Shifting Trajectories

Construct Urban Strategies to Restructure Mumbai’s Main Centralities and their Functional Relationships to Facilitate the Development of Metropolitan Hinterlands

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what is mumbai?
**context [locating mumbai]**

**Country**
India

**State**
Maharashtra - Marathi’s as the major ethnic group

**Mumbai Metropolitan Region**
Greater Mumbai + Navi Mumbai + Thane + Raigad districts

**Greater Mumbai**
Island City + City Suburbs

**India**
area: 3,287,590 km²
population: 1,131.04 millions
density: 344 per/km²
gdp: 8.9%
number of states: 29

**Maharashtra State**
area: 307,713 km²
population: 105.51 millions
density: 343 per/km²
gdp: 13%
number of districts: 35

**Mumbai Metropolitan Region**
Greater Mumbai + Navi Mumbai + Thane + Raigad districts
area: 4,355 km²
population: 17.76 millions
density: 4,080 per/km²
gdp: 39%

**Greater Mumbai**
Island City + City Suburbs
area: 438 km²
population: 11.98 millions
density: 27,348 per/km²
gdp: 26%
number of wards: 24
context [geography]

Man-Made + Natural Topography
81% work in service sector
88% use public transport

300 km long suburban lines
context [population growth]

17.7 million (2001)

26.4 million (2025)
27,348 person/km²
where will they all go for work?
how will they move?

7 million people
where will they live?
more economic centers?
what next?
metropolitan restructuring?
what is mumbai?
as a reference to its spatial context
Different scales [regional]

Regional structure between Mumbai-pune-nashik-surat

- Mumbai-pune Corridor
- City And Hinterlands
- Center

Region

Mumbai-pune corridor

- Region
- Metropolis
- City
- Center

With Navi Mumbai centralities
different-scales [regional relations]

Heavy Commercial
Old City To Gujarat

Wholesale Agriculture
Navi Mumbai To Nashik

IT And ITES
Bandra-kurla Complex To Pune

The Silicon Corridor
different-scales [regional relations]

The map shows the distances between major cities: Surat (285 km), Nashik (165 km), and Mumbai (151 km). The pie charts below represent different categories such as Notified, Formal Approval, In-Principle Approval, and Total with various segments indicating the distribution of different types of projects.
Regional Structure (Mumbai, Navi Mumbai Pune)

Legend:
- Industrial areas
- National Highways
- National and Suburban Railways
- Regional and City Arterial Roads
- Major Centralities

Major Centralities of the Mumbai Metropolitan Region:
- Thane (Thane District)
- Bandra-Kurla Complex (BKC) in Greater Mumbai
- Vashi in Navi Mumbai
- Panvel (Raigad District)
- Fort-Nariman Point in Island City

Cities in the Region (Mumbai, Navi Mumbai Pune, Surat, Nashik)
- Surat
- To Ahmedabad (Gujarat)
- To Bangalore
- To Ahmednagar

Different-scales [Mumbai Pune Corridor]
industrial areas
different-scales [centralities]
NARIMAN POINT-FORT
Not Changed Much As It Was Earlier
Retained Its Importance As Major Work Node
Looks Both Inside And Outside The City
No Relation To Its Hinterlands
Involves Different Economic And Social Cycles
Organized Well Within Itself
Very Well Connected By Rail And Road

PANVEL
Proposed International Airport
Along Mumbai-Pune Corridor
High Potential For New Development
Has Rural Parts

THANE
Increasing Housing Market
Power Center Of Thane District
Major Hub For Regional Transportation
Blends The Twin Cities Across Creek

VASHI
Successful Commercial Node
Planned In Sectors With Mix
More Directly Linked To Island City
Organized Wholesale Food Market
Major Converging Point Where Pune Meets Mumbai

BANDRA-KURLA COMPLEX
More Connected To Navi Mumbai
Achieved Somewhat Decongestion
Greater Proximity To Airport
Functions Are Oriented Towards Pune Corridor
Low Connectivity
Fragmented From Local Neighborhoods
Exists In The Shadow Of Nariman Point

5
1
2
3
4

5
1
2
3
4
what was mumbai?

spatial and infrastructural development
spatial development [bombay presidency]

1600 s-1900s

british india

states of gujarat and maha-rastra before 1947

bombay islands
spatial development [colonial-trade and expansion]

- fort organized around ship-building
- port strategically connected to railways
- native and european suburbs
- commercial waterfront and esplanade

