



TITLE: PRIMARY MODELS OF URBAN MORPHOLOGY IN INDIAN CITIES.

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Abstract:

This paper delves into the primary models of urban morphology observed in Indian cities, shedding light on the diverse historical, cultural, and developmental influences shaping their physical form. Through an analysis of ancient, colonial-era, and post-independence urban centers, three distinct models emerge: organic, irregular layouts characterized by historical evolution and cultural significance; planned, gridiron patterns reflecting colonial imposition and administrative order; and modernist, rational planning approaches emphasizing functional segregation and geometric precision. By examining case studies and comparative analyses, the paper elucidates the spatial, social, and economic implications of these models, highlighting the complexities and challenges inherent in contemporary urban development in India. The synthesis of historical legacies, socio-cultural dynamics, and economic imperatives underscores the need for nuanced and context-specific urban planning strategies. This research contributes to a deeper understanding of urban morphological evolution in Indian cities and provides insights for policymakers and planners to navigate the complexities of urban growth, fostering sustainable and inclusive urban environments for the future.

Key Words: Urban morphology, built form, social pattern, concentric model, sector model, nuclei model.

Introduction:

Urban morphology, the study of the physical structure and form of cities, serves as a lens through which to understand the complex interplay of historical, cultural, social, and economic forces shaping urban landscapes. In the Indian context, cities exhibit a rich tapestry of morphological patterns, reflecting millennia of human settlement and development. From ancient urban centers with organic, meandering streets to colonial-era cities featuring planned gridiron layouts and post-independence cities embodying modernist planning principles, the evolution of urban morphology in India is multifaceted and dynamic.

This research paper aims to explore and analyze the primary models of urban morphology present in Indian cities. By examining case studies spanning different historical periods and geographical regions, this study seeks to elucidate the underlying factors driving the morphological characteristics of Indian cities. Furthermore, the paper will investigate the spatial, social, and economic implications of these morphological models, considering their impacts on urban livability, sustainability, and inclusivity.

Understanding the diverse morphological patterns of Indian cities is imperative for informed urban planning and policy formulation. By uncovering the historical legacies and socio-cultural dynamics embedded within urban form, this research endeavors to provide insights for fostering more resilient, equitable, and sustainable urban environments in India.

Urban Morphology:

The study of the form of human settlement and the process of their formation and transformation. Specially focuses on how the physical form of city changes.

Factors influencing Urban form:

- Historical and political events
- Economic considerations
- Migration

- Existing land use
- Religion
- Street patterns
- Function (human activities)
- Layout of city
- Neighborhood

The variation in influencing factors and historical circumstance gave rise to different urban forms in different parts of the world. The evolution of the urban pattern of Indian cities is divided into the **social pattern and the built form**.

The Built Form- The historical evolution of the built form of Indian cities can be divided into three distinct phases:

1. The Hindu Phase

Science of architecture and planning, Vastushastra, governed the alignment of roads, orientation of buildings and arrangement of internal rooms based on astrological and religious criteria. The square was used in the creation of the vastupurusha mandala, which was the terrestrial representation of the cosmic universe inhabited by Brahma, the creator.

2. Islamic Phase

The Islamic elements included the mosque and domestic architecture which emphasized the purdah through enclosed courtyards, jali (carved screens) and projecting balconies.

3. The Colonial Phase

The morphological components include buildings used for trade -warehouses, counting houses. This led to the development of commercial centers and zoning based on Western market principles.

Theory of Primary Models or Social Patterns- Various spatial theories of the social pattern of cities have been advanced; some static, others dynamic in nature. The same city may express different models at different time periods. The three leading Western models are:

• Concentric zone model

This theory put forth by E. W. Burgess in 1925 related population mobility and societal organization to the physical expansion of the city.

Concentric Zone Model or Burgess Model

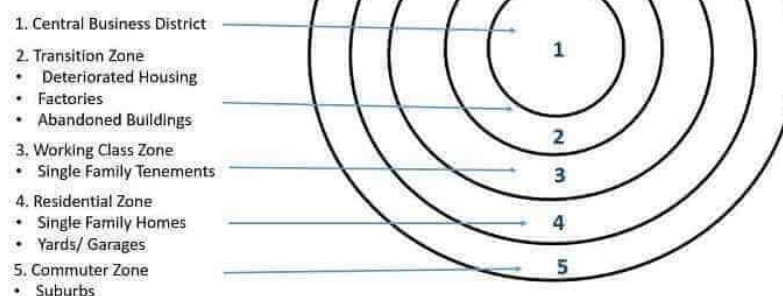


Fig:1 concentric zone model

The CBD core had all major commercial, political and social activities. This was surrounded by a transition zone, which had factories and slums. It also had older residential districts, which were being taken over by the expanding CBD.

