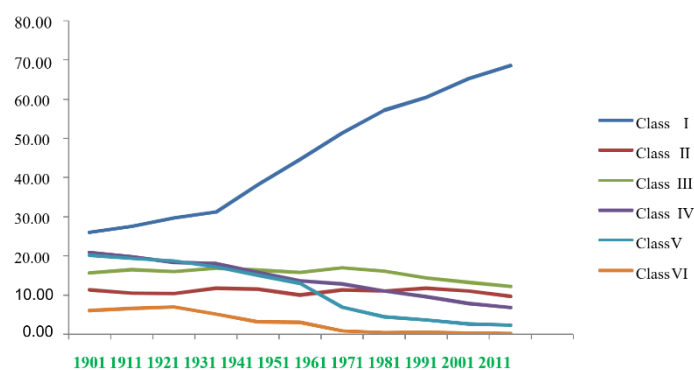
Fig. 2: Distribution of population from Class I to VI cities
Source: Census of India

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

29

The significant city direction of India's urbanization is distinctive and indicative of the rising disparity and inequalities in the urban population distribution, leading to a concentrated urban structure in India. Class-I cities are the essential manifestation of this top heaviness-induced urbanization, which over time have resulted in the emergence of new large metropolises. The urban way of life, or urbanism, and the diversity of their populations make these metropolitan areas, or cities with a million or more residents, distinctive (Cheshmehzangi and Aurelia, 2020; McGuirk, 2021; Sridhar, 2017). Due to their rapid population growth and rising percentage of the total urban population living in these cities, their growth pattern exemplifies metropolitanization as the distinguishing feature of Indian urbanization in the post-independence era (Bhagat and Mohanty, 2009; Krishna-Hensel, 1999).

At the start of the 20th century, there has been just one metropolitan city, Kolkata, British India's capital, with a population of 1.52 million (see Table below). In 1911, Mumbai has joined this league. These two cities have taken over the urban scene until 1951, when Chennai, Delhi, and Hyderabad were also included, bringing their total to five. As the outcome of many Class-I cities graduating to the present group of million-plus cities, the overall number of metro cities ascended, reaching 23 in 1991, 35 in 2001, and 52 in the 2011 Census. The substantial rise in their numbers can be attributed to this. It is important to note that over the years, not only have there been more of these million-plus cities, but also their respective proportions of the overall urban population and the country's total population have grown significantly.

There were just 1.5 million urban Indians in metropolises in 1901 compared to 159.57 million presently. Thus, the percentage of those living in cities has increased sevenfold, from 6% in 1901 to 42% in 2011. There are also some clear trends in the decadal surge of metropolitan growth. A total of 54 metropolitan cities existed across the nation in 2012, according to the McKinsey report Understanding India's Economic Geography (2014). The GDP they contributed to was 40%. According to the research, India will have 69 major cities by 2025. From 2012 to 2025, they will contribute 54% of the country's additional GDP, along with their hinterland. The massive metropolitan expansion in India following the founding of these cities is evident from the rise in the density of urban residents in metro areas. The result of the notable economic activity concentration in major cities is the enormous influx of people there, which draws residents from all around, mainly from the countryside and other smaller cities and towns. As a result of these faster metropolitan agglomerations, new towns, and metro areas have sprung up. This process significantly altered rural regions' physical landscape and social structure near the original cities (Paquette and Domon, 2003).

Table 5: Number of Metropolitan city and their share in urban population
Source: Census of India

S.No.	Year	Number of Metropolitan city	Metropolitan city population (in million)	Percentage of India Total population	Percentage of India Urban population
1	1901	1	1.52	0.64	5.88
2	1911	2	2.80	1.11	10.81
3	1921	2	3.16	1.26	11.24
4	1931	2	3.44	1.23	10.28
5	1941	2	5.34	1.68	12.11
6	1951	5	12.01	3.33	19.24
7	1961	7	18.48	4.21	23.41
8	1971	9	28.45	5.19	26.07
9	1981	12	43.29	6.34	27.15
10	1991	23	70.99	8.39	32.63
11	2001	35	108.29	10.53	37.85

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

30

| 12 | 2011 | 52 | 159.57 | 13.19 | 42.31 |

According to literature, urbanisation is the most concrete phenomenon changing global dynamics. Each day many people move from rural areas to urban centers in search of better job opportunities. This movement-led urban development is responsible for evolving human settlement conditions. Global escalating trends of urbanisation can be observed from the 19th century, with the share of the urban population rising from 2% in 1800 to 15% in 1900, 30% in 1950, and currently, more than half of the world's global population living in cities with a share of 56%. World Urbanisation Prospects report by UNDESA predicts the trend to continue with the percentage of urban dwellers to become 72% by 2050 with a population of 6.3 billion.

According to Neuenkamp et al. (2021) and Pauleit et al. (2021), the rapid increase in city population has also swiftly magnified the urban centers' proportions, with the current population of cities above 10 million people being 34. Within 50 years, the sum of 1 million population has shot up from 80 to 533. Such expeditious urbanisation across the globe has put urban ecosystems through incredible challenges. India has also been experiencing similar urbanisation scales with a growing urban footprint from 17.29% in 1951, 19. 91% in 1971, 27.81% in 2001, and the current share is 35%. Indian urban population in 2050 is expected to be 800 million, almost double the current 493 million, which would mean that every two Indians will be urban dwellers then.

The growth rate of the population in Indian cities has been 28% between 2001 and 2011. This share is 23%, the continuation of which would surpass the percentage of the rural population between 2040 and 2050. Indian cities' size classes reveal that there are 52 million plus cities, 4 five million cities, and 5 ten million plus cities. Amongst these, the million-plus cities graph has been the most dynamic, from 35 in 2001 and 52 currently, which is projected to increase to 100 by 2031.

