(REVIEW ARTICLE)

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Urban morphology in Indian Contexts: A review of methods, approaches, and gaps

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Abstract

Urban morphology, the study of the physical form of cities and their transformation over time, has emerged as a multidisciplinary field bridging architecture, geography, and urban planning. Three dominant global traditions the Conzenian school of Britain and Germany, the Muratorian school of Italy, and the French school of socio-spatial analysis have shaped the discipline with distinct analytical frameworks. While these approaches have been widely applied in Europe and North America, their presence in India remains fragmented and inconsistent.

This paper undertakes a comparative literature-based review of global morphological traditions and examines their limited but notable applications in the Indian context. The review highlights that most Indian studies are concentrated in heritage precincts, colonial towns, and hill settlements, with limited engagement in peri-urban or informal contexts. Moreover, much of the scholarship is descriptive rather than methodological, rarely employing systematic analytical tools from global morphological traditions.

The analysis identifies three persistent gaps: (i) the absence of an India-specific morphological framework, (ii) poor integration of morphological insights into planning regulations and building bye-laws, and (iii) minimal use of contemporary digital tools such as GIS, LiDAR, and space syntax. The paper concludes by proposing a research agenda that emphasizes methodological localization, technological integration, and stronger linkages with sustainability and climate-responsive planning in India's rapidly urbanizing landscapes.

Keywords: Urban Morphology; India; Conzenian School; Italian School; French School; Heritage Precincts; Informal Settlements; Planning Regulations

1. Introduction

Urban morphology, broadly defined as the study of the form, structure, and transformation of cities, provides a powerful lens to interpret how societies shape and are shaped by the built environment (Whitehand, 2001; Moudon, 1997). It focuses on the material city the arrangements of streets, plots, buildings, and open spaces and interprets their transformation over time. By doing so, it links history, geography, architecture, and planning into a cohesive analytical framework.

Globally, the field has developed along three major traditions. The Conzenian school, rooted in British and German geography, emphasizes town-plan analysis, plot patterns, and building fabric, with particular attention to historical layering (Conzen, 1960; Whitehand, 1981). The Muratorian school of Italy, pioneered by Saverio Muratori, foregrounds typological processes and the continuity of building forms as a basis for understanding urban transformation (Muratori, 1960; Caniggia and Maffei, 2001). The French school, represented by Castex, Panerai, and colleagues, integrates

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morphological form with socio-spatial practices, linking the built environment to cultural and political processes (Panerai et al., 2004).

In India, however, the systematic study of urban morphology is still in its infancy. Although cities such as Shahjahanabad, Jaipur, and Pondicherry have been examined for their historical forms (Hosagrahar, 2005; Kumar, 2002; Brunhes-Delamarre, 2010), much of this work remains descriptive, conservation-driven, or historically oriented rather than grounded in morphological methodology. Informal settlements, peri-urban expansions, and rapidly transforming metropolitan landscapes dominant features of Indian urbanization remain largely absent from morphological scholarship (Dupont, 2011).

This paper therefore aims to bridge this gap by undertaking a comparative review of urban morphology in India. The objectives are fourfold

- To review the global schools of urban morphology and their methodological contributions;
- To examine the extent and nature of their application in Indian contexts;
- To identify gaps and challenges in Indian morphological scholarship; and
- To propose directions for future research that can better align morphological analysis with India's urban realities.

2. Literature review

Urban morphology has evolved as a distinct discipline over the past century, though its intellectual roots lie in both geography and architecture. The British/German tradition, pioneered by M. R. G. Conzen (1960), emphasized detailed town-plan analysis and the concept of time-depth in urban form. Conzen's study of Alnwick demonstrated how successive layers of development produce complex urban fabrics, a method later extended into fringe-belt theory by Whitehand (1981, 2007).

The Italian tradition, led by Saverio Muratori, centered on the continuity of building and settlement types. Muratori (1960) and later Caniggia and Maffei (2001) argued that urban form evolves through typological processes, balancing permanence and transformation. This school had significant influence on architectural pedagogy and design practice in Europe.

The French school, articulated by Panerai, Castex, and Depaule (2004), expanded morphology into socio-spatial territory. Rather than focusing solely on physical form, this tradition emphasized the relationship between urban space and cultural practices, thereby aligning morphology with historical geography and social science.

Subsequent decades have seen methodological diversification. Moudon (1997) emphasized morphology as an interdisciplinary field bridging architecture, geography, and planning. Hillier and Hanson's (1984) *The Social Logic of Space* introduced space syntax, linking configuration with social interaction. Griffiths (2016) applied GIS for large-scale morphological analysis, while Dovey and Pafka (2017) advocated for configurational and mapping approaches suited to contemporary urban design.

