Master Thesis

Urban aspects and characteristics that support rail-bounded infrastructure projects in Latin American emerging cities

A selected group of medium size emerging cities in the Latin American region has been analized through their urban aspects, economics characteristics and current situation regarding mobility and transportation.

In a first stage of analysis a part of these cities are discarded as non-suitable for rail-bounded infrastructure in the short term.

In the second stage a ranking for the remaining cities is set, carried out through the application of a mathematical methodology summarized in the next equation:

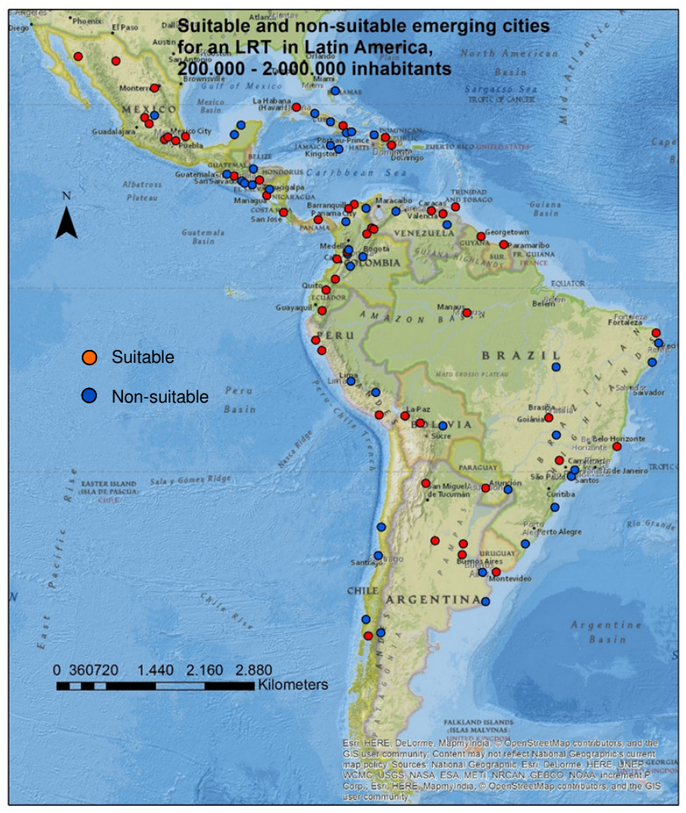
$$DS = T * RI * PTO * UL * \frac{\Delta GDP * (GDP - \%FD * GDP) * \Delta GDP}{G}$$

In the third and final stage, land suitability analysis is used to define the more suitable locations inside the urban areas fo some key cases, with attention to the potential coridors for a future LRT. This analysis consist in a multicriteria weighted overlay carried out on ArcMap, and prioritizing areas with a suitable density and mixed land use to guarantee enough ridership and a constant trip demand.

As a global result, 43 emerging cities are suitable to support, operate and maintain a LRT, all of them under specific circumstances regarding investment, design and operation.