Roy (1994) and Sharma and Jain (2021) point out that this indicates that Indian cities are dynamically transforming into mega urban hubs, putting massive pressure on infrastructure and consuming urban ecosystems with development pressures. As interest in India grows worldwide, various agencies and organizations have begun to examine its urbanization data from various angles. The number of studies, variations in methodology, approaches, and analyses are frequently to blame for the variation in results one encounters. There is no question that India's urban trajectory is vital for the world since it is intimately related to the nation's economic trajectory, consumption patterns, and climate change, among other things (Sitharam and Dhindaw, 2016; Tiwari et al., 2015; Tripathi et al., 2013). In addition, interventions are required at several levels, including policy, money, management, and technological advances.

Discussion

Literature affirms the importance of metropolitan cities in achieving sustainable urbanisation. It is observed that due to unprecedented population expansion, metropolitan cities are posing a threat to human health and development. The evolution of urbanisation in India is discussed further as in order to plan Indian metropolitan cities effectively. It is important to understand how cities were planned after India's independence.

Findings: Part 2
Evolution of Urbanisation in India

India established several organizations and institutions for urban development, like the National Building Organization and the Delhi Development Authority, within the first two five-year planning periods. However, despite having consecutive urban growth strategies throughout the plan period, India appeared reluctant to embrace the necessity of transformation of cities (Chadchan and Shankar, 2012; Ghosh et al., 2020). The subsequent five-year plan (1961–1966) especially highlighted the crucial role of cities' inequitable regional growth as, historically, villages were always home to Indians, and the significance

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

31

of cities to economic, social, and cultural evolution was commonly underestimated. Thus, at the governance and policy levels, there was always resistance to the growth of cities. Additionally, Gandhi played a significant role in directing the planning process in the post-independence era of India. He believed that for India to progress, the villages needed to be developed as self-sufficient units that would generate and utilize all the necessary resources to function independently. This becomes a crucial reason for the continued focus of planning priorities to villages only. In Gandhi's words, Gram Swaraj is "a comprehensive republic, autonomous from the surrounding area for its individual essential needs while remaining interconnected in numerous ways in which interdependence is a necessity" (Kakati, 2021; Rigby, 1997). Gandhi thought that to have an authentic appearance of democracy, political power should be distributed among those who reside in rural areas. According to Gandhi, autonomous, self-sufficient communities that provided chances for the population's full involvement could only truly achieve Swaraj. It was referring to village communities. Therefore, highlighting urban demands might have been considered politically inappropriate. Gandhian ideology influenced governments in terms of the day's priorities throughout the plan period. The importance of urban growth in forming a modern, industrialized society was not even mentioned in the Nehruvian concept of modern India. India's total urban development was hampered by the apparent resistance to acknowledge the necessity for cities to grow and thrive.

Developments: 1951–1961

This hesitation did not suggest the absence of an intention to have prolific development of cities in India. The First Five Year Plan (1951–1956) in India implemented this by making camps and shelters for laborers who migrated from the villages to cities in search of jobs. Four important organizations working towards building houses and other infrastructure for the migrated city population were established: the National Building Organization, Housing Board, Town & Country Planning Organization, and The Ministry of Working and Housing. Further, many schemes were also launched by the Government of India to provide houses to people from lower- and middle-income groups affordable housing to factory and plantation workers. Also, schemes to eradicate the growth of new slums and enhance the service facilities in existing slums were made. The Second Five Year Plan (1956–1961) noted the high rents, particularly in large cities, as well as the speculative purchase of urban land and rising prices, and expressed worry about these issues. It was ascribed to the rising industrialization in the Plan. Under the second plan period, the topic of regional planning and emphasis on creating urban master plans were initially presented to address the issue (Viegas et al., 2013). A plan for building homes for the low-income group was put up to make up for the urban housing shortage. Slums Area (Improvement and Clearance) Act was also launched in 1956, which defined slums as any region with houses unsuited for habitation, decaying buildings, a dense population, and improper building arrangement or design. In other words, environments that are "detrimental to safety, health, or morals." This Plan was motivated by a concern for the underprivileged and a need to create a blueprint for future growth. The importance of maintaining the basic requirements of environmental cleanliness and necessary public services while keeping rentals within the means of those who live in slums was stressed. The urban development plan acknowledged the housing shortage and strongly emphasized housing facility construction, which persisted during the Third Plan (Ahmad et al., 2007). Overall, it clarified the necessity of developing strategies for achieving planned urban development, increasing housing options, and creating a forward-thinking civic government.

Developments: 1961–1979

Housing and rural and urban planning were again highlighted in the Third Five-Year Plan (1961–1966). Housing and development for cities received Rs. 142 crores in funds during its tenure. One of its key elements was recognizing the significance of cities and towns in India's balanced development. Implementing a regional approach to urban planning was

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

32

suggested during this planning period. The need for Master Plans preparation for cities was also emphasized (Delmastro et al., 2016). The Master Plan document for cities was intended to designate the various land uses and thus would also help regulate land costs for proper urbanization. The concerns of the previous plans, namely affordable housing for all strata of societies, also empathized within this plan. The Rajiv Awas Yojna, Pradhan Mantri Awas Yojana, and Indira Awas Yojana (for rural housing) formulated during the third FYP are still in effect today. The Fourth Five Year Plan (1969–1974) strongly emphasized attaining balanced urban development by relieving pressure on major cities by dispersing urban people among smaller urban areas. Thus, regional studies of the regions close to major cities like Delhi and Mumbai have been carried out. Additionally, the government provided special funding to hasten the development of the new state capitals of Gandhinagar, Bhopal, Bhubaneshwar, and Chandigarh. The fourth five-year plan emphasized the construction of 72 urban centers. However, the regional and urban growth programs remained at its core. In addition, the strategy emphasized the need to update urban laws and identify the laws that impede urban development (Bajracharya and Hastings, 2018; Ding et al., 2022).The Housing and Urban Development Corporation (HUDCO), established in 1970 to provide loans for state and urban development authorities, played a significant role in assisting the impoverished and disadvantaged sections of society with their housing needs in metropolitan areas. Most of the HUDCO-funded residential housing is geared toward the lower income and economically disadvantaged groups.

