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CONTRIBUTIONS TO URBAN SETTLEMENT GEOGRAPHY IN INDIA. A CRITICAL REVIEW OF SELECTED LITERATURE

Abstract: India, the home to one of the earliest urban civilizations on this planet, has a very long tradition of research and writings on urban issues. The fundamental objective and chief motivation of writing a review of urban settlement studies in India is to fabricate a legible synthesis of the relevant sources, obtainable from the literature to answer a salient research question that may interest all geographers as well as other social scientists. Since urban settlement geography has emerged as a systematic sub-theme of urban geography after World War II, the post-independence period (1950–2019) of India has been taken into consideration for the present review. This research, therefore, is a humble effort to analyze and interpret over 60 publications, published between 1950 and 2019, on various aspects of urban settlements in India and to provide a brief critical review of them. The review indicates that diversified aspects of physical, functional, economic, and historical dimensions of urban settlements belonging to different parts of the country were discussed and interpreted by scholars from India and abroad. On the grounds of the present study, papers are organized under the following broad themes, such as location, distribution, configuration, and morphological studies of urban settlements; studies on urban settlement systems, economic linkages, and spatial-functional characteristics of urban settlements; studies on the typology of urban settlements; and historical studies of urban settlements. Eventually, this endeavor seeks to get a place in the vast body of literature, on the subject of urban geography, by offering a brief review of the select literature in the sub-theme of urban settlement geography to enable readers to acquire an overview of the scholarly literature in the area, so that they can enhance their understanding of what is found, how it is found, and in which way to communicate this information.

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Key words: urban settlements, review article, hierarchy, urban system, India

INTRODUCTION

Settlement geography is a recent bud from the revered casket of human geography, as systematic description and analysis of human settlements have become one of the most significant themes of human geography during the post-World War II period. Geographers approach human settlements as an anthropogenically-induced occupancy unit on the earth's surface, where people live, work, and interact. They examine the settlement features, such as buildings and their architectural styles, roads, and properties, not only to identify new categories and patterns or develop new classifications, but also for the light they throw on the historical sequence and functional relationships (Singh 1975, p. 5). As K.H. Stone (1975, p. 15–16) outlined the core subject area of settlement geography is "...the description and analysis of the distribution of buildings by which people attach themselves to the land... Description in any science usually requires classification, so in the geography of settlements it might include such elements as materials or the floor plans of buildings....to explain a distribution pattern at a given scale may require knowledge of race, religion, transport or occupation...". This might look too simple as a depiction of the subject matter of settlement geography, but it evinces the keynote of the scope of settlement geography, presuming that the expressions "description, analysis and distribution" are explicated in the broadest sense (Sharma 1969). Thus, the location, size, form, and all other properties, as well as historical and functional dimensions of human settlements together, constitute the essential subject matters of settlement geography.

Urban settlement geography is that thematic branch of urban geography that has gained the maximum attention from settlement geographers in India. Three pioneering institutions in India cradled the studies on urban settlement geography in the country. The Madras School of Geography (Chennai) which became operational in the late 1920s and was mostly oriented towards the locational and historical analysis of south Indian towns and cities and the lion's share of the articles were published in the *Journal of the Madras Geographical Association* (Ramachandran 1989). Subsequently, the Calcutta School of Geography emerged under the erudition of S.P. Chatterjee, where the scholarly literature on urban settlement geography evidently focused on the urban places of eastern India and was mostly published in the *Geographical Review of India* (Sharma 1969). Finally, the return of R.L. Singh from London and his affiliation with Banaras Hindu University led to the onset of Banaras School of Urban Geography, where the main platform for research publications was the *National Geographical Journal of India* (Sharma 1969). However, in the subsequent decades, the landscape of studies on urban settlement geography in India has expanded beyond the traditional hubs of Chennai, Kolkata, and Varanasi, with scholars from emerging centers like Delhi, Guwahati, Mumbai, and Hyderabad making significant contributions to the field, particularly since the last quarter of the previous century. Withal, urban settlements have received exceptional assiduity from geographers because not only of their sharp internal differentiation and huge agglomerations of the population, but also for their regional and national importance as the production, exchange, and distribution centers of a wide range of goods and services and the consequent concentration of economic, social and political power in and around the space they occupy. Hence, urban settlement geography is concerned with the physical, historical, and functional entities of urban settlements, where the systematic description and interpretation of processes, patterning, functions, and spatial organization of cultural landscape within the urban environment is the central focal theme. Against this backdrop, the present paper outlines the contributions of a sound number of scholarly works to the subject matter of urban settlement geography, which itself is a very recent sub-theme of specialization under the umbrella of a broad thematic branch of geography i.e. urban geography. Taking inspiration from the review of M. Auroousseau (1924, p. 445), where he recognized "four major partitions of the research [in urban geography] to be – situation, site, history, and the existing city", as well as after careful analysis of the broad thematic dimensions of the select literature, the present paper organizes them under the following broad heads, such as – location, distribution, configuration and morphological studies of urban settlements; studies on urban settlement

system, economic linkages and spatial-functional characteristics of urban settlements; studies on the typology of urban settlements; and historical studies of urban settlements.

