Transforming the Urban Space through Transit Oriented Development

The 3V Approach

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LAND USE AND TRANSPORT INTEGRATION: A HEALTHY CONVERSATION

Here is a land-use vision, conveying a sense of where population, jobs, and other key elements of urban structure will be in 20 years.

Thank you! Here is a sketch of a frequent transit network, including both rapid and local elements, which will serve that land use pattern.

Notice in our network these new opportunities, challenges, and needs.

This network creates certain opportunities for land use, and also has inefficiencies that you can eliminate by adjusting the land use. Here are some stations that need to be provided for.

The conversation gets updated continually in this way.

Thank you! Here’s an updated transit network plan, reflecting the changes you’ve made to the land use vision and also extending further into the future.

Also, a couple of years have passed, so here is an updated plan to take us 20 years into the future.

Thanks! Given that, here is a revised land-use plan that would take better advantage of your draft frequent transit network, perhaps by putting more density around the stops.

LAND DEVELOPMENT AND ACCESSIBILITY

Only 15% of new development in the access range of metro stations in 2015

<table>
<thead>
<tr>
<th>Scope</th>
<th>Scale of construction plots within the coverage (hectares)</th>
<th>Scale of construction plots outside the coverage (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2.61</td>
<td>148.87</td>
</tr>
<tr>
<td>Public infrastructure</td>
<td>25.29</td>
<td>4.37</td>
</tr>
<tr>
<td>Total</td>
<td>27.9</td>
<td>153.2</td>
</tr>
</tbody>
</table>

Guaranteed future congestion
Variation in Densities

Source: Serge Salat
THE SPIKY URBAN ECONOMY OF GLOBAL CITIES

- **London**
  - Peak 141,600 jobs/km²

- **New York**
  - Peak 151,600 jobs/km²

- **Hong Kong**
  - Peak 120,200 jobs/km²

London’s Jobs hierarchy exponent minus 1, (minus 0.7 for population like in systems of cities in economic geography); one third of jobs, 1.5 million jobs, in 16 km² in London

<table>
<thead>
<tr>
<th>Share</th>
<th>Pop</th>
<th>Area pop</th>
<th>Job</th>
<th>area jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>33%</td>
<td>2,724,646</td>
<td>145</td>
<td>1,500,160</td>
<td>16</td>
</tr>
<tr>
<td>33-66%</td>
<td>2,724,646</td>
<td>285</td>
<td>1,500,160</td>
<td>150</td>
</tr>
<tr>
<td>66-100%</td>
<td>2,724,646</td>
<td>1144</td>
<td>1,500,160</td>
<td>1408</td>
</tr>
</tbody>
</table>

*Source: Urban Morphology Institute.*
SUBWAY NETWORKS CONVERGE TOWARDS A CHARACTERISTIC STRUCTURE WITH A DENSE AND INTERCONNECTED CORE WITH BRANCHES

Degree centrality describes how connective a station is, that-is how many lines it connects (major interchanges have high degree centrality values)

Closeness centrality describes how close a station is from all the other stations in the network (closeness centrality is a measure of accessibility to a station within the network)

Betweenness centrality describes how many routes go through a given station (the more routes through the network pass through a station, the more “in between” this station is)

Source: QuantUrb, CASA
Hub, Interchange, Single station
Diversity of connectivity
Node Accessibility/Centrality
Intensity of node activity

Source: Urban Morphology Institute
The stations along Crossrail route where property prices have outperformed compared to the market are the ones located in Central London where both jobs and connectivity are highly concentrated © JLL
Applying the 3V Framework
3V FRAMEWORK

THERE IS NO ‘ONE SIZE FITS ALL SOLUTION: UNDERSTANDING WHERE, WHEN AND HOW ECONOMIC VALUE CAN BE CREATED REQUIRES A TYPOLOGY

THE 3V FRAMEWORK SERVES THE FOLLOWING PURPOSES

- Provides a quantified basis for understanding development opportunities around mass transit stations
- Facilitates interagency dialogue to identify misalignment and imbalances between connectivity, accessibility, place quality and market potential values and create an aspirational vision of future land use based TOD
- Achieves shared development vision with citizens, private developers, and other stakeholders
**Node Value**: importance of a station in the public transport network derived from its passenger traffic volume, inter-modality and centrality within a network. It is measured through a composite index.

**Place Value**: urban quality of a place and its attractiveness to residents in terms of amenities, schools and healthcare, type of urban development, local accessibility to daily needs by walking or biking, quality of the urban fabric around a station, size of blocks, network of streets and pattern of land use. It is measured through a composite index.