If providing housing and ensuring balanced urban planning were the fourth plan's top priorities, the Fifth Five Year Plan (1974–1979) emphasized regulating the cost of land to grow medium and small towns and improve their services. A task group for planning and growing small and medium cities was also formed in 1975 (Kaufman et al., 2016; Cohen, 2006). The task group was expected to review legislation governing local government and urban development and advise appropriate changes to existing laws to support, among other things, the planned expansion for small and medium towns. This plan also strongly emphasized addressing the cities' inadequate infrastructure, and to that end, the Integrated Urban Development Programme was established. With housing being a top priority, determining the price of urban land was quite tricky. Thus, India Urban Land (Ceiling and Regulation) Act, 1976, was introduced by the government. It was a significant step toward India's planned urbanization.
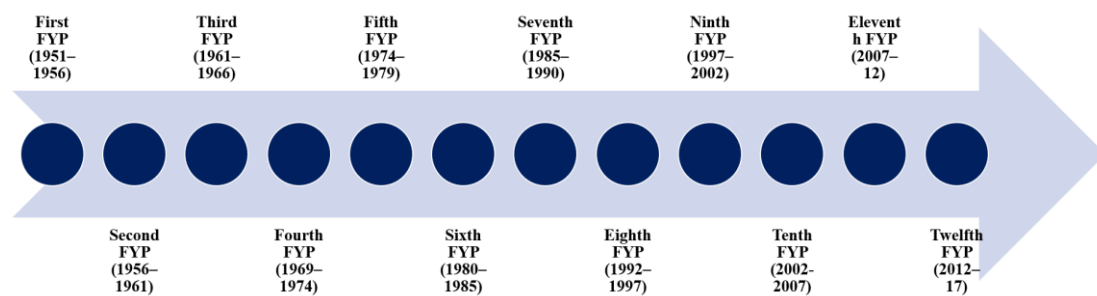

Fig. 3: Timeline of Five-Year Plans
Source: Author

Developments: 1980s and 1992–1997

The Sixth Five Year Plan (1980–1985) focused primarily on the establishment of small and medium cities and the supply of basic amenities in urban slums, in addition to the growth of metropolitan cities and mid-size cities. Implementing Integrated Development of Small and Medium Towns (IDSMT), aimed at offering fundamental services and infrastructure to the cities with over 1000,000 population, was a significant policy direction under the Plan. The enhancement in the quality of fundamental urban facilities, including sewage, sanitation, etc., was underscored in the Plan, which is still a challenge for the

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

33

proposed smart cities (Kaufman et al., 2016; Clement et al., 2023).. Up to this point, national planning for urbanization has lacked a clear future vision and has instead just addressed the requirements of newly forming cities. In 1976, when almost 0.7 million people in Delhi were relocated to the outskirts of the city without any amenities or means of subsistence, the removal of slums and the promise of providing them with improved civic services proved politically ineffective. This was viewed as a significant setback to India's dedication to communism and inclusive development. Beginning in the middle of the 1980s, India started to move in the direction of economic liberalization.

The Seventh Five Year Plan (1985–1990), the thought process was somewhat perceptible. The private sector was given the opportunity to participate in urban development, which prepared the door for its entrance into the residential and real estate markets. According to the plan, the government's only responsibility was to mobilize resources for housing, provide affordable housing for economically disadvantaged groups, and acquire and develop land (Tiwari and Rao, 2016). To end the issue of homelessness, the first-ever National Housing Policy was also established in 1988. The National Capital Region Planning Board was established to help cities like Delhi, which were struggling with the increasing population. The intention was to relieve strain on the cities of the neighboring states of Haryana and UP. Today, the NCR has grown into a sizable metropolitan agglomeration that includes Gurgaon, Noida, and Ghaziabad, among other places. According to the notification, NCR encompasses all of NCT-Delhi and a few districts in Rajasthan, Uttar Pradesh, and Haryana. About 30,242 square kilometers are covered overall. As of the 2001 Census, 37.03 million people are living there. Urban planners still face much difficulty in controlling this population and geographic spread. Adopting the 74th constitutional amendment throughout the Eighth Five Year Plan period (1992–1997) was one of the seminal moves for strengthening and empowering the urbanization process. The amendment enabled the establishment of elective urban local bodies, which led to decentralizing decision-making on urbanization (Biswas et al., 2020). It was a significant step towards economic empowerment because autonomy in financial planning made it possible to identify alternative sources of financing, utilize institutional finance, and issue market instruments like municipal bonds to fulfill capital investment requirements.

