Urban development in Mexico

Ideas to tackle auto-oriented urban expansion

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Auto-oriented sprawl in Mexico

The current model of housing production in Mexico is expansive and auto-oriented.

Mexican cities are becoming increasingly segregated.

Social housing developments in the municipality of Zumpango, north of the Mexico City Metro (SFR, 2016) 40% of housing in Zumpango was abandoned in 2010 (OECD, 2015)
The “Donut-Effect”  
(Comandon and Monkkonen, 2018)

Urban growth is concentrated in dense, disconnected pockets in peripheral areas.

The large majority of housing is produced by the private sector and financed through national housing mortgage institutions.

<table>
<thead>
<tr>
<th>Trends in 100 largest cities (1990-2010)</th>
<th>Jobs</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center (2km radius)</td>
<td>40%</td>
<td>-4%</td>
</tr>
<tr>
<td>Changes in high density peri-urban areas (25% sectors furthest from the center)</td>
<td>36%</td>
<td>41%</td>
</tr>
</tbody>
</table>
Land use, urban form, and travel

Urban form in Mexican cities impacts **automobile ownership and use** more than income (Guerra et al. 2018)

Moving to a social housing complex greatly increases your probability of owning an using a car. (Guerra 2015)
National housing policies

INFONAVIT and FOVISSSTE, the largest housing lenders, only lend to formal workers.

Spatial mismatch between construction of social housing and formal jobs
Impacts

National-level housing policies are largely to blame.

- Housing abandonment in critical levels
- High-levels of violence
- Overall, low quality of life and accessibility
- Moving into these developments is associated with social isolation and stress
- Low mortgage repayment rates

Cities with more mortgage lending have significantly higher vacancy rates (Monkkonen, 2018)
National housing policies

Currently, subsidized mortgages are granted based on predefined perimeters. (CONAVI, 2018)

They consider linear proximity to some basic services is considered, not considering transport

The new national government has reduced these subsidies and has yet to announce a formal policy goal.
Can an accessibility framework help guide a more sustainable development pattern?

Accessibility: The ability to reach destinations

“the potential for interaction” (Hansen, 1959)

Adapted from Rode et al. (2019)
Cumulative opportunity indicators:

Number of things you can reach in a given time threshold, under specific conditions

“Rings of opportunity” (Levinson, 2017)
Why measure access?

Integrate traditionally separate policy areas

Why accessibility measurement is not merely an option, but an absolute necessity (Martens, 2016)

Adapted from Rode et al. (2019)

Environmental sustainability
How to translate accessibility into policy?

Some cities are setting accessibility goals.

What about cities in the Global South?
Can we embed accessibility criteria in national housing policies?

Minimum access levels (ITDP Brasil, 2017):

- Kindergarten 10-15 minutes walking
- Primary school 15-20 minutes walking
- Health center 2.4 km
- Public transport connectivity

Can accessibility metrics be used in national housing policy criteria?
Tools for policy makers

Accessibility is increasingly easy to measure in cities in developing countries

Open data and open-source software:

- **Transit system data**: GTFS
- **Street network data**: OpenStreetMap
- **Traffic data**: Waze CCP
- **Spatial data**: Open, high-resolution global population maps (Worldpop)
- **Open-source software**: OpenTripPlanner, URMO (DLR)
- **Software add-ons**: Network Analyst (ArcMap), Urban Network Analytics Toolbox (Rhino)

https://josm.openstreetmap.de/
Tools to measure accessibility

ITDP Mexico

Open-source accessibility calculator

Data:
- OSM
- GTFS
- Location data

Software tools:
- OpenTripPlanner
- Python app

Jobs reachable walking 30 minutes: 248,592
Tools for policy makers

Evaluating equity of transport investments:

Did new BRT corridors increase or decrease access to lower-income people in Rio?

Infrastructure investments related to the 2014 World Cup and the 2016 Olympic Games, combined with cuts in service levels could have reduced average accessibility levels in Rio.

Spatial clusters showing the local association between average household income per capita and gains in access to formal job opportunities by public transport between 2014 and 2017. Rio de Janeiro. Pereira (2018)
Tools for policy makers

Communicate impacts in transport policy to the public

Visualizing changes in service.

Busconnect, Irish National Transport Agency (2018)

https://busconnects.ie/initiatives/dublin-area-bus-network-redesign/
Tools for policy makers

Accessibility mapping as a tool to facilitate public participation in transit projects

CoAXs (MIT DUSP, 2017)
Challenges

Data availability:

- GTFS is still lacking in many cities
- Quality of OSM is uncertain
- Data sources need to be parsed with official sources and audited by authorities to be useful in policy

Technical capabilities of governments

Comparison OSM vs Official Data
Resources

Open GTFS source editors
GTFS Manager, WRI India
https://github.com/WRI-Cities/static-GTFS-manager

Paid services
Trillium
Paid subscription with technical support for GTFS feeds
https://trilliumtransit.com/

NGOs
Caravan Studios

Specialized tools
Conveyal
Final thoughts

Back to Mexico:

Can accessibility framework to housing could help guide a more integrated vision between:

- **Social housing** finance
- **Land use and urban form** through local-level policies and plans
- **Mobility policies** at various levels
- **Public participation**
- Other environmental and social policies
References