1700-1850

European CBD

Native CBD

Colonial City

Port City
spatial development [formation of mumbai metropolis]

- independence and nationalization
- urban-rural migration
- booming textile industries
- suburbanization
- increasing inner city congestion
- new growth initiatives - mmrda (bkc, navi mumbai)

1870-19670

National CBD
Native CBD
Industrial City
Financial City
spatial development [change in economic base]

- service industries
- foreign-multinational firms and investments
- industrial relocation from the inner city areas
- high land prices
- navi mumbai became the dormitory settlement

1980-2010+

Global CBD
National CBD
Local CBD

Alpha City
Gateway City
generates two-thirds of Mumbai’s employment
spatial development [employment]

- spread of work

**Total number of companies - 415**
- global corporations - 29%
- domestic companies - 71%

- national headquarters - concentrated equally in Fort and BKC
- global headquarters - concentrated in Nariman Point CBD

**- nariman point and bandra-kurla complex cbds**
infrastructure [linear situation] [work and living patterns]
infrastructure [significance of public transportation]

- long-distance commute
- 7 million people travelling from suburbs to island city
infrastructure [city embedded in the region]
mumbai today? concluding growth of the city
problem definition [link between the scales]

urban frames: issues
main objectives

- To restructure Mumbai’s main centralities towards metropolitan-region
- Use hinterland potentials to open-up development opportunities.
- Relieve the pressure of island city, distribute work and living
- Introduce a public transportation system with relevance across different scales
- Connect the disconnected parts
- Develop south Navi Mumbai, using the potentials of seaport and proposed airport

connecting link: levels
public transportation
main research question

How to reconfigure Mumbai’s main centralities to facilitate urban development by using its hinterland potentials within a framework of different scales?
what will be mumbai?

vision, strategy, design tests
vision 2050

- the ring
- the centralities
- the link

reinforce polycentric urban structure

propose hi-speed public transportation
the ring [shifting urban development]

Loop city
Copenhagen-Malmo

5 Centralities restructured in a ring system towards Mumbai-Pune corridor
development corridors + centralities

new regional structure
Develop new infrastructure

Proposed

Intermediate
Hi-Speed Regional Rail Network
Major Centralities, Nodes in MMR and Regional Connections to Surat, Pune, Nashik (150-200 Kmph)

Proposed

National Bullet Trains
Hi-Speed Bullet Trains to other Indian Cities (300 Kmph)

National Western Railways
Intercity Services to other Indian Cities

Redevelop the existing infrastructure to adapt the new hispeed system
the link: hi-speed research studies

shinkansen
270 km/h
500 km

shatabdi express
160 km/h
701 km

china railways
250-300 km/h
1300 km

thalys
300 km/h
500 km

mumbai suburban
50-100 km/h
300 km

ns sprinter
160 km/h
ranstad

fyra
250 km/h
211 km
strategy 01 [reorient mumbai towards mumbai-pune axis]

identify:

industrial clusters

+ sub-centers
strategy 01  [reorient mumbai towards mumbai-pune axis]

develop:
specialized clusters
+
sez industries
strategy 02 [metropolitan integration of centralities]

regional master plan 1999-2011, mmrda
strategy 02 [metropolitan integration of centralities]

Legend
- Urban areas
- Industrial areas
- Settlements
- Marsh Lands
- Hill Lands
- National Park
- Hinterlands
- Major Centralities

- New Centrality
- Intensification of Centralities
- Proposed Hi-Speed Stations
- Proposed Hi-Speed Intercity Stations
- Secondary Roads
- Primary/Arterial Roads
- Mumbai Suburban and National Railways
- Proposed Hi-Speed Regional Rail Network
- Proposed Metro Phase

Hi-Speed Bullet Trains
Major Centralities

Hi-Speed Regional Ring Rail
U Loop between twin cities

Intensification of centralities
Mumbai Metro Rail

Development Axis
Design Tests

Major Centralities
- Bandra-Kurla Complex (BKC)
- Fort
- Nariman Point

Existing International Airport

Proposed International Airport

Panvel

JNPT

Proposed

Proposed Hub

Bandra-Kurla Complex (BKC)
Fort
Nariman Point
Existing International Airport

New Centrality
Intensification of Centralities
Proposed Hi-Speed Stations
Proposed Hi-Speed Intercity Stations
Secondary Roads
Primary/Arterial Roads
Mumbai Suburban and National Railways
Proposed Hi-Speed Regional Rail Network
Proposed Metro Phase
infrastructure proposal [hi-speed dedicated lines and stops]

amsterdam

mumbai proposed sea-link
infrastructure proposal [bullet trains]

mumbai rail network

01-regional crossroads

PUNE-MUMBAI-AHMEDABAD
Type: Bullet Train
Frequency: 60 minutes
Distance Covered: 643 Km
Speed: 270 Km/h - 300 Km/h
Travel time: 2.5-3 hours
**infrastructure proposal** [intermediate regional light rail]