Developments: 1997–2002

The Ninth Five Year Plan (1997–2002), which ran concurrently with India's 50th anniversary of independence, was seen as a link between rapid economic growth and an improvement in the general well-being of the populace. As a result, its outlook was given as Growth with Social Justice and Equity. The India Infrastructure Report (2001) also emphasized the need for more fiscal autonomy for ULBs. The ULBs must create creative financing plans for urban services and infrastructure so that "the current funds provided from plan deployment could be augmented by engaging the capital market." The proposal acknowledged the incapacity of small municipalities to secure funding from banking and capital markets, even as it intended to hold ULBs responsible for their economic viability by reducing their budgetary allocation. State governments were tasked to play a significant role in overcoming regional imbalance. A significant governmental attempt at urban renewal was the establishment of the "Urban Development Fund," which was inspired by the idea of "pooled finance" and intended to support small cities in commercial borrowing (Rana, 2018). Some of the main thrust areas of this strategy included making cities viable economically, creating jobs, providing affordable housing, and developing infrastructure. During this conference, the market-friendly policy to permit entire Foreign Direct Investment in infrastructure projects, like roads and mass rapid transit systems, was also unveiled. Repealing the 1976 Urban Land Ceiling Act in 1999 was another significant step in fusing growth in cities with economic expansion. In December 1997, the Swarna Jayanti Shahari Rozgar Yojana (SJSRY) was introduced to guarantee inclusive urban development and offer jobs to urban unemployed and underemployed people, with a focus on self-employment.

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

34

Developments: 2002–2017

The Tenth Five Year Plan (2002-2007) established significant policy initiatives for extensive urban improvements. One was the Ministry of Housing and Urban Affairs (MoUHPA) 2005 launch of the flagship Jawaharlal Nehru National Urban Renewal Mission (JNNURM) program. The program "aimed at integrated development of slums through projects for providing shelter, basic services, and other related civic amenities to provide utilities to the urban poor" and provided "Basic Services for Urban Poor and Integrated Housing and Slum Development Programme (Kudryavtseva, 2022)." The 65 cities covered under BSUP were determined based on the population and cultural relevance; the remaining cities were covered through IHSDP. With 25% of the city's revenue set aside, it sought to provide the urban poor with time-bound access to cheap water, sanitation, housing, health care, schooling, and social security. This mission's original expiration date of March 2012 was prolonged for three years. Although it has continued to be a significant program for urban renewal in recent years, the more excellent benefits have been limited to a few key states, including Gujarat, Maharashtra, Delhi, UP, West Bengal, and Rajasthan, which have also received more central funding for IHSDP and BSUP. As a result, the same pan-Indian impact has not been observed. With a 331 million urban population base at the start of the Eleventh Five Year Plan period (2007–12), urban development was a priority. It was anticipated that 36.8 million people would be added to the current population over the plan period. Planning was therefore necessary to accommodate a further enrollment of 7-8 million additional individuals annually in the cities. The urban development strategy included the following actions: Stabilizing urban local governments by enhancing their capabilities and financial management (Janssen et al., 2023; Kudryavtseva, 2022). It increased urban productivity and efficiency through land development and deregulation, eliminating the public sector's monopoly on urban infrastructure and fostering an environment that encourages private investment—putting an independent regulatory system in place to monitor how public and private industries operate. Lower the prevalence of poverty—a significant use of innovation and technology. JNNURM, which was started under the previous plan, continued to be a significant endeavor under the eleventh plan. However, JNNURM suffered from many shortcomings in terms of conventional urban planning, insufficient reforms, and delays in project implementation, just like other programs (Popova and Ptuhina, 2019). It was noted that the peri-urban areas outside the cities had developed unplanned and chaotic due to a lack of ownership and planning. Many instances of good service delivery needed to be improved. Another program to provide homes for the urban poor was introduced in 2011 as part of the Rajiv Awas Yojana within the same plan period. It represented yet another effort to eradicate slums in India.

The final plan on the list was the Twelfth Five Year Plan (2012–17). That marked the end of the planning period. In 2015, the National Institution for Transforming India, or NITI Aayog, took over the role of the Planning Commission. The government's policy planning agency has been replaced with a think tank in India. However, it was important from the standpoint of urbanization because it visualized smart cities and their significance as the driving force of growth for the country (Mohanty and Kumar, 2021). The Planning Commission's stated aim is that "cities must offer outstanding services and infrastructure at affordable prices to provide a competitive advantage to the economic activity that they host." In addition to the permanent residents, it acknowledged the increase in migrant workers, their families, and other weaker groups of society and the essential services they need. It was based on the guiding premise that the urban agenda should be centered on people and that they should have more influence over how the city should be designed and how to get there.

The Modern Era

A thorough analysis of India's urban development throughout the plan period illustrates the type of urban difficulties and the procedures used to address them occasionally. All development plans continued to be guided by social integration and compassion for the

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

35

disadvantaged and excluded, but sometimes, the resources were unavailable to carry them out successfully (Radovanović et al., 2020). Although the fourth plan period recognized the necessity for balanced urban growth, the regional disparity of urbanization was not addressed. Some of India's largest states, including UP, Bihar, Rajasthan, Odisha, and Assam, have very low urbanization and population levels. According to 2011 data, Bihar's population living in cities is still 11.3%, placing it 34th overall on the ranking of urbanization. The vast majority of people in Bihar are still living in rural areas. Therefore, the massive influx of people from less urbanized regions to metropolitan cities in other states places a significant strain on their already overburdened infrastructure. The shift in focus from focusing on fundamental urban development initiatives to considering cities as the economic growth engine demonstrates the change in strategy (Frick and Rodríguez, 2018). Nevertheless, it can take some time before the actual outcome is apparent. It is also notable that, despite urban development being the paradigm from the planning era, urban change is the current necessity. The concept of creating 100 smart cities reflects this urgency at a time when peri-urban regions and small cities are also experiencing urban growth. According to data from the Centre for Policy Research (2015), most of the towns created in 2011 are census towns. Smaller towns are becoming more populous, and since 2001, the proportion in census towns has doubled. While the "haves" in Indian cities may enjoy a standard of living comparable to that of Latin American towns, the "have nots" may experience conditions akin to many Sub-Saharan African countries. India needs help with this. The fundamental levels of development—housing, water and sanitation, transportation, electricity, etc.—need improvement (Pereira and Marques, 2022). As a result, a quantum leap is needed to transform Indian cities into smart cities.