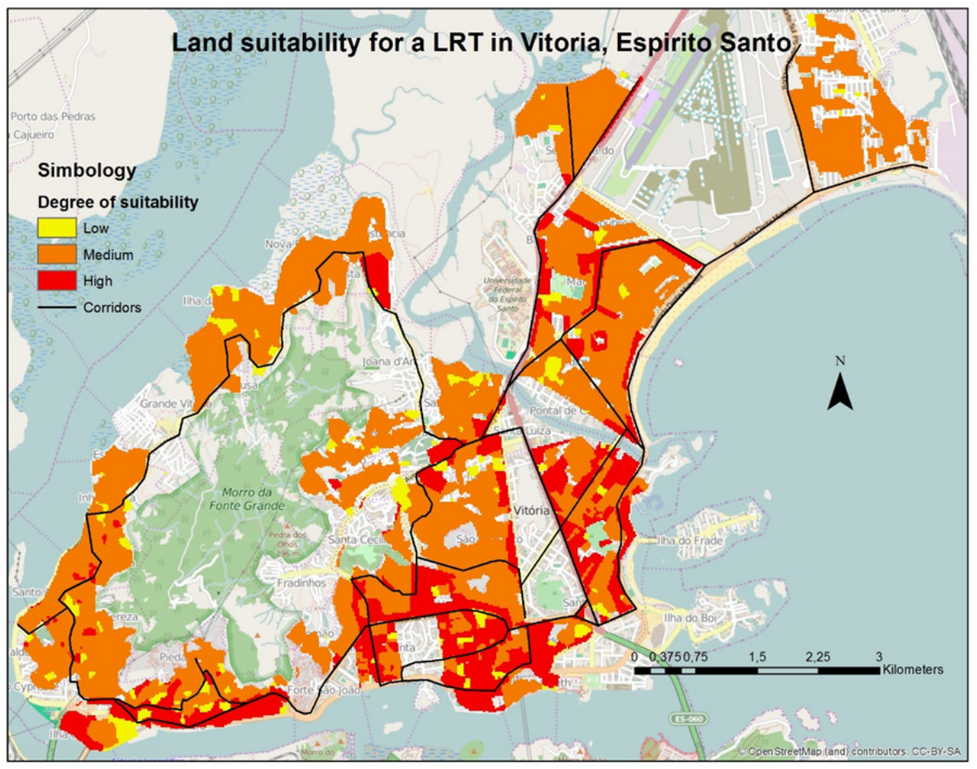
Foto: Carlos Delgado

First stage: Discarding non-suitable cities by:
- Urban Density
- Economic structure
- Need for PuT improvement



Second stage: Evaluating Degree of suitability for chosen emerging cities according to:
- Topography
- State of rail-bounded infrastructure
- PuT current offer
- Urban layout paterns
- Gross Domestic Product per capita
- Fiscal Deficit
- Gini coefficient

Third stage:
Land suitability analysis for key cases of emerging cities



Ranking for Latin American emerging cities suitable to support a Steel-Wheeled LRT

Rating	Country	City	RANKING
1	Uruguay	Montevideo	216.915
2	Brazil	Vitoria (ES)	179.835
3	Argentina	Córdoba	178.288
4	Argentina	Rosario	159.573
5	Venezuela	Great Maracay	157.698
6	Panama	Panama City	144.517
7	Trinidad & Tobago	Port of Spain	130.397
8	Mexico	Saltillo	114.833
9	Venezuela	Maturin	112.524
10	Colombia	Cartagena	106.407
11	Venezuela	Barcelona	93.868
12	Costa Rica	San Jose	91.365
13	Brazil	Manaus	85.601
14	Argentina	Paraná	82.311
15	Mexico	Chihuahua	70.952
16	Mexico	Puebla	67.564
17	Brazil	São Carlos	63.806
18	Peru	Arequipa	61.533
19	Mexico	Hermosillo	60.113
20	Colombia	Cucuta	56.950
21	Brazil	Goiania	54.038
22	Mexico	León de Aldama	52.293

Ranking for Latin American emerging cities suitable to support a Steel-Wheeled LRT

Rating	Country	City	RANKING
23	Dominican Republic	Santiago	50.618
27	Colombia	Barranquilla	44.167
28	Chile	Puerto Montt	41.050
29	Colombia	Bucaramanga	37.246
30	Peru	Chiclayo	36.086
31	Paraguay	Asunción	34.702
32	Mexico	Naucalpan	34.372
33	Mexico	Xalapa	27.421
34	Guatemala	Guatemala City	21.992
35	El Salvador	San Salvador	17.278
36	Nicaragua	Managua	12.108
37	Bolivia	El Alto	11.037
38	Bolivia	Cochabamba	5.465

Ranking for Latin American emerging cities suitable to support a Rubber-tired LRT

Rating	Country	City	RANKING
1	**Ecuador**	**Quito**	32.724
2	Colombia	Pereira	29.304
3	Colombia	Pasto	26.636
4	Honduras	Tegucigalpa	13.485
5	Bolivia	La Paz	11.494

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