In the Indian context, morphological scholarship is limited but growing. Hosagrahar (2005) analyzed Shahjahanabad, highlighting its courtyard-based domestic morphologies and their negotiation with modernity. Kumar (2002) studied Jaipur's grid plan as a hybrid of traditional and colonial planning. Gupta (2014) examined Bengaluru's colonial Cantonment, noting the coexistence of European and indigenous morphologies. Brunhes-Delamarre (2010) compared Pondicherry's French and Tamil quarters, demonstrating dual morphologies within one city. Prakash (2012) documented the sectional morphologies of hill towns like Shimla and Darjeeling, while Bhat and Rao (2025) explored regulatory mismatches in Mysuru's Devaraja Market.

Despite these contributions, the literature reveals three shortcomings: (i) a descriptive rather than analytical focus, (ii) confinement to heritage or colonial towns, and (iii) limited methodological engagement with global morphological traditions. Informal and peri-urban landscapes remain largely ignored, despite their prominence in Indian urbanization (Dupont, 2011).

This review thus underscores the uneven application of global morphological traditions in India and frames the need for localized, methodologically robust approaches.

3. Global Schools of Urban Morphology

3.1. The Conzenian School

The Conzenian school emphasizes plan analysis through three elements: streets, plots, and building fabric (Conzen, 1960). It provides historical depth and analytical rigor, institutionalized through Whitehand's work on fringe belts (Whitehand, 1981).

3.2. The Muratorian/Italian School

Muratori (1960) introduced typological processes, emphasizing building types as evolving elements. Caniggia and Maffei (2001) further elaborated the typological method, integrating permanence and transformation in urban form.

3.3. The French School

The French school, through Panerai, Castex, and colleagues, linked morphology to cultural and social processes, framing urban form as both physical and socio-spatial (Panerai et al., 2004).

3.4. Contemporary Developments

Recent decades have introduced digital tools: GIS (Griffiths, 2016), space syntax (Hillier and Hanson, 1984), LiDAR, and AI-based mapping (Dovey and Pafka, 2017). These broaden analytical capacity but demand adaptation for contexts with informality and rapid change.

4. Applications in Indian Contexts

4.1. Heritage Precincts and Historic Cores

Studies of Shahjahanabad (Hosagrahar, 2005), Jaipur (Kumar, 2002), Pondicherry (Brunhes-Delamarre, 2010), and Mysuru's Devaraja Market (Bhat and Rao, 2025) highlight historical morphologies but remain largely descriptive.

4.2. Hill Towns

Shimla, Darjeeling, and Madikeri exhibit contour-driven morphologies. Prakash (2012) emphasizes sectional patterns, though analysis is often framed around conservation and tourism.

4.3. Colonial Towns

Studies on Bengaluru Cantonment (Gupta, 2014) and Pondicherry (Brunhes-Delamarre, 2010) reveal layered morphologies of indigenous and European traditions.

4.4. Informal Settlements and Peri-urban Areas

Research on slums in Delhi and Mumbai (Dupont, 2011) acknowledges incremental growth patterns but rarely employs morphological methodology. Peri-urban morphologies remain underexplored despite their centrality to Indian urbanization.

5. Critical Gaps and Challenges

The comparative review of global morphological traditions and their applications in India reveals several critical gaps. While European and North American contexts have developed robust frameworks, India's morphological studies remain fragmented, descriptive, and narrowly focused. The table below summarizes these contrasts.

Table 1 Critical Gaps in Applying Global Morphological Traditions to Indian Contexts

Dimension	Global Traditions (Conzenian / Italian / French / Contemporary)	Indian Applications	Gap / Challenge
Frameworks and Theories	Well-developed methodologies: town-plan analysis, typology, socio-spatial analysis (Conzen, Muratori, Panerai)	Limited adoption; studies often descriptive or historical	Lack of India-specific morphological framework
Scope of Study	Applied across historic cores, suburbs, peri-urban areas, and metropolitan regions	Focus on heritage cores, colonial towns, and hill settlements	Neglect of informal settlements and peri-urban landscapes
Integration with Regulation	Used in Europe for conservation guidelines, zoning, and planning	Minimal influence on Indian bye-laws and planning codes	Disjuncture between organic morphologies and rigid bye-laws
Methodological Rigor	Systematic plan analysis, typological processes, and socio-spatial mapping	Fragmented approaches; little use of systematic methods	Weak methodological grounding in Indian studies
Use of Digital Tools	Integration of GIS, space syntax, LiDAR, AI for urban form studies	Rarely applied in Indian contexts	Minimal technological integration
Sustainability Linkages	Increasingly tied to urban resilience, heat mitigation, and sustainable urbanism	Rarely connected to environmental/climate dimensions	Missed opportunity to connect morphology with sustainability