**Mumbai Suburban Rail Network**
- Type: Light Train
- Frequency: 15 minutes
- Distance Covered: Min 7 Km to Max 160 Km
- Speed: 100 Km/h - 150 Km/h
- Travel time: Min 6 minutes to Max 70 minutes

**Mumbai Intermediate Regional Rail**
- Type: Light Train
- Frequency: 15 minutes
- Distance Covered: Min 7 Km to Max 160 Km
- Speed: 100 Km/h - 150 Km/h
- Travel time: Min 6 minutes to Max 70 minutes

**mumbai rail network**

**02-ring network**
infrastructure proposal [densification of centralities]

03-programs

04-construction

LEGEND
- NEW STOP
- EXISTING STOP
- NEW LINE
- ELEVATED
- SEA LINK
- UNDERGROUND
- TRANSFORMED LINE
infrastructure proposal [across bay connections]
01 banda-kurla complex
planned CBD

02 uran ———
potential CBD

strategic tests [organizing principles for bkc and uran]
generic principles [public transportation]

- improve accessibility and connection to rail corridors
- transit-oriented development of green fields
**generic principles [network hierarchy]**

- Improve accessibility and connection to rail corridors
- Organize vehicular speeds for regional, city and local connections
- Transit-oriented development of green fields
- Locational advantages to strengthen regional connectivity
generic principles [urban grid]

- improve accessibility and connection to rail corridors
- organize vehicular speeds for regional, city and local connections
- integrate existing urban structure and environment into planning

- transit-oriented development of green fields
- locational advantages to strengthen regional connectivity
- integrate transportation and urban planning for flexibility; station environment
Sensitive to the Existing Urban Fabric

**Regional Strategy:** Specialized Business Clusters  
**Local Strategy:** Program infill along transport corridors

1 Character: Multifunctional Business and Commercial District

2 Relations: IT/ITES and Airport Offices; Corporate; Retail; Leisure; Luxury Housing

3 Quality: Public Green; Local Parks; Station Squares; Waterfront Connections

4 Typology: High Risers; High Density; Green Edge; New Public Realm; FSI-4 to 6

5 Transformation Sites: Vacant plots; Old Industrial areas
before intervention
after intervention

Legend
- Marsh Lands
- Existing Urban Fabric
- Proposed BKC Intensification
- Proposed Hi-Speed Regional Rail Network
- Proposed City Roads
- Proposed Local Roads
- Proposed Hi-Speed Stations
- Existing Suburban Stations
- Existing Intercity Station
- Sub-Centralities
- Local Centralities
- Green Connector

Public Programs in Business areas
- Organized Commercial and Retail spaces
- Metro Station
- Existing Suburban Railways
- Proposed Metro Line
- Hi-Speed Regional Rail
- Landscape and Public Green
- Landscape and Mithi River

Infrastructure Hubs

Urban Plazas

Landscape

Western Expressway

To Navi Mumbai

International Airport

CST

Ghatkopar

Andheri

Lokmanya Terminus

Dharavi
Existing Urban Fabric
Derelict Mills
Legend
Marsh Lands
Port Area
Industrial Areas
City Roads
Existing Suburban Stations
Arterial Roads
Suburban Railways
Existing Intercity Stations
2Km
1Km
0Km
N

Mahalaxmi
Racecourse
Worli Naka
Worli
Prabhadevi
Dadar
Mahim
Dharavi
BKC
ITO
SG Barve Marg
RC Marg
Shivaji Chowk
BKC
Kalina
Santacruz
Airport T1
Airport T2
Sahar Complex Road
Asalpha
Gh Subhash Nagar
Saki Naka
Marol Naka
JVPD
Juhu
Navati Hospital
Arya Samaj Chowk
Khar
National College Bandra
MMRDA
Mithi River
Mahim Bay
Kurla
Navi Mumbai-MMR
Existing Urban Fabric
Legend
Redevelopment areas
Proposed BKC Intensification
Proposed Hi-Speed Regional Rail Network
Proposed Local Roads
Existing Local Roads
Existing Suburban Stations
Proposed Hi-Speed Stations
Sub-Centralities
Local Centralities
Green Connector
Proposed Metro Line
Proposed Regional Roads
Proposed City Roads
Metro Stops
Existing Suburban Stations
Proposed Intercity Hi-Speed Stations
Existing Intercity Stations
Proposed Intercity Hi-Speed Station
2Km
1Km
0Km
N