Smart Cities Initiative

According to urban experts and planners, India has to undergo a significant urban transformation and restructure its cities as smart cities to address the impending issues of urbanization (Pereira and Marques, 2022). Even if India's approach to managing and planning cities may be fresh, the idea of a smart city has been around for a while. The late 1990s Smart Growth movement, which promoted innovative urban planning strategies, maybe where "smart cities" first appeared. By 2005, many technological businesses, including Siemens, Cisco, and IBM, had adopted the phrase and its underlying concept. They saw the concept as a chance to leverage technology to manage intricate metropolitan processes and offer seamless services for urban buildings, transit, power, water supply, and sanitation, among other things (Romanelli, 2021). They created many models of technology-driven improvements for cities' design, growth, and administration. The nascent field of urban management involves collecting and distributing real-time data via ICT-powered infrastructure. Many country's cities have already included them in their infrastructure, including Spain, South Korea, Denmark, UAE, and Portugal. The global models of a smart city are defined by integrating technology in ICT, data in real-time, connected devices, distributed sensors, and internet technologies. They are used to gather valuable data, provide new services, and increase the performance of those already available, all of which improve the delivery of services. Cellular technologies and services are crucial to the process. The management of congestion, urban transportation, natural disasters, the provision of water and energy, and solid waste management all use the flow of real-time data (Sharma and Jain, 2021). It also offers details on numerous services available nearby and other things. Technological advances like geo-tagging make it easier to find and swiftly transport machinery and equipment from one location to another.

In the new global models of smart cities, technology, and information technology are being employed to bring innovation at all levels. The city's management, workspace managers and owners, electrical and water suppliers, mobile operators, and technology vendors are working together through the Envision Charlotte partnership program in Charlotte, North Carolina, US, to increase the energy efficiency of buildings larger than 10,000 square feet. The technology offers users real-time information about their energy

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

36

usage (Tripathi, 2021). With the aid of an IP network as well as cloud infrastructure, Busan's Green-u-City in South Korea uses an Integrated Operation Centre (IOC), which aids with its smart city management process and offers both free and paid services to the city. Smart cities' communication and technology system is mainly based on sensors. For instance, Santander, Spain, has over 12,000 sensors deployed over a 35 km2 region of the city to measure, among other things, sunlight, humidity, temperature, air quality, and the real-time position of automobiles. In addition to being installed at permanent locations, the sensors can be fixed and mobile and installed on public transportation and other vehicles. Even residents may download the sensor-based app, which gathers data as users walk around the city in real time. Santander receives the following services from these clever inventions: remote dimming of streetlights on deserted roads, collecting only full trash cans to minimize collection trips, real-time information on parking space, congestion, and accident information, and air quality measurement.

Only after the eleventh plan period did it seem that centralized urban planning prioritized using developing technology to alter cities and build modern cities. Nevertheless, the nation acknowledged the need to transform its urban areas into smart cities while keeping them modern and contemporaneous throughout the 12th Plan Period, when it was stated clearly. Future Indian cities are expected to be smart cities. The country that became aware of its urban problems and the need to revitalize the ailing system understood the necessity of adopting a wholly revolutionary method. In order to use IT-integrated technology for urban maintenance, governance, and better service delivery, the concept of a "smart city" was adopted. In a simpler sense, the prefix 'smart' is a euphemism for clever, appropriate, and effective use of technology and design for managing the civic system. One of the main concerns about India's move toward smart cities is that the concept is more appropriate for wealthy countries.

It is often believed—and understandably so—that using technology to solve complex urban problems will necessitate a substantial financial commitment and new knowledge and training. This model's perceived leaning towards achieving the expectations of an educated middle class and its social inclusion have also been scrutinized. Because of the extensive use of IT and dependence on it in several facets of urban management, concerns have also been raised about the security and protection of personal data. In addition, many urban experts believe that influential technological companies rather than individuals may benefit from the process. The idea of the Smart City Mission is unclear. Without a comprehensive framework to comprehend the need and the impact of the same, implementing technology seems to be the main focus (Das and Sonar, 2020). The goal (a Smart City) and the methods (ICT) are unclear. "Despite these reservations, the Indian government initiated the Smart City program in 2014 in a mission mode. The Ministry of Housing and Urban Affairs (2017) Smart Cities Mission states that the goal is to "promote cities that provide basic infrastructure and give their residents a respectable quality of life, a clean and sustainable environment, and implementation of "Smart" Solutions. The goal is to examine compact areas and design a reproducible model that will serve as a lighthouse for other aspirant cities, emphasizing sustainable and equitable development.

Conclusions

This paper offers an overview of rapid urbanization scenarios in Indian metropolitan cities and highlights the concerns that unprecedented population expansion threatens human health and development. It offers insights into understanding the layered process of urbanization. It brings forth the viewpoint of various authors on understanding urbanization not just in terms of the spatial distribution of land but also its ecological and social consequences. Urbanization encompasses not only patterns of employment but also elements like population density, stratification of society, access to amenities, and infrastructure development.

The paper uncovers that the share of metropolitan cities in the world population will increase to 14% by 2030. Economic opportunity-driven urbanization in India has

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

37

significantly increased the urban population and resulted in multiple cities with one million or more populations. Although these cities have significantly contributed to India's GDP, they also present several problems that require quick action. According to projections, India will have 800 million urban residents by 2050, highlighting the severity of the issues raised by increasing urbanization, such as the need for sustainable infrastructure and the environment. The need for urban lodgings and services, which puts enormous strain upon infrastructure, finance, and governance, is one of the main issues this research study highlights. The share of metropolitan cities being the highest amongst the share of million-plus cities is also bought forth. Furthermore, the discovery of Indian metropolitan areas changed the economic landscape by being economic activity hubs, attracting many businesses, industries, and investments. Moreover, the trends of rising metropolitan cities shared with the Indian urban population are also discussed.