REVIEW QUESTION, OBJECTIVE AND METHODOLOGY

The fundamental objective and chief motivation of writing a review of urban settlement studies in India is to fabricate a legible synthesis of the relevant sources, obtainable from the literature to answer a salient research question that may interest all geographers, as well as other social scientists. Hence, the present review seeks to answer a pivotal question i.e. what is the changing nature of scholarly works in the field of urban settlement geography in India, within a fixed time frame? Accordingly, it followed an unadorned three-step methodology – systematic survey (of literature), analysis, and synthesis, where two methods of synthesis are combined to get the insights: (i) thematic synthesis and (ii) chronological synthesis. So far as the selection of scholarly works is concerned, a subjective filter has been appropriated – only those studies are considered for the present review which are typically associated with the historical, functional, and/or physical properties of urban settlements. As, to the best of our understanding, grounded on the insights gathered from the pioneering works of Auroousseau (1924), Stone (1975), and Ramachandran (1989), these three elements represent the core-settlement dimension of the broad thematic sub-discipline of urban geography. Therefore, studies on urban culture, society, or policies have not been incorporated into the present endeavor of review. Furthermore, three principal database platforms are harnessed to search for the relevant literature in the field, such as *Google Scholar*, *Scopus*, and *J-Store*. Additionally, a sound number of classical works about the sphere of urban settlement geography have been consulted that are not available on Internet platforms. Given the fact that literature is gathered from both the relevant online and offline sources via internet serving and library consultation respectively – substratumed by the consideration that the study period comprehended by this research is quite long and a sound number of classical works on the urban settlement geography in India are still not available on internet platforms that defies the use of any software-centric standardized method of literature review – this endeavor is entirely based on manual filtering of literature. Consequently, near about 130 abstracts were consulted by the researchers gathered from both the library-based and internet-oriented platforms that ultimately yielded the final selection of 65 articles for full-text evaluation that precisely corresponded to the disciplinary theme of this review endeavor i.e. urban settlement geography (Table 1). After the collection of filtered literature, a rigorous review of their methodologies and findings is performed. Thenceforth, based on the thematic analysis, the review has identified four broad sub-themes under the head of which this literature could be organized. Eventually, to summarise the selected body of research in the field and to make their salient features obtainable from a single document in a convenient manner, the review is presented in chronological order (old to new) under each head. This venture is expected to attain a clearer understanding of the changing nature of research with time.

RELEVANCE AND CONTRIBUTION OF THE REVIEW

The relevance of a review article is undeniable in any discipline, including Geography, enabling scholars to enhance their scientific knowledge, grounded on the existing body of scholarly works in the discipline. Review articles provide an articulate foundation for a larger spectrum of knowledge produced within space-time contexts for a given problem, a sub-discipline (as in this case), an event, and so on. Moreover, it may proffer scholarly insights into the prevailing schools of thought and knowl-

Table 1. Overview of remarks on findings and publication trends: Insights from reviewed papers over time

Sub-area(s)	1950–1959	1960–1969	1970–1979	1980–1989	1990–1999	2000–2009	2010–2019	Critical remarks
Location, distribution, configuration, and morphological studies of urban settlements	1	1	9	4	3	2	6	• Though started with a narrative or descriptive stance, the lion's share of studies in this category are based on quantitative analysis of distributional and morphological characteristics of urban settlements. • Very few studies have considered the notion of political economy in the production of urban spatial structure while studying the morphology of cities/towns. • Since the onset of the 21st Century, this area of research has experienced the maximum infiltration of remotely sensed data and Geographic Information science.
Studies on urban settlement systems, economic linkages, and spatial-functional characteristics of urban settlements	0	1	4	11	1	1	4	• Extensive use of normative theories and quantitative models like the “Central Place Theory”, “Rank-Size Rule”, “cluster analysis” and others to study different dimensions of urban settlement systems is visible in this field of inquiry. • Monotonous application of Westernised models can be recognized concerning the relationship between different urban places with each other and with their surrounding countryside and a lack of critical urban research is evident, especially those addressing the imbalanced urban settlement systems at national and provincial scales.
Studies on the typology of urban settlements	2	2	1	2	1	1	2	• A clear dominance of quantitative methodology is visible. • This area of research is least affected by the emergence and increasing popularity of geospatial technology in geographical research.
Historical studies of urban settlements	1	1	1	1	0	2	0	• The most neglected sub-theme of urban settlement geography in India. • The studies are mostly descriptive and based on archival research due to obvious reasons. • This field of research has a great potential for incorporating geospatial technology in the coming days that in turn can enrich the studies on the histogenesis and morphogenesis of urban settlements in the country.

Source: prepared by the authors.

edge paradigms that in turn can facilitate the (re)production of new knowledge. It is not feasible, for instance, for a researcher to keep up to date with the contents and subject matters of dozens of journal articles and the daily release of books that might have importance to their research work (Harden, Thomas 2005). Review papers, thus, have become the conventional tools to address this issue by summing up the prevailing body of research and synthesizing its key points in an exclusive document. Similarly, this endeavor seeks to get a place in the vast body of literature, about the subject of urban geography, by offering a brief review of the selected literature in the sub-theme of urban settlement geography to enable readers to acquire an overview of the scholarly literature in the area, so that they can enhance their understanding of what is found, how it is found, and in which way to communicate this information. After all, if researchers are unaware of the previous work that has been conducted in the area of their interest, then how they will know whether or not their investigations will add to existing knowledge (Harden, Thomas 2005)?