As Table 1 shows, Indian urban morphology faces challenges at multiple levels. First, the absence of an India-specific framework results in reliance on descriptive accounts rather than systematic analysis. Second, the scope of research is narrow, confined mostly to historic cores, with limited attention to peri-urban, informal, and metropolitan contexts that dominate contemporary urbanization. Third, planning regulations and bye-laws remain disconnected from morphological realities, leading to conflicts between organic urban fabrics and rigid regulatory norms. Fourth, methodological rigor is inconsistent, with few studies systematically applying plan analysis or typological processes. Fifth, technological advances such as GIS, space syntax, and AI-based mapping—common in global research—are underutilized in India. Finally, there is little integration of morphology with sustainability debates, despite its potential to address climate change, heat stress, and resilience in rapidly urbanizing cities.

Future Directions

- Localized frameworks: Develop India-specific morphological approaches that acknowledge cultural, climatic, and socio-economic diversity.
- Regulatory integration: Embed morphological insights into development control regulations and bye-laws.
- Technological adoption: Employ GIS, LiDAR, remote sensing, and AI for large-scale, real-time morphological analysis.
- Expanded scope: Study informal settlements, peri-urban expansions, and metropolitan peripheries.
- Sustainability alignment: Link morphology with environmental resilience, climate adaptation, and sustainable urban design.
- Pedagogical inclusion: Integrate morphological methods into architectural and planning education in India.

6. Conclusion

Urban morphology offers powerful methods for analyzing the evolution of cities, yet its uptake in India remains fragmented and uneven. While global schools provide robust frameworks, their application has been limited to descriptive studies of heritage and colonial towns. Informal, peri-urban, and rapidly transforming contexts remain largely absent from the discourse.

This review identifies critical gaps in methodology, scope, and regulatory integration, and calls for the development of an India-specific morphological framework. Future research must localize global traditions, embrace digital tools, and align morphological insights with sustainability and climate-responsive urban planning.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1]   Bhat, S., and Rao, R. (2025). Morphological mismatches between bye-laws and heritage markets: The case of Devaraja Market, Mysuru. Journal of Urban Heritage Studies, 12(2), 134–152.

[2]   Brunhes-Delamarre, A. (2010). Colonial morphologies: The French and Tamil quarters of Pondicherry. Urban History, 37(3), 417–436.

[3]   Caniggia, G., and Maffei, G. L. (2001). Architectural composition and building typology: Interpreting basic building. Florence: Alinea.

[4]   Conzen, M. R. G. (1960). Alnwick, Northumberland: A study in town-plan analysis. London: Institute of British Geographers.

[5]   Dovey, K., and Pafka, E. (2017). What is urban morphology in urban design? Urban Morphology, 21(1), 1–10.

[6]   Dupont, V. (2011). The dream of Delhi as a global city. International Journal of Urban and Regional Research, 35(3), 533–554.

[7]   Griffiths, S. (2016). Space syntax as interdisciplinary urban morphology. Progress in Planning, 107, 1–49.

[8]   Gupta, N. (2014). Colonial layering in urban morphology: The case of Bengaluru Cantonment. Planning Perspectives, 29(4), 467–485.

[9]   Hillier, B., and Hanson, J. (1984). The social logic of space. Cambridge: Cambridge University Press.

[10]   Hosagrahar, J. (2005). Indigenous modernities: Negotiating architecture and urbanism. London: Routledge.

[11]   King, A. D. (1976). Colonial urban development: Culture, social power and environment. London: Routledge.

[12]   Kropf, K. (2009). Aspects of urban form. Urban Morphology, 13(2), 105–120.

[13]   Kumar, R. (2002). Jaipur: Planned morphology and the city of palaces. Indian Journal of Urban Studies, 4(1), 45–62.

[14]   Moudon, A. V. (1997). Urban morphology as an emerging interdisciplinary field. Urban Morphology, 1(1), 3–10.

[15]   Muratori, S. (1960). Studi per una operante storia urbana di Venezia. Rome: Istituto Poligrafico dello Stato.

[16]   Oliveira, V. (2016). Urban morphology: An introduction to the study of the physical form of cities. Cham: Springer.

[17]   Panerai, P., Castex, J., Depaule, J. C., and Samuels, I. (2004). Urban forms: The death and life of the urban block. Oxford: Architectural Press.

[18]   Prakash, M. (2012). Morphological patterns of Indian hill towns. Journal of Mountain Urbanism, 5(2), 89–104.

[19]   Whitehand, J. W. R. (1981). The urban landscape: Historical development and management. London: Academic Press.

[20]   Whitehand, J. W. R. (2001). British urban morphology: The Conzenian tradition. Urban Morphology, 5(2), 103–109.

[21]   Whitehand, J. W. R. (2007). Urban morphology and policy: Bridging the gap. Urban Morphology, 11(2), 123–134.