Finally, the paper offers an overview of the evolution of urbanization in India. It offers insights into the urban growth strategies implemented throughout the plan period. As the urban population increased, policies shifted towards a city-focused concentration, liberalization of the economy, decentralized management, and the establishment of smart cities as an alternative to the obstacles posed by urbanization. At first, there was a disagreement about growing urbanization, with an intense focus on rural growth inspired by Gandhian ideology. The paper uncovers how the twelve Five-year plans evolved urbanization in India. The rise of various organizations like the National Building Organization, Housing Board, and TCPO led to the building of city infrastructures in the country. Regional planning efforts and Master and Development Plans aimed to resolve several urban infrastructure issues ahead. Slum Area Act, Rajiv Awas Yojana, Integrated Urban Development Programmer, and others were prime policy efforts guiding urbanisation. Moreover, the NITI Aayog establishment further elevated the urban landscape through the Smart City Programme and many similar policy initiatives. However, the efforts led to unprecedented population expansion within metropolitan cities, resulting in several challenges for the residing population. Moreover, the rapid growth in metropolitan cities poses a threat to the physical environment and the environment. India's metropolitan areas will remain essential in determining the nation's course in the following decades. Therefore, metropolitan cities require the foremost attention of urban planners and decision-makers to overcome urban challenges and achieve sustainable urbanization.

References

Arha, A., Audichya, R. & Pant, D. C. (2014) Challenges in the urban and Peri-urban transition zones and strategies for sustainable cities: Experiences from selected cities. In Water Science and Technology Library, pp. 71–85. Springer Netherlands. Available at: https://link.springer.com/chapter/10.1007/978-94-017-8878-6_6

Bajracharya, B. & Hastings, P. (2018) A regional, strategic growth-management approach to urban and Peri-urban development in south east Queensland, Australia. Journal of Regional and City Planning, Vol.29, pp. 210-233. Available at: https://doi.org/10.5614/jrcp.2018.29.3.3

Balland, P. A., Jara-Figueroa, C., Petralia, S., Steijn, M., Rigby, D. L. & Hidalgo, C. (2018) Complex economic activities concentrate in large cities. SSRN Electronic Journal, Available at: https://doi.org/10.2139/ssrn.3219155

Bhagat, R. B. & Mohanty, S. (2009) Emerging pattern of urbanization and the contribution of migration in urban growth in India. Asian Population Studies, Vol.5 No.1. pp. 5–20. Available at: https://www.tandfonline.com/doi/abs/10.1080/17441730902790024

Biswas, S. D. & Mondol, Z. (2021). International Journal of English Learning & Teaching Skills, Vol.3 No.2, pp. 2157–2167.

Carra, G. & Barthelemy, M. (2019) A fundamental diagram of urbanization. Environment and Planning. B, Urban Analytics and City Science. Vol.46 No.4. pp. 690–706. Available at: https://journals.sagepub.com/doi/abs/10.1177/2399808317724445

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

38

Chadchan, J. & Shankar, R. (2012) An analysis of urban growth trends in the post-economic reforms period in India. International Journal of Sustainable Built Environment, Vol.1 No.1. pp. 36–49.

Chatterjee, A. & Chattopadhyay, R. N. (2020) Problems and policies of metropolitan growth in India. In Advances in 21st Century Human Settlements. pp. 29–58. Springer Singapore.

Cheshmehzangi, A. & Aurelia Li, H. M. (2020) Innovation through urban diversity and achieving comprehensive sustainable urbanism from a community-oriented approach. Current Urban Studies, Vol.8 No.2, pp. 222–240.

Cristiano, S., Zucaro, A., Liu, G., Ulgiati, S., & Gonella, F. (2020) On the systemic features of urban systems. A look at material flows and cultural dimensions to address post-growth resilience and sustainability. Frontiers in Sustainable Cities, Vol.2, pp.2.

Das, D. K. & Sonar, S. G. (2020) Exploring dimensions and elements for smart city development in India. In Contemporary South Asian Studies. pp. 245–259. Springer International Publishing.

Delmastro, C., Lavagno, E. & Schranz, L. (2016) Underground urbanism: Master Plans and Sectorial Plans. Tunnelling and Underground Space Technology, Vol.55 pp. 103–111.

Dhanush, C. & Devakumar, A. S. (2019) Consequences of urbanization on water quality in the Agro-ecosystems along the rural-urban and transition zones of Bengaluru metropolitan city. International Journal of Current Microbiology and Applied Sciences, Vol.8 No.12. pp. 1998–2013.

Ding, C., He, X. & Zhu, Y. (2022) Megacity growth, city system and urban strategy. Chinese Journal of Urban and Environmental Studies, Vol.10 No.4. Available at: https://doi.org/10.1142/s2345748122920014

Biswas A. (2020) Establishing metropolitan governance and local governance simultaneously: Lesson from India's 74th Constitutional amendment act. Journal of Urban Management, Vol.9 No.3. pp. 316–330.

Frick, S. A. & Rodríguez-Pose, A. (2018) Change in urban concentration and economic growth. World Development, Vol.105, pp. 156–170.

Ghosh, D., Kaliyath, A. & Roy, A. K. (2020) Knowledge and skills for planning profession in the high growth period of urban transformation in India. In Urban and Regional Planning and Development, pp. 371–387. Springer International Publishing.

Haque, I. & Patel, P. P. (2018) Growth of metro cities in India: trends, patterns and determinants. Urban Research & Practice, Vol.11 (4). pp. 338–377.