THE REVIEW

Location, distribution, configuration, and morphological studies of urban settlements

In a broad sense, urban centers are just points on the maps depicting physical and cultural landscapes. Geographers in the past have devoted much attention to the question of why a place is located where it is (Ramachandran 1989, p. 3). The post-independence urban settlement studies in India, are the testimonies of the historical, locational, morphological, and functional approaches of geographers to the country's urban settlements. R.L. Singh's pioneering works on Banaras, published in 1955 with the name of *Banaras: A Study in Urban Geography*, build the foundation of urban settlement geography more precisely and urban geography more generally, in India. During the following two or three decades, a considerable number of works on Indian urban settlements were accomplished by the scholars of Banaras Hindu University, under the enlightenment of R.L. Singh. Thus, Banaras Hindu University has achieved its fame as the Urban Settlement School of Geography in India. From the mid-1960s. onwards several other centers like the University of Calcutta, University of Delhi, Jawaharlal Nehru University, Osmania University, Guwahati University, etc. also started contributing significantly to the geographical studies of urban settlements in India.

During the 1950s, the deterministic nature of urban settlement studies, based on narrative or descriptive methodology was in prominence, principally focusing on the site, situation, and morphological analysis of urban places. As is visible from the illustration of Figure 1, where the larger size of words like "morphology", "spatial", and "distribution" stands for the abundance of such words and/or their repetitive occurrences in the titles of the published literature under consideration. The paper by P.P. Karan (1957), for instance, on the physical morphological characteristics of some Indian towns like Ghazipur, Aligarh, Almora, Jahangirabad, Hathras, and Rampur was a pioneering contribution to the studies on urban morphology and patterns of Indian towns. He identified Ghazipur as an elongated, Aligarh as circular, Almora as linear, Jahangirabad as typically circular, Hathras as triangular, and Rampur as a rectangular town. B. Guha (1963) presented a pioneering study on urban morphology, considering seven different land-use types in the context of Burdwan town of West Bengal. During the subsequent phases, Indian scholars continued to contribute to the study of urban morphology and land-use patterns from a variety of perspectives (Taneja 1973; Dubey 1973; Singh 1980).

Geography is so keenly involved with the distribution of phenomena that an interest of geographers in the distribution of towns and cities seems to be an obvious consideration (Aurousseau 1924). The 1960s and 70s experienced a noticeable surge in studies mostly encompassing numerical and statistical methodologies to rationally and systematically address the distributional aspects of urban settlements in the country. N.B.K. Reddy (1970), for instance, analyzed the pattern of distribution of urban settlements in the Krishna and Godavari delta regions, using some cartographic techniques including the application of the statistical method of central tendency to the data of areal distribution. Following two quantitative techniques of nearest neighbor analysis and entropy, B. Thakur (1980) focused on the distributional pattern of urban places in Utkal Coastal Plain, Bihar Plain, Lower Ganga Plain, Chotanagpur Plateau and Orissa Highland. This meticulous research asserted the effectiveness of the entropy method in determining changes in the distributional pattern of urban settlements and provided a feasible method of print pattern analysis of different physical and economic environments.

Analysis of the regional pattern of urbanization was a widely recognized theme of urban settlement geography, among Indian geographers. Since the 1970s, a considerable number of publications came into existence, confined around different natural or artificial regions of the country that were solely focused on the spatial distribution of urban settlements and their spatio-temporal changes (Jain, Talwalkar 1979; Singh 1979; Singh, Singh 1979; Prakasa Rao, Tewari 1986; Singh 1992). Considering three small towns along River Ghaghara, viz. Golabazar, Barhalganj and Barhajbazar, S.L. Kayastha and R.P. Yadava (1979) presented a comparative study on the morphogenesis of these three towns, where the role of physio-cultural factors in the evolution of urban morphology was the prime focal

theme. Another comparative analysis took the Coimbatore and Thanjavur districts of Tamil Nadu as cases and compared the spatial pattern of urbanization, characteristics of small towns, and hierarchy of urban settlements in these two districts (Swaminathan et al. 1979).

Concentrating on the physical configuration of Delhi, C.S. Yadav (1979) explained the spatial pattern of residential land use and housing attributes (construction material, number of rooms, presence of kitchen, latrine) in planned and unplanned localities of Delhi. He concluded that the gigantic contrasts in residential land use in Delhi require urgent modifications. Furthermore, using cartographic and statistical tools, an astonishing conferment of the structure of Bangalore was undertaken in the late 1970s (Prakasa Rao, Tewari 1979). The study focused on the past forms, present structure, and future direction of growth of the city. Moreover, the evolutionary pattern and physical structure of some South Indian cities were also inspected, with special attention to the natural and human processes that lead to the formation of the morphology of the urban landscape (Ramesh, Noble 1977).

The colonial influence of British rulers on the Indian empire was reflected in various settlement types, each of which was molded by the cause of its genesis and succeeding process of evolution. As in other regions of the Third World, urban morphological characteristics of South Asian cities reflect the imprint of both regional and colonial forces. Studying the foundational characteristics of South Asian cities, A.K. Dutt (1983), propounded two outstanding models on the physical forms of Colonial-based City and Bazar-based City of South Asia. Colonial cities of South Asia are assumed to have a waterfront location, accessible to ocean-going ships, to facilitate colonial trade and any required military intervention. A walled fort near the port, an open space around the fort, segregated European, Anglo-Indian, and native Indian residential zones, separate western-style Central Business District, and traditional street-oriented bazar, etc. are the major land use zones, in colonial cities. Whereas, the Bazar-based cities roughly have a concentric zone type of structure consisting of a complex road junction (chowk), intensive commercial activities at the city center, and segregated residential zones of different classes with some dispersed pockets of minorities.