existing situation

proposed situation
reference to practices

Lille, France
Office Towers near Station Areas

Strøget, Copenhagen
Pedestrian Friendly Streets
cross-section of part typology

mixed-use; increased public spaces; pedestrian friendly environment; high-income housing
sectional perspectives
mixed use business areas

housing and commercial development around station
impression of bkc CBD
Sensitive to Wetlands, Land Form and Rural Settlements

**Regional Strategy:** Metropolitan Centrality between Historic CBD and Pune

**Local Strategy:** Flexible Urban Grids and Transit Oriented Development

1 Character: Compact Mixed-Use Development with Sub-Centralities

2 Quality: Stilted on Wetlands; Eco-park; Preserved Landscape

3 Typology: High Density Station Development; Medium-Low Density Developments towards Marshlands;

4 Inner Courtyard Blocks; Traditional Villages

5 Transformation Sites: Green Field Sites; Reclaimed lands

6 Landscape: Figure-Ground green; Agricultural Fields; Marshlands; Nature Parks; Beach-Tourism
before intervention
after intervention

- Hi-Speed Regional Rail
- Regional Roads
- City Roads
- Local Roads
- Sub Centralities in Network
- Wetland Landscape-Water Channels

Legend:
- Marsh Lands
- Port Industries
- Existing Villages
- Proposed Low-Income Group Housing
- Proposed High-Income Group Housing
- Proposed Middle-Income Group Housing
- Mixed-Use (Office, Commercial, Retail)
- Proposed Hi-Speed Regional Rail Network
- Proposed Regional Roads
- Proposed City Roads
- Proposed Local Roads
- New Suburban Stations
- New Hi-Speed Stations
- Eco-Park
- Public Green
- Existing Suburban Station
- Proposed International Airport
- JNPT Dockyard
- Uran
- Koproli
- Karanja
- Agriculture Fields
- Elephanta Caves
- To Fort-Nariman Point
- Ecological Park
- Uran Beach
- Port Industries
- Urban Farming
- Urban Fishing
proposed intervention [compact mixed-use development]
- 500x500 m urban blocks
- 150x150 m housing blocks
- organized networks
- fsi: 4 to 6 near rail corridors and 1 to 1.5 near wetlands
Amsterdam Sloterdijk Station area development and program mixity
Sint-Niklass Station environment, Belgium
Pedestrian friendly streets
birds eye view of uran
Within 25 km of radius, Mumbai has 66% of water bodies and 212 km² of built area as compared to Jakarta (22% and 1438 km²) and Seoul (5% and 360 km²).

Mumbai, Jakarta and Seoul represented at the same scale

<table>
<thead>
<tr>
<th></th>
<th>Population (millions)</th>
<th>Built-up area (km²)</th>
<th>Density (p/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai municipality</td>
<td>9.83</td>
<td>252</td>
<td>389</td>
</tr>
<tr>
<td>Seoul</td>
<td>10.60</td>
<td>360</td>
<td>295</td>
</tr>
<tr>
<td>Jakarta Jabotabek region</td>
<td>14.91</td>
<td>2,942</td>
<td>51</td>
</tr>
</tbody>
</table>
- shifts growth activities towards regional corridors
- equalizes development opportunities (using public transport; stations etc.)
- integrates the five centralities in a single form of transit
- reshapes urban conditions to relieve development pressures of island city
- strengthens the regional connectivity and relationships
- organizes movement networks for functional hierarchy
- increases the economic competitiveness of centralities
- provides developable land for urban opportunities
new perspectives to merge the different-scales, reduce travel-time, increase efficiency, activates underdeveloped parts of Navi Mumbai.

Therefore, the proposal can be seen as an alternative solution to shift,

- Focus of planning to the development corridors,
- From linear-monocentric to ring-polycentric,
- From inequity to equity, travel for all.
- From disconnected to connected, ease of access
- From distant-time to reduced-time and importantly,
- From scale of the center-driven planning to scale of the region-driven planning
results

the ring
shifting trajectories

Thank You.
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