**Market Potential Value**: unrealized market value of station areas derived through the practice of real estate market analysis. Measured by a composited index considering major drivers of demand including current and future human densities, number of jobs accessible within 30 minutes of transit and major driver of supply (developable land, FAR, market vibrancy).
INCREASING THE THREE VALUES

- Increase number of hubs and number of lines/modes they connect to
- Interlink neighboring stations into clusters
- Increase accessibility within the network for all
- Increase compactness (proximity to existing urban activity and short travel time to main destinations)
- Increase diversity of uses
- Increase concentration of commercial, cultural and education amenities
- Design neighborhood that promote walking and biking
- Create a vibrant public realm

Address Imbalances

<table>
<thead>
<tr>
<th>Node Value</th>
<th>Place Value</th>
<th>Market Potential Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increase number of hubs and number of lines/modes they connect to</td>
<td>- Increase compactness (proximity to existing urban activity and short travel time to main destinations)</td>
<td>- Increase residential density</td>
</tr>
<tr>
<td>- Interlink neighboring stations into clusters</td>
<td>- Increase diversity of uses</td>
<td>- Increase job density</td>
</tr>
<tr>
<td>- Increase accessibility within the network for all</td>
<td>- Increase concentration of commercial, cultural and education amenities</td>
<td>- Increase human density</td>
</tr>
<tr>
<td></td>
<td>- Design neighborhood that promote walking and biking</td>
<td>- Increase diversity of land parcels to create a vibrant land market</td>
</tr>
<tr>
<td></td>
<td>- Create a vibrant public realm</td>
<td>- Increase social diversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Increase Floor Area Ratios</td>
</tr>
</tbody>
</table>

Source: The 3V Framework (World Bank)
Infill is mainly for dependent nodes in suburban neighborhoods with single transit lines and low value market. The strategy there is to:
- Promote long term planning
- Increase activity levels and transit service through increased densities
- Plan and fund multimodal transportation system
- Plan for maintaining equity in vulnerable or challenged communities

Intensification is for emerging station areas in urban neighborhoods with interchanges and emerging markets. The strategy there is to:
- Invest in catalytic TOD projects to prime and push the market
- Promote development oriented planning
- Evaluate and address missing multimodal connections and accessibility
- Prime areas for affordable housing

Transformation is the strategy to be applied in major hubs where creating a high level of place value through job concentration and good urban design with major investments in public spaces can create high peaks of land and real estate value.
- Invest in aggressive TOD projects to push the market
- Significantly higher densities and lower parking ratios
- Innovative building types and advancements in urban design & living, employment uses and destination
- Encourage some affordable or work force housing
- Foster increased transit service, capacity and amenities to support intensity of uses
Metro Group adopted phased strategy for TOD along Line #1, starting from stations in downtown and move on to the suburbs.

As of 2016, estimated profits from TOD will cover 15-20% of the total construction costs of Line #1 and #2.
Applying the 3V on a corridor: Zhengzhou Line 3
Densities are not uniform

Source: The 3V Framework (World Bank/Urban Morphology Institute)

Need to articulate densities around network
Source: Urban Morphology Institute/World Bank 3V Framework Application to Zhengzhou, China
Mix of land uses
Density of social infrastructure
Compactness
Physical form and street patterns
Walkability and bikability

Source: Urban Morphology Institute
• Economic attractiveness for developers (job densities/accessibility; People density)
• Land and real estate opportunities (FAR/unbuilt land)
• Market prices and activity
• Land shortage at city level

Source: World Bank; Serge Salat and Gerald Ollivier, 3V Framework (2016)
Residential density (inhab/km²)
0 - 1000
1000 - 2000
2000 - 3000
3000 - 4000
4000 - 5000
5000 - 7500
7500 - 10000
10000 - 15000
15000 - 20000
20000 - 30000
30000 - 50000
More than 50000

## Key messages

<table>
<thead>
<tr>
<th>Overview</th>
<th>Adopt TOD for more sustainable city development.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan scale</td>
<td>Maximize citywide accessibility to jobs through a hierarchically integrated transit system. Embrace nonuniform densities, concentrating jobs where accessibility is highest. Ensure local accessibility to health, education, and amenities.</td>
</tr>
<tr>
<td>Network scale</td>
<td>Align network centrality characteristics and intensity of land use.</td>
</tr>
<tr>
<td>Station scale</td>
<td>Create accessible, diverse, dense, mixed-use, vibrant communities based on station characteristics and good design.</td>
</tr>
<tr>
<td>3V³ Framework</td>
<td>Cluster stations based on node, place, and market potential value. Identify imbalances between values to stimulate interagency dialogue and understand opportunities.</td>
</tr>
<tr>
<td>Developing solutions</td>
<td>Understand the drivers of and interplay between values. Apply infill, intensification, and transformation strategies based on the 3V typology.</td>
</tr>
<tr>
<td>Station examples</td>
<td>Hammarby, Bo01, Marina Bay, Hudson Yards, King’s Cross</td>
</tr>
<tr>
<td>Corridor examples</td>
<td>Crossrail, Line 3 (Zhengzhou)</td>
</tr>
<tr>
<td>City examples</td>
<td>London, Zhengzhou</td>
</tr>
</tbody>
</table>

Transforming the Urban Space through **Transit-Oriented Development**

**The 3V Approach**

Serge Salat and Gerald Ollivier

Available at [http://hdl.handle.net/10986/26405](http://hdl.handle.net/10986/26405)
Next - the 3V: Methodology and Case Studies