In his classic paper, B. Thakur (1986) analyzed the concept of settlement entropy in the context of North-Eastern India and established the notion of communication theory that was grounded on Shannon's concept of Settlement Entropy. P.B. Gowda and P.D. Mahadev (1986) emphasized the impact of a metropolitan center on the spatial-functional transformation of surrounding rural settlements by taking Bangalore as a case. M. Kosambi and J.E. Brush (1988) have developed an impressive schematic model to depict the urban morphology of three major colonial port cities of Madras, Bombay, and Calcutta which exhibit similar morphological features that result from combined European and Indian influences. A fort adjacent to the commercial waterfront, an open esplanade around the fort, separate European and Indian residential sectors with Western and Indian commercial areas, other residential zones for immigrant Asians and Eurasians, a peripheral manufacturing zone adjoining the Indian sector, and an outlying military zone bordering to the European sector (Kosambi, Brush 1988) were the common structural characteristics of these three cities.

Historically, the analysis of architectural designs in India was largely confined to the country's elite mansions and religious buildings. Palaces and religious establishments had gotten much more attention while the housing of common people had been proportionately neglected. In recent times, although, a growing interest of scholars in vernacular architecture can be recognized. P. Desai (1995) attempted an outstanding study of the urban morphological analysis of colonial and indigenous settlements of India considering the values that they represent, both at the urban scale and the level of individual dwellings. Simultaneously the study moves on to look at these issues in the context of modern Indian architecture, referring to the notion of a "revival" of traditional urban forms and lifestyles (Desai 1995).

Using the Survey of India Topographical Maps, IRS-IB LISS II geocoded satellite imagery, panchromatic aerial photographs, and photo maps, K.S. Bisht et al. (1995), undertook an analysis of the morphology of Saharanpur town in north-western Uttar Pradesh. The study listed nine major

land-use categories for the town and discovered a similarity between the structures of the town with the Concentric Zone Model of E.W. Burgess. However, the study fails to acknowledge the changing pattern of urban morphology with time and uses the term urban morphology superficially, considering the functional zones as the sole parameter of urban morphology. Despite taking the reference of the Concentric Zone Model, the study did not attempt to classify different residential units of the town based on class-wise occupancies of housing.

With the onset of the 21st century, the geographical study of urban settlements had gotten a new impetus. The use of improved computer technology highly facilitated the locational and spatial analysis in urban settlement geography. K. Kumari and M. Haroon (2007) assessed the pattern of the spatial distribution of urban centers in Eastern Uttar Pradesh, focusing on the spatial distance between urban settlements.

S. Chakravorty (2000) has attempted to explain the spatial transformation of Calcutta (Kolkata), emphasizing the role of globalization in reshaping the internal structure of the city. He nicely exemplified the structural changes of a colonial city during this age of globalization by accentuating the complex and dynamic socio-economic interplay between global influences and local processes operating at national and regional levels, which ultimately results in a remarkable structural transformation of the city.

The compact cities can acquire various claimed benefits like consumption of a lesser amount of land and prevention of land wastage, shorter average journey trips, more efficiency of the government to provide basic services, etc. However, the city of Delhi does not have these advantages because it is an “inverted compact city” having low gross residential densities in the inner areas and high densities in the outer areas. The density pattern of Delhi – which is a result of the combined effect of planning policies of the government and several other social, economic, and political factors – has led to the emergence of several issues like illegal high-rise developments, unplanned vertical constructions, development of squatters, haphazard development of vacant land, etc. A policy of decentralized construction was pushed by the Delhi Development Authority only half-heartedly, leading to no major gains (Kumar 2004).

Studying the evolving land use patterns in a suburb of Chennai, namely Perungalathur, S. Ramesh et al. (2011), emphasized the spatial and temporal variations in the land use pattern using cadastral maps. The period, considered by the study was 1960–2001. The study concluded that the selected region is characterized by a higher rate of land-use conversion, mostly from agricultural plots to residential and commercial utilizations, indicating a change in the occupational pattern of the population in the region. R.A. Lallianthanga and R.L. Sailo (2013), analyzed the site suitability and mapped the urban land use pattern of Champhai town (Mizoram), using Remote Sensing and Geographic Information System (GIS) technology. The unplanned spatial expansion and rapid demographic growth of the city have been found to have a negative impression on the urban infrastructure of the city.

Shannon’s entropy method together with satellite image processing using a GIS environment yielded an efficient analysis of the urban sprawl of Gulbarga city in the Hyderabad-Karnataka region (Narayanan 2013). Furthermore, an attempt was made to detect the land use and land cover changes of Dehradun city considering the period between May 2004 and May 2013, using LISS-III and Landsat-8 images (Patidar, Sankhla 2015). The study has discovered more than 50% positive changes in the built-up area and 38% declination of vegetation cover during the study period. Likewise, D. Biswas and A. Sarkar (2019) used Landsat data to explore the spatio-temporal changes in the pattern of urban growth and consequent sprawling of Barasat city in West Bengal.