Example:

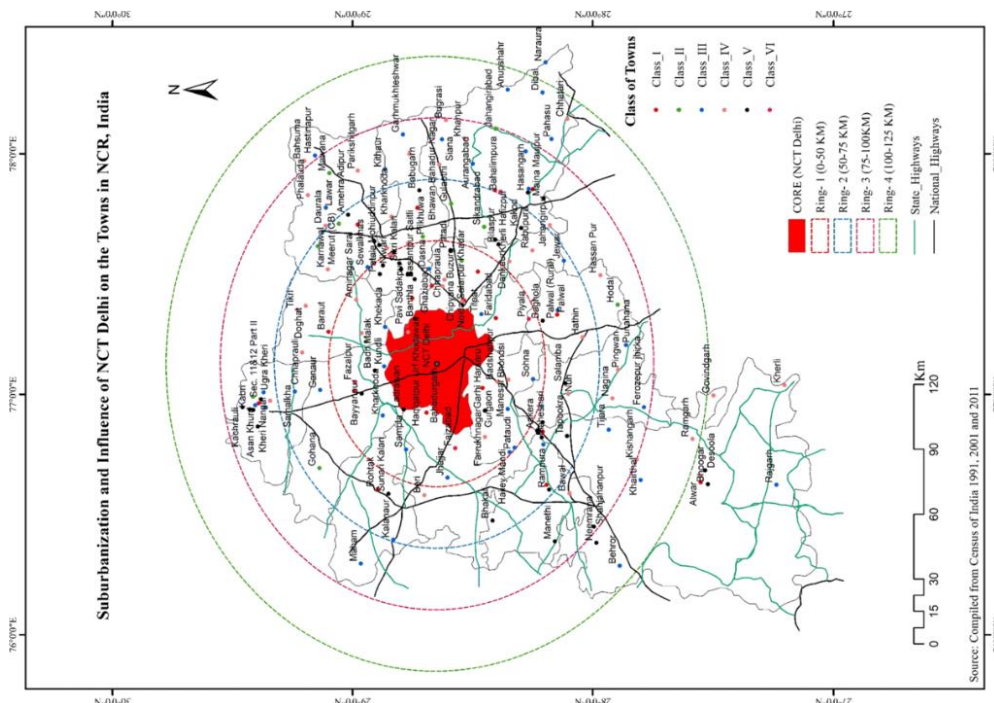


Fig:2 concentric zone model of Delhi NCR

The concentric model pattern in Delhi NCR, like many urban areas, is influenced by various factors including historical development, economic activities, transportation networks, and socio-cultural dynamics. In the case of Delhi NCR, this pattern can be attributed to several key factors:

1. **Historical Development:** Delhi has a long history dating back thousands of years, with various rulers and empires shaping its urban landscape over time. The city has experienced periods of expansion and consolidation, leading to the formation of concentric layers of development.
2. **Economic Activities:** Economic factors such as trade, commerce, and industrialization have influenced the spatial organization of Delhi NCR. Central areas often serve as commercial hubs, while peripheral areas may be more residential or industrial in nature.
3. **Transportation Networks:** The development of transportation infrastructure, including roads, railways, and highways, has played a significant role in shaping the concentric model of Delhi NCR. Accessibility to different parts of the region has influenced settlement patterns and land use.
4. **Socio-Cultural Dynamics:** Social and cultural factors also contribute to the spatial organization of Delhi NCR. Residential preferences, cultural amenities, and social infrastructure influence where people choose to live and work within the region.

Overall, the concentric model pattern in Delhi NCR is the result of a complex interplay of historical, economic, transportation, and socio-cultural factors that have shaped the urban landscape over time.

- **Sector model**
Homer Hoyt put forth a land use theory after studying over 100 cities in the U. S (Hoyt,1939). Hoyt primarily studied residential land use. The model also accounts for growth along transport routes. For example, industries may cluster around the railway line or low in-come housing along a riverbank.

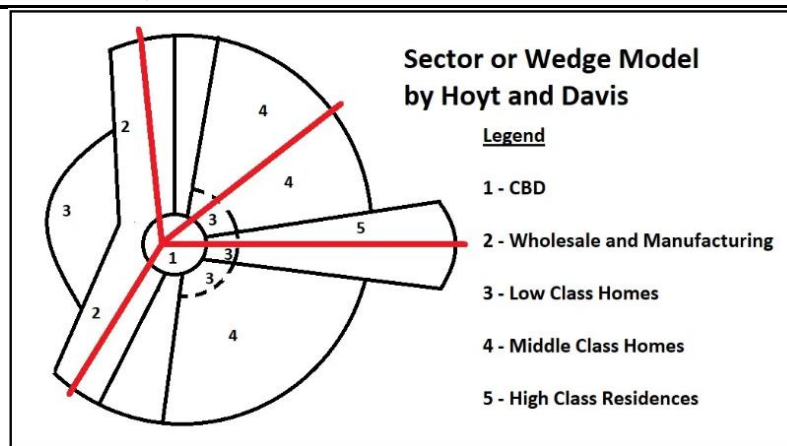


Fig:3 Sector or Wedge model

Example:



Fig:4 Sector zone model of Chandigarh

Chandigarh's sector or wedge model pattern is primarily attributed to its unique planning and design by renowned architect Le Corbusier. Here are some key reasons for this specific urban layout:

1. **Master Plan by Le Corbusier:** Chandigarh was planned and designed in the 1950s by the Swiss-French architect Le Corbusier, who envisioned a modern, efficient, and organized city. His master plan divided the city into sectors, each with its own designated functions such as residential, commercial, industrial, and institutional areas.
2. **Functional Zoning:** The sector-wise division facilitated functional zoning, ensuring that different activities were segregated into distinct areas. This segregation helped in creating efficient traffic flow, managing utilities, and providing amenities within each sector.
3. **Wedge-shaped Green Belts:** In addition to sectors, Chandigarh's plan also incorporated wedge-shaped green belts, which served as buffers between sectors. These green belts not only provided recreational spaces but also helped in maintaining environmental quality and reducing urban sprawl.
4. **Emphasis on Open Spaces and Greenery:** Chandigarh's design emphasized the importance of open spaces, parks, and greenery. Each sector was planned with ample green spaces, enhancing the city's aesthetics and livability.
5. **Hierarchy of Roads:** The road network in Chandigarh followed a hierarchical system, with major arterial roads connecting sectors and smaller streets within each sector. This design ensured efficient movement of traffic while minimizing congestion.
6. **Modernist Principles:** Le Corbusier's design for Chandigarh was influenced by modernist principles, which emphasized functionality, simplicity, and order. The sector or wedge model pattern reflects these principles in its organized and rational layout.

Overall, Chandigarh's sector or wedge model pattern is a result of meticulous urban planning and design aimed at creating a modern, efficient, and aesthetically pleasing cityscape.

- Multiple nuclei model

The multiple nuclei theory was put forth by Harris and Ullman. This model proposes that patterns in many cities be arranged around several centers.

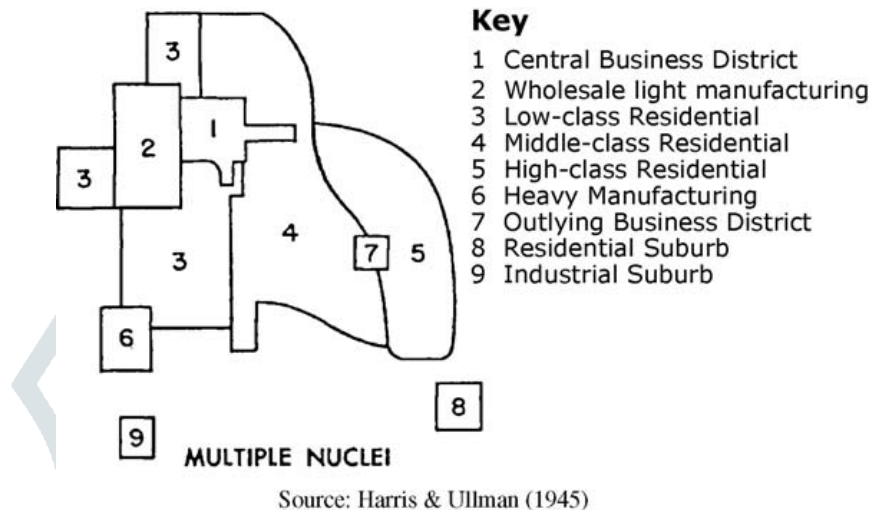


Fig:5 multiple nuclei model

Example:

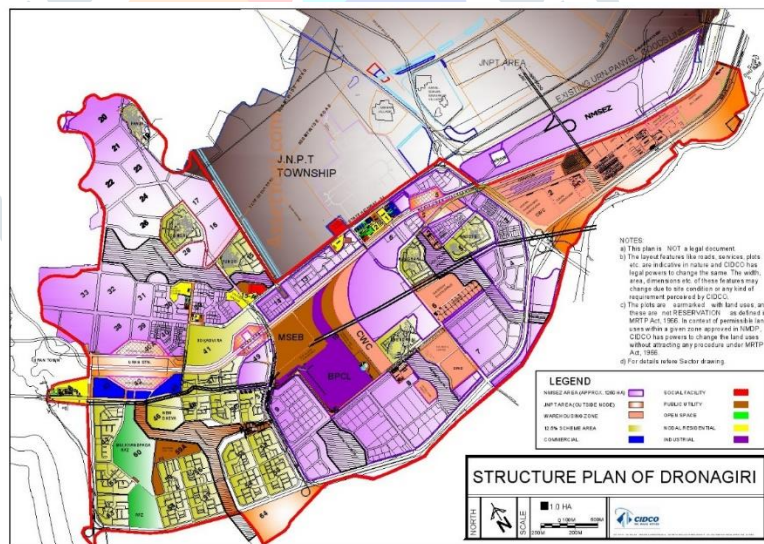


Fig:6 multiple nuclei model of Mumbai

Mumbai's nuclei model pattern, also known as the polycentric or multi-nuclei model, can be attributed to several factors:

- 1. Historical Development:** Mumbai has a long history of urbanization, dating back centuries. The city evolved organically over time, with different settlements and nuclei emerging along the coastline, islands, and mainland.
- 2. Geographical Constraints:** Mumbai is situated on a series of islands connected by reclaimed land, which has led to the development of multiple nuclei as independent urban centers. Each nucleus often corresponds to a historical settlement or neighborhood.
- 3. Economic Activities:** Mumbai is the financial and commercial capital of India, with a diverse economy comprising industries such as finance, entertainment, manufacturing, and services. This economic diversity has led to the concentration of business districts, industrial zones, and commercial hubs in various parts of the city, creating multiple nuclei of activity.

4. **Transportation Infrastructure:** Mumbai's transportation infrastructure, including roads, railways, and waterways, has facilitated the development of multiple nuclei by connecting different parts of the city. The suburban railway network, in particular, has played a crucial role in shaping the polycentric pattern by providing accessibility to various nodes.

5. **Social and Cultural Dynamics:** Mumbai is a melting pot of cultures, languages, and communities, each with its own distinct identity and settlement patterns. This diversity has contributed to the emergence of multiple nuclei, each reflecting the unique characteristics of its residents.

Overall, Mumbai's nuclei model pattern is a result of its historical development, geographical constraints, economic activities, transportation infrastructure, and social dynamics. These factors have shaped the city into a polycentric urban landscape with multiple centers of activity and influence.

Concentric + Sector + Multiple Nuclei Theories



Fig:7 combine zone model

These examples show that the urban social pattern of Indian cities is very complex due to the influence of a variety of factors.

The presence of many religions, languages, castes and classes produces a more heterogeneous pattern.

The social patterns were also strongly influenced by the age of the city. The existence of multiple physical urban patterns caused by the presence of indigenous settlements, British cities and industrial towns within the boundary of the urban area.

Conclusion:

The study of urban morphology in Indian cities reveals a rich tapestry of diverse spatial patterns and forms shaped by historical legacies, geographical constraints, economic dynamics, and socio-cultural influences. Three primary models that stand out prominently across different urban landscapes in India are the concentric model observed in Delhi NCR, the sector or wedge model prominent in Chandigarh, and the nuclei model exemplified by Mumbai. Each model offers valuable insights into the complexities of urban development in India, highlighting the interplay of various factors in shaping urban morphology.

Delhi NCR, as a sprawling metropolitan region, presents a concentric model characterized by radial expansion from a central core. This pattern reflects the city's long history, with successive layers of development expanding outward over time. The central core serves as a commercial and administrative hub, surrounded by concentric rings of increasingly suburban and industrial zones. This model is influenced by economic activities, transportation networks, and socio-cultural dynamics, shaping the spatial organization of the region.

In contrast, Chandigarh, meticulously planned by Le Corbusier, embodies a sector or wedge model characterized by functional zoning and organized spatial divisions. The city is divided into sectors, each designated for specific functions such as residential, commercial, industrial, and institutional uses. Wedge-shaped green belts serve as buffers between sectors, enhancing the city's aesthetic appeal and environmental quality. Chandigarh's model reflects modernist principles of efficiency, simplicity, and order, resulting in a well-organized urban landscape with clear spatial delineations.

Mumbai, the bustling metropolis on the west coast of India, presents a nuclei model characterized by multiple urban centers or nuclei dispersed across the city. This pattern emerges from Mumbai's historical development, geographical constraints, economic diversity, transportation infrastructure, and social dynamics. Each nucleus represents a distinct urban center with its own economic, cultural, and social significance, contributing to the city's vibrant and dynamic character.

In conclusion, the primary models of urban morphology observed in Indian cities offer valuable insights into the complexities of urban development in the country. Understanding these models is essential for informing sustainable urban planning practices tailored to the diverse needs and contexts of Indian cities. Further research into these models can deepen our understanding of urban morphology and contribute to the development of effective strategies for managing urban growth and enhancing the quality of urban life in India.

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