He, C. (2013) Urbanization and migration. In The Encyclopedia of Global Human Migration. Blackwell Publishing Ltd. Available at: https://doi.org/10.1002/9781444351071.wbeghm568

Hoole, C., Hincks, S. & Rae, A. (2019) The contours of a new urban world? Megacity population growth and density since 1975. The Town Planning Review, Vol.90 No.6. pp. 653–678.

Janssen, C., Daamen, T. A. & Verheul, W. J. (2023) Governing capabilities, not places – how to understand social sustainability implementation in urban development. Urban Studies. Available at: https://doi.org/10.1177/00420980231179554

Johnson, B. H., Poulsen, T. G., Hansen, J. A. & Lehmann, M. (2011) Cities as development drivers: from waste problems to energy recovery and climate change mitigation. Waste Management & Research: The Journal of the International Solid Wastes and Public Cleansing Association, ISWA, Vol.29 No.10, pp. 1008–1017.

Kakati, B. K. (2021) Gram Swaraj: The sustainable model for rural industrialisation and employment. The International Journal of Community and Social Development, Vol.3 No.3, pp. 274–289.

Kalantari, Z., Ferreira, C., Page, J., Goldenberg, R., Olsson, J., & Destouni, G. (2019) Meeting sustainable development challenges in growing cities: Coupled social-

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

39

ecological systems modeling of land use and water changes. Journal of Environmental Management, Vol. 245, pp. 471–480.

Kaufman, J., Adar, S., Barr, R., Budoff, M., Burke, G., Curl, C., Daviglus, M., Diez Roux, A., Gassett, A., Jacobs, D., Kronmal, R., Larson, T., Navas, A., Olives, C., Sampson, P., Sheppard, L., Siscovick, D., Stein, J., Szpiro, A. & Watson, K. (2016). Association between air pollution and coronary artery calcification within six metropolitan areas in the USA (the Multi-Ethnic Study of Atherosclerosis and Air Pollution): a longitudinal cohort study. The Lancet, Vol. 388 No.10045, pp. 696–704.

Krishna-Hensel, S. F. (1999) Population and urbanization in the twenty-first century: India's megacities. People and their Planet. pp. 157–173. Available at: https://doi.org/10.1007/978-1-349-27182-5_10

Kudryavtseva, V. A. (2022) An integrated development mechanism as the basic element of development of urban areas. Silicon PV 2021, The 11th International Conference on Crystalline Silicon Photovoltaics. Hamelin, Germany. Available at: https://doi.org/10.1063/5.0091749

Kumar, S., Kumar, S. & Gupta, B. (2018) Urban health: Needs urgent attention. Indian Journal of Public Health, Vol. 62 No.3, pp. 214–217.

Liu, R., Dong, X., Wang, X., Zhang, P., Liu, M., & Zhang, Y. (2021) Study on the relationship among the urbanization process, ecosystem services and human well-being in an arid region in the context of carbon flow: Taking the Manas river basin as an example. Ecological Indicators, Vol. 132.

Madlener, R. & Sunak, Y. (2011) Impacts of urbanization on urban structures and energy demand: What can we learn for urban energy planning and urbanization management? Sustainable Cities and Society, 1(1), pp. 45–53.

McGuirk, P. (2021) Global urbanism. In Global Urbanism. pp. 243–250. Routledge.

Mohammad Taghi, S. (2020) Mutual effects of environment and urbanization: A sociological assessment. Annals of Environmental Science and Toxicology, 4(1), pp. 024–026.

Mohanty, R. & Kumar, B. P. (2021) Urbanization and smart cities. In Solving Urban Infrastructure Problems Using Smart City Technologies. pp. 143–158. Elsevier.

Ahmad, I., Arbin, E. & Ramly, A. (2007) Urban housing development: Town planning issues. Planning Malaysia Journal, pp. 5. Available at: https://doi.org/10.21837/pm.v5i1.57

Mondal, A., Rao, P. & Madria, S. K. (2018) Mobile computing, IoT and big data for urban informatics: Challenges and opportunities. In Handbook of Smart Cities. pp. 81–113. Springer International Publishing.

Majumder, S., Roy, S., Bose, A., & Roy, I. (2023) Multiscale GIS based-model to assess urban social vulnerability and associated risk: Evidence from 146 urban centers of Eastern India. Sustainable Cities and Society. Vol. 96. Available at: 104692. 10.1016/j.scs.2023.104692.

Murayama, Y. & Estoque, R. C. (2020) Urbanization: Concept, Mechanism, and Global Implications. In Human Geoscience. pp. 261–282. Springer Singapore.

Neuenkamp, L., Fischer, L. K., Schröder, R. & Klaus, V. H. (2021) Special issue: Urban ecosystems: potentials, challenges, and solutions. Basic and Applied Ecology, 56, pp. 281–288.

Paquette, S. & Domon, G. (2003) Changing ruralities, changing landscapes: exploring social recomposition using a multi-scale approach. Journal of Rural Studies, 19(4), s425–444.

Pauleit, S., Sauerwein, M. & Breuste, J. (2021) Urbanisation and its challenges for ecological urban development. In Urban Ecosystems. pp. 1–39. Springer Berlin Heidelberg.

Pereira, M. A. & Marques, R. C. (2022) From a millennium to a sustainable water and sanitation development: were we there already? Aqua, 71(2), pp. 293–300.

Potere, D. & Schneider, A. (2007) A critical look at representation of urban areas in global maps. GeoJournal. Vol.69, pp. 55-80.