Temple towns formed during the medieval period in the southern part of the Indian subcontinent bear the imprint of dominant religious control, which in turn is reflected upon their urban morphological characteristics. N.L. Thilagam and U.K. Banerjee (2016) undertook a diligent study to analyze the morphological characteristics of seven medieval temple-oriented towns that are presently located in the State of Tamil Nadu: Madurai, Tirunelveli, Tiruvannamalai, Tiruvarur, Nagapattinam, Chi-

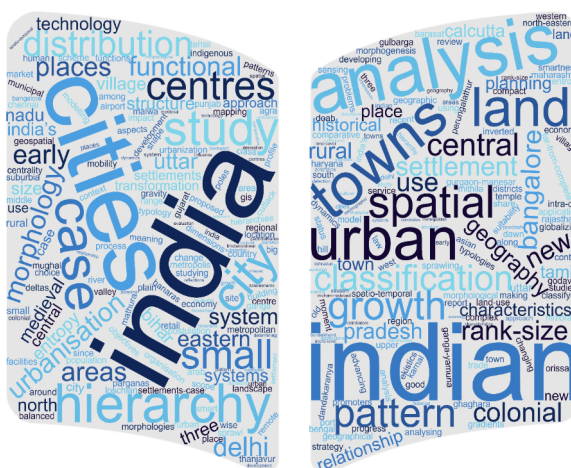
dambaram, and Tiruchengode. These seven urban centers are eulogized Saivite (oriented to Lord Shiva) centers having a visible imprint of Hindu religious norms in their socio-spatial morphology. The study made use of the Space Syntax Theory to present a quantitative and intensive analysis of the socio-spatial configuration of temple towns in the area concerned. All the selected seven urban centers are considered individually as well as correlated and contrasted against each other to arrive at a comparative insight into their symbolic attributes of urban space. The analysis detected and revealed a high level of axiality, higher geographical coevality in an identical settlement pattern, and visible accordance with the core of the town having an association with a large and elegant temple. Nonetheless, the analysis has been proven quite ambiguous concerning the timeframe concerned. Towns like Madurai have been in existence since 600 BC and therefore, can very hardly be considered as a medieval urban centre.

Using high-resolution satellite data, K. Mandal et al. (2016) undertook a morphological analysis of the historical landscape of Contai town in Eastern India and the contemporary land-use conflicts in the town that are associated with post-modern redevelopment initiatives. Though this study considered the term urban morphology in a comparatively broader sense by considering the socio-spatial configuration of urban space, it fails to ascribe the post-modern changes in the urban landscape and the consequent conflict between historical and contemporary land uses at different levels. Moreover, a good effort was made by M. Dhingra and S. Chattopadhyay (2016), where they tried to explain the notion of the smart city in the context of two medieval urban places of Alwar (India) and Riyadh (Saudi Arabia) which were planned based on traditional urban planning ideas and are organically evolved settlements. This approach adopted case analysis of two cities from India and Arab considering their socio-economic and environmental dimensions encompassing a wide range of elements – land-use pattern, dwelling density, and neighborhood characteristics are the names but a few. However, this study lacks a proper comparative analysis of the structural characteristics of the two cases which could facilitate a proper understanding of the differences in traditional urban planning notions of India and Arabs.

A study on the distribution of urban centers in Eastern Uttar Pradesh used Zipf's law of the "Rank-Size Rule" and Primacy Index to analyze the settlement system in the selected region. The study concluded that the urban centers of Eastern Uttar Pradesh do not completely follow the Rank-Size Rule and there is a primacy of Varanasi City over the region (Kumari 2014). A similar study on the class and size-wise distribution of urban centers in Maharashtra was conducted by P.A. Khadke and P.B. Waghmore (2018).

Studies on the urban settlement system, economic linkages, and spatial-functional characteristics of urban settlements

Towns and cities exist not only on their productive base but also based on the mutual exchange of goods and services between the city on the one hand and the rural counterparts on the other (Ramachandran 1989, p. 4). The abundance of research on multiple dimensions of urban settlement systems in India, grounded on the principles of intra-settlement interrelationship, is well depicted through the larger appearances of words like "hierarchy", "rank-size", and "system" in Figure 1. Moreover, the 1950s saw that the studies of individual cities and towns dominated the thinking of settlement geographers in India, but the early 1960s experienced a shift of focus in urban settlement research from the analysis of individual cities to the spatial-functional relation of urban centers with their surrounding regions. A new and remarkable wave of thinking based on a normative theory of central places dominated the ideas of Indian settlement geographers who began to apply the central place principle in the Indian context and tried to establish a relationship between different urban places with each other and with their surrounding countryside. Thus, a meticulous application of Christaller's Central Place Theory against the actual situation of India was endeavoured by a considerable number of Indian scholars (Singh 1966; Dutt 1969; Bhat 1976; Prakasa Rao, Ramachandran 1983). Considering



Source: prepared by the authors.

Indian Punjab as the study area, R.C. Mayfield (1963) used cluster analysis to determine the range of central goods and services to establish a relationship between the service centers of Ludhiana and Jullundur (Jalandhar) districts of Punjab.

A few studies in India considered the cognition of small towns and their position in the national settlement system of the country, at a macro level. R.L. Singh and R.P.B. Singh (1979) are one such contributor, who induced a macro-level analysis of the Indian urban settlement system by considering solely small towns of the country. This macro-level analysis came out with three rigorous models viz. model of the strategies on small-town systems, spatial planning for small towns, and small towns as the agents of rural transformation respectively. A similar contribution was made by U.C. Mallick (1979), where he emphasized the role of small towns in the overall economic development of the country. Using the Loschian notion of Economic Landscape, R.B. Mandal (1979) proposed a thoughtful analysis of the potential and profitable location of rural centers with urban settlements. However, this study is based on the Madhubani District of Bihar solely, and therefore, the conclusions are not generalizable enough to formulate any model or modification of the Loschian concept of Economic Landscape for Indian rural and urban settlements. A state-level analysis of small towns in Tamil Nadu took 13 different standard services under 9 groups and used the notion of the Relative Centrality Index to depict a hierarchical relationship among the small towns of the state having a population of less than 20,000 (Gopalakrishnan 1979). Furthermore, R.P. Misra (1983) wisely used the concepts of Growth Centre and Growth Pole to explain the nature and extent of urban and regional problems in India. Considering Mysore City as a case, P.D. Mahadev and K.R. Rao (1983) explained the location and spatial arrangement of service facilities at an intra-urban level.

A very scattering number of studies have appeared on the settlement systems of Bihar, focusing on the pertinence of the central place concept. P. Dayal and B. Thakur (1982) attempted to analyze the growth trends and features of urban settlement systems in Bihar with special attention to the applicability of rank-size rule and central place theory. Moreover, using the quantitative technique of Two-Way Analysis of Variables, S.P. Sinha (1983) analyzed the spatial and functional relationship between urban and rural settlements at the state level by considering Haryana as the case. Again, taking Bihar as a case, M. Singh (1992) determined the hierarchy of central places using the CMIE Index of the Level of Economic Development and focused on the decadal change in the Centrality of central places from 1971 to 1981. Taking nine different census years into account from 1901 to 1981, S.C. Bansal (1992), studied the rank-size relationship of urban centers in the Upper Ganga-Yamuna

Doab region. Similarly, a meticulous study on the functional interconnection of central places with their zone of influence in Kashipur Tahsil in the then State of Uttar Pradesh yielded a valuable model of spatial interaction of central places with their interaction zones (Pandey, Rawat 1983). Furthermore, B.L. Singh (1985) has furnished a remarkable work on the rank-size relationship among the central places of Mithila Plain. J.L. Jain (1986) provided an important insight into the urban system of the Malwa region and the hierarchical relationship among them within the conceptual framework of Central Place Theory. A diligent work by G.S. Sastry (1986) made use of the Guttman Scaling and Functional Index to delineate the hierarchical structure of retail trade in the city of Bangalore.

Distortions in the urban settlement system of India are an undeviating consequence of the colonial explorative policy and consequent concentration of colonial power in a very few prime urban centers in the country, which in turn has led to the hypertrophy of those prime political and administrative centers. This thing has prevented an even growth of urban places throughout the entire length and width of the Indian Territory. To generate a more desirable system of urban and metropolitan economy and to rectify the distortions in the system of urban settlements, the Government must intervene to restrain the role of prime cities, prevent polarised development of large metropolitan centers, accelerate the growth of middle and lower order urban centers and initiate a public policy to promote the percolation of developmental impulses to the lowest level of settlements in the system (Alam 1986).

A 2005 study by N. Dash emphasized the hierarchy of market centers and their spatial arrangements in the rural hinterland of two great cities in Orissa, such as Cuttack and Bhubaneswar. S. Singh and O.P. Singh (2007) proposed a geographical exposition of service centers in the Mohammodabad tehsil of Middle Ganga Plain using the functional hierarchy method. M.J. Ali and D. Varshney (2012) have conducted a study on the hierarchical development and functional potentiality of urban settlements in the Aligarh district of Uttar Pradesh, focusing on the infrastructural influence of the urban centers on their respective rural hinterland. They have also examined the competency and deficiency of infrastructural facilities in the urban service centers and provided some suggestions to stimulate balanced regional development.

Considering seven different census years from 1951 to 2001, A. Kumari (2015) undertook a macro-level analysis of urban hierarchy at the national scale, recognizing Zipf's Rank-Size Rule as the theoretical base and identifying the population rank of Indian cities, belonging to all the six population classes, and concluded that Indian urban settlement system does not follow the Rank-Size Rule at all. The author also attempted to analyze the degree of urban primacy in India at the national and regional scales, and the primacy index reflected that India does not have any primate city at the national scale, even from 1951 to 2011. But there was a primacy of Kolkata over the Eastern region, as its primacy index for Eastern India was 9.18 in 2011. Mumbai also acquired primacy over Western India with a primacy index of 2.90, whereas Delhi had a primacy over the Northern part of the country having a primacy index of 5.59 in 2011. Contrariwise, in the Southern part of the country, the largest city i.e. Chennai had not been able to establish its primacy due to its spatial proximity to several big urban clusters like Bengaluru and Hyderabad. Nevertheless, this study is an oversimplification of the theoretical models of Zipf and Jefferson in the Indian context that are too old to be used as the theoretical basis for analyzing urban settlement systems in the 21st Century, for a rapidly urbanizing country like India, where urban areas do pose sharp internal diversities and complex pattern of regional associations with each other.

Following the notion of a metropolis in the progressive growth of urban habitats in the 20th century, the concept of "aerotropolis" has become a brand new inclusion to urban development strategies during the early 21st century in relation to the tremendous expansion of the volume of both the passenger and goods traffic in this continuously globalizing world. This new urban development resolution is embedded in the idea that information and communication technology and the aviation sector are competent enough to furnish enormous economic growth in a nation. In India, a similar growth trajectory to develop airport cities or aerotropolis has gotten emphasis in the last few years. Andal Aerotropolis,

based on Kazi Nazrul Islam Airport, in the state of West Bengal, is the first of its kind in India. The state government of West Bengal has granted “Industrial Township” status to this aerotropolis and is expected for a world-class city development under private governance procedure (Samanta 2015).