Popova, E. & Ptuhina, I. (2019) Urban-planning analysis of the project of infill development in terms of sustainable development of the city. E3S Web of Conferences, pp. 135

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

40

Putnam, R. G., Taylor, F. J. & Kettle, P. K. (2014) A geography of urban places. Routledge. Available at: https://doi.org/10.4324/9781315823911

Radovanović, T., Grandov, Z. & Filijović, M. (2020) The essence and implications of integrated local development planning. EMC Review - Časopis Za Ekonomiju - APEIRON, 18(2). Available at: https://doi.org/10.7251/emc1902248r

Rana, R. (2018) Policy initiative for balance regional development and growth. Theoretical Economics Letters, 08(14), pp. 3034–3045.

Rigby, A. (1997) "gram Swaraj" versus "globalization." Peace & Change, 22(4), pp. 381–413.

Romanelli, M. (2021) Cities rethinking smart-oriented pathways for urban sustainability. In Handbook of Quality of Life and Sustainability pp. 451–467. Springer International Publishing.

Roy, B. K. (1994) Indian urbanization: Proliferation of mega cities and urban corridors. In The Asian City: Processes of Development, Characteristics and Planning. pp. 145–158. Springer Netherlands.

Sadler, R., Walling, D., Buchalski, Z. & Harris, A. (2020) Are Metropolitan Areas Primed for Success? A Prosperity Risk Index for Evaluating Economic Development Patterns. Urban Planning, 5(3), pp. 323–337.

Saini, A., Sharma, S., Kumar, G. & Kumar, A. (2022) Problems and Prospects of Urban Developments in Mandi Town of Himachal Pradesh, India. Journal of the International Society for the Study of Vernacular Settlements. Vol9(5), pp. 83-97.

Shahidehpour, M., Li, Z. & Ganji, M. (2018) Smart cities for a sustainable urbanization: Illuminating the need for establishing smart urban infrastructures. IEEE Electrification Magazine, Vol. 6(2), pp. 16–33.

Sharma, A. K. & Jain, S. (2021) Urban transformation and applied planning initiatives in Indian cities. In Social Transformations in India, Myanmar, and Thailand: Volume I. pp. 243–258. Springer Nature Singapore.

Sharma, S., Saini, A., Shrivastava, B., Kumar, G. & Kumar, A. (2022) Evolution of Indian Hill Stations During the British Era: Problems and prospects of development. Journal of the International Society for the Study of Vernacular Settlements. Vol9(2), pp. 114-129.

Sitharam, T. G. & Dhindaw, J. (2016) Benefits and challenges of urbanization and low carbon energy needs in India. Journal of Sustainable Urbanization Planning and Progress. 1(1). Available at: https://doi.org/10.18063/jsupp.2016.01.004

Clement, J. Ruysschaert, B. & Crutzen, N. (2023) Smart city strategies – A driver for the localization of the sustainable development goals? Ecological Economics. Vol. 213,

Smith, G., Archer, R., Nandwani, D, & Li, J. (2018) Impacts of urbanization: diversity and the symbiotic relationships of rural, urban, and spaces in-between. International Journal of Sustainable Development and World Ecology, 25(3), pp. 276–289.

Sridhar, K. S. (2016) Costs and benefits of urbanization: The Indian case. SSRN Electronic Journal. Available at: https://doi.org/10.2139/ssrn.2892925

Sridhar, K. S. (2017) Economic Change and Specialization in India's Cities. Review of Urban and Regional Development Studies: RURDS: Journal of the Applied Regional Conference, Vol. 29(1), pp. 63–87.

Streule M., Karaman O., Sawyer L., & Schmid C. (2020) Popular Urbanization: Conceptualizing Urbanization Processes Beyond Informality. Vol.44 (4). Pp. 652-672 Available at: https://doi.org/10.1111/1468-2427.12872

Swain, D., Roberts, G., Dash, J., Vinoj, V., Krishna, Lekshmi & Tripathy, S. (2016). Impact of rapid urbanization on the microclimate of Indian cities: a case study for the city of Bhubaneswar. Conference SPIE Asia-Pacific Remote Sensing. Available at: https://doi.org/10.1117/12.2228111

Theisen, O., Gleditsch, N. & Buhaug, H. (2013) Is climate change a driver of armed conflict? Climatic Change. Vol.117, pp. 613-625

Tiwari, P., Nair, R., Ankinapalli, P., Rao, J., Hingorani, P. & Gulati, M. (2015) Drivers of emerging urban landscape. In India's Reluctant Urbanization. pp. 27–50. Palgrave Macmillan UK.

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

41

Tiwari, P. & Rao, J. (2016) Housing Markets and Housing Policies in India. Available at: https://doi.org/10.2139/ssrn.2767342

Tripathi, S. (2013) Do large agglomerations lead to economic growth? Evidence from urban India. Review of Urban and Regional Development Studies. Journal of the Applied Regional Conference, 25(3), pp. 176–200.

Tripathi, S. (2021). Does smart city development promote urbanization in India? In Smart Cities - Their Framework and Applications. Intech Open.

Cohen, B. (2006) Urbanization in developing countries: Current trends, future projections, and key challenges for sustainaility. Technology in Society, Vol. 28(1-2), pp. 63–80.

Viegas, C., Saldanha, D., Bond, A., Ribeiro, J., & Selig, P. Urban land planning: The role of a Master Plan in influencing local temperatures. Cities, Vol. 35, pp. 1–13.

Wagner, M. & Growe, A. (2019) Regional urbanization and knowledge-intensive business activities (KIBS): An example of small and medium-sized cities in the Greater Stuttgart Region (Germany). Urban Science, 4(1), pp. 1.

Yang, Q. (2017) Build sustainable cities. Proceedings of the 2017 2nd International Conference on Education, Sports, Arts and Management Engineering (ICESAME 2017): Zhengzhou, China. Available at: https://doi.org/10.2991/icesame-17.2017.354

Journal of the International Society for the Study of Vernacular Settlements [eISSN:2738-2222]
From Historical Vernacular to Contemporary Human Settlements

42