Many challenges are there to make sense of the transfigurations brought about by the process of urbanization in India, either considering the development in the socio-economic scenario or ecological sustainability. With regard to the urbanization phenomena on a worldwide scale, the lion’s share of the academic attempts concerning urban settlements and their growth in India are confined around megacities or large metro centers. However, it is a prevalent fact that despite being placed in the prominent limelight, large metro centers make a very partial contribution to the overall urban dynamics of the country. Non-metro cities and small towns (100,000 or lesser population) contain a substantial share of the total urban population of the country and their share is yet to grow as predicted by the model of the Urbanization Cycle. They are going to play a visible role to accommodate the future urban population of India. Nevertheless, the weightage of small towns in the overall Indian urban growth remains important as 28% of the augmentation of the Indian urban population between 1961 and 2011 is caused by the increase in the number of small towns and their demographic proliferation, and at the same time, the demographic evolution of small towns is independent of their distance from major economic centers i.e. large metropolitan clusters (Swerts 2017).

As per the Regional Plan 2021, for the National Capital Region (NCR) of India, the Central NCR is one of the four policy zones of NCR. S. Sharma and A. Sen (2015) presented a study on the level of urban influence and the functional hierarchy of 120 settlements (both rural and urban) in the Gurgaon-Manesar Urban Complex of Central NCR, using census data from 1981 to 2001. The study also focused on the role of the Haryana Urban Development Authority in the present planning operations for the development of the region.

Studies on the typology of urban settlements

No two cities in this world are identical. Cities can be largely similar, but their physical, social, and economic individualities cannot be ignored. This thing reflects the fact that the growth of urban places is reliant on a number of forces that are unique to individual cities. However, generalizing the cities, based on their common characteristics under the umbrella of some specific classes has dominated the thinking of settlement geographers for a long. Because generalization and classification do facilitate a comparative assessment of urban places, belonging to a certain space.

Focusing on the ideas of C.D. Harris and H.J. Nelson, throughout the second half of the 20th century, geographers from India devoted themselves to classifying Indian urban settlements into different functional categories at regional and national levels. A. Lal (1959), for instance, classified 67 one-lakh-plus cities¹ of India using 1951 census data, following the Location Quotient method. Q. Ahmed (1965) used 63 variables to classify one-lakh-plus cities in India, using 1961 census data. Considering the multi-functionality of Indian urban centers, S.M. Rafiullah (1965) invented a new technique to classify Indian towns and cities based on more than one function, performed by them. Consequently, he identified five functional classes viz. Monomial, Binominal, Trinominal, Quadrinomial, and Polynomial respectively. Based on 1971 census data, A. Mitra (1973) classified urban centers of India into 7 major functional categories and also identified their degree of specialization over a certain function. A similar attempt was made by R. Pyare (1980), where he classified 37 towns of Bundelkhand based on occupational data provided by the Census of India. However, barring a few exceptions majority of these attempts are based on the modification and superimposition of some purely quantitative techniques, mostly developed by Western scholars. Most of these approaches avoided proper empirical analysis and groundwork to explore the functional typicalities of exclusively Indian cities, and are solely founded on secondary data sources.

¹ Cities with a population over 100,000.

A 1986 study on land use patterns of Indian urban centers took 122 urban centers from different states of India (except Himachal Pradesh) and classified them firstly on their demographic size and then on functional specialization, using a purely quantitative methodology i.e. Development Index (Kulshrestha 1986). This macro-level study has also addressed the variety of land-use patterns in the selected towns belonging to different size-class categories. R. Thakur (1994) wonderfully attempted to classify the early medieval towns in India (c. 750–1200) using authoritative architectural treatises like *Manasara*, *Mayamata*, *Samaranganasutradhara*, *Aparajitaprccha* etc. R.N. Mishra and P.K. Sharma (2007) classified 222 urban centers in Rajasthan with the help of the Functional Specialization Index of J.W. Webb (1959).

An astonishing study attempted to build a typology of 100 Indian Smart Cities, identified by the Smart City Mission of India. The study used cluster analysis to classify the cities under consideration, and later a multiple discriminant analysis was employed to characterize each classified city. It divided the selected cities' urban functions into indicators and quantified them through data and revealed that poor distribution of and access to social services (higher education, health, etc.) severely hinders progress in India's small and medium-sized towns (Praharaj, Han 2019).

Historical studies of urban settlements

Settlement geographers and historians have continued to argue that the urban centers that we recognize in the modern period are the products of some long-term evolutionary processes, through which the settlements of ancient and medieval periods gradually evolved into complex and diversified cities of modern times. The historical geography of urban settlements of any region or country can be authored from two distinct perspectives. The first outlook treats each town or city as a unique spatial unit and considers its idiosyncratic history. Even if such urban settlements are assembled together and evaluated accordingly. The elements that work behind their origin and growth, affluence and misery, are studied strictly from a historical perspective within a spatial framework. The second approach considers the spatio-temporal pattern of urban growth from a regional perspective, where the historical geography of each urban settlement in a region is studied in association with the histogenesis of other towns in the region. This approach is grounded on the belief that no urban settlement on this planet can function as a discrete entity, detached from other settlements. The urban settlement studies in India immediately after independence were largely focused on the origin and evolution of individual towns and cities. By and large, research was confined to archival sources and very limited evidence of field survey was there. However, over time, historical studies of urban settlements continued to be popular, but the researchers of the late 20th century and the early 21st century wisely acknowledged the role of field observation to support historical studies of urban centers, besides using the archival scriptures.

Delhi, the national capital of India, has a very complex history of its origin and growth. S.S. Bhatia (1956) has presented an account of the evolution of the urban geography of Delhi regarding a succession of periods and spatial growth.

India, immediately after independence experienced the emergence of a considerable number of new towns to meet the national goal of development. V. Prakash (1969) has provided a remarkably obliging work on the new towns of India, constructed between 1947 and 1964. He mainly dealt with three major components of the selected new towns: the relevance of their location, the nature of planning, and the mechanism to execute or practice control over the implementation of the plan.

Urban settlements of Mughal India can be approached by the question of how these urban settlements evolved and what activity did they perform. Political and administrative control of Mughal India was concentrated essentially on six prime cities of the Empire: Agra, Ahmedabad, Burhanpur, Delhi, Lahore, and Patna. Considering the north-western frontier, Kandahar and Kabul could also be included in the list. The twin capitals of Delhi and Agra being the main chairs of the empire functioned

as the pivotal points for political activities. Being situated at the crest of the Mughal power, these primate cities functioned more politically, where strategic or defense activities were of secondary interest. However, there was a considerable growth of garrison towns, like Aurangabad, Gwalior, Allahabad, Chunar, etc. which contributed as the military centers for the Empire. Commercial or industrial activities had a very limited role to play in the origin and growth of such urban centers. Hence it might be assumed that the sphere of influence of a prime city would spread over the entire span of the Empire and it would be steady and stable over a considerable period. Examples include the great capitals of Delhi or Agra which can be positioned in the class of the most prominent prime city when the concentration of political power is concerned, but their commercial and industrial role might be less pronounced than any of the provincial prime city. Thus, the idea of spatial-functional organization of Mughal urban settlements can be established in two consecutive ways viz. firstly they need to be distinguished based on the qualitative roles like politico-administrative functions, defense functions, commercial activities, religious-cultural importance, and finally by demographic character. Secondly, they are required to be arranged in a certain functional hierarchy following both the spatial and temporal dimensions. The painstaking listing of cities and qasabas in Ain-E-Akbari marks the contemporary awareness of the distinction between rural and urban settlements, and the argument concerned so far leads to the conclusion that any complex civilization like the Mughals, has an in-built political, economic, and social structure that gravitates it towards the formation of multi-functional urban localities (Chaudhuri 1978).

The classic paper of S.P. Chatterjee (1983) on the evolution of human settlements in India, is a valuable contribution to the Historical Geography of urban settlements in India. The study of the settlement pattern, cultural, socio-economic, and political history of the ancient town of Mathura is a bright example of historical analysis of urban settlements focusing on the history of origin, spatiotemporal growth, functional, and structural evolution and planning of Mathura City (Singh 2005). R.P.B. Singh (2005) presented an outstanding geographical exposition of the historical evolution of the oldest continuously inhabited city in the World i.e. Varanasi, showing the impact of cultural actors and the appearance of the sacred landscapes.

Recent (revolutionary) advancements in methodological stance

Academic traditions and the body of research that hold up such conventions reflect the state of intellectual and technological advancements of the society that they are associated with. India, largely since the onset of the previous decade, is experiencing nothing less than a revolution concerning the linkages of Remote Sensing (RS) and Geographical Information Systems (GIS) to urban affairs. Concerning the four major dimensions of urban settlement geography that this paper has discussed in the preceding sections, a remarkable surge in research interest grounded on geospatial methodologies could be seen where not only locational, physical, and functional aspects (Jain et al. 2011; Rahman et al. 2012; Verma et al. 2017; Shukla, Jain 2019) of urban settlements are placed in front of high-technology academic solutions but also studies on spatial history of urban settlements (Petrie et al. 2019) have also experienced the infiltration of such computer-intensive methodologies. Developments in geospatial science, analytical tools, and associated flows of spatially informed “big data” thus enable creative ways to transcend the long-standing problems of data availability and visualization concerning urban research and practice. The diffusion of remotely sensed data and GIS technology into the academic sphere of urban settlement geography has further progressed at a remarkable rate during the post-2020 period, which is judiciously well-documented, but simultaneously is highly criticized by an emerging body of research that addresses this technocentrism of urban research in particular and geographical research in general, as mechanistic addressal to human society that is highly indifferent towards the deeply contextual contingencies of human behavior (Wyly 2014; Banerjee 2022a).

CONCLUSION

The present review of the research publications on urban settlement geography in India after independence has reflected that this branch of settlement geography has congregated literature on conspicuously varied topics. This special branch of geography has covered a progressive journey from the narrative and descriptive studies of individual towns and cities during the mid-20th century to the extensive use of computer technologies in general and RS & GIS in particular from the early 21st century. Though heavily claimed by geographers, this branch of knowledge is equally built and being contributed by sociologists, urban planners, GIS scientists, and the like. With the urban at the forefront, especially in the Indian scenario, this expansion is timely. All the changes that appeared with the passage of time have opened some new avenues to interpret the intra and inter-urban complex phenomena with greater precision and efficiency. At the same time, Indian scholars have also continued to endeavor for the academic analysis of future cities like Green City, Informational City, Virtual City, Aerotropolis, Railopolis, etc. (Samanta 2015; Banerjee 2022b, 2023). Thus, the sphere of influence of urban settlement geography is getting increasingly diversified, where new and innovative themes of research are being thought of by scholars.

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