

ERAdiate

Enhancing Research and innovAtion dimensions of the University of Zilina in intelligent transport systems

Travel Time, Resource Reachability and Quality of Living in Urban Contexts: a case study from Slovakia

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Time Use in Smart Cities

- "Smarter use of time"
 - Highly subjective: no "one fits all" solution
- Affects overall Quality of Living
- Measurement Indicators
 - Context of analysis: urban mobility (i.e. travel time)







Smart City Transformation

- Achieving Smarter Use of Time
- Is it just a personal matter?
- Designing smart city and its services to facilitate time use





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Personal Experience: Helsinki, Brussels and Žilina



Opportunities (to max) vs Inconveniences (to min)

- Resources embedded in the urban context: people, goods, activities, infrastructure, services
- Reachability / Accessibility of such resources



Travel Time & Urban Livability

Several Quality of Living Indicators

- OECD "Better Life Index"
- ISO 37101 ad 37120
- Eurostat Quality of Life Scoreboard
- The Economist "Global Liveability Report"
- Numbeo user contributed data on cities

But travel time dimension not always acknowledged...



OECD Better Life Index



Transport is not among indicators, but it features work-life balance





ISO 37101 and 37120

WORLD COUNCIL ON CITY DATA



Transport is an indicator, but focus is on "how much people travel" and 'how people move rather than on accessibility and travel time indicators



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Numbeo



Based on user surveys

Traffic > Comparison > Czech Republic vs Belgium > Prague vs Brussels

Traffic Comparison Between Prague and Brussels

🖆 Like 🎔 Twee	t.	G+1	
Index 🕕	Prague	Brussels	
Traffic Index:	115.89	125.48	
Time Index (in minutes):	35.89	33.71	
Time Exp. Index:	695.35	392.79	
Inefficiency Index:	88.71	107.60	
CO ₂ Emission Index:	1,954.40	3,791.81	

Travel time

Improve data for Prague

Improve data for Brussels

Main Means of Transportation

	Prague	Brussels
Working from Home	8.57%	6.06%
Walking	14.29%	18.18%
Car	18.57%	33.33%
Bike	1.43%	6.06%
Motorbike	0.00%	0.00%
Bus/Trolleybus	14.29%	18.18%
Tram/Streetcar	5.71%	6.06%
Train/Metro	37.14%	12.12%

Average when primary using Walking





of the University of Zilina in intelligent transpor systems

acknowledged

Case Study: Mobility in Žilina

- Mid-Sized city (4th in Slovakia, ~84.000 inhabitants)
- Average monthly income: ~ 800 EUR gross
- Transport and Mobility (~35% of income)
 - Largely associated to car use (~46% of modal split)
 - Large pedestrian area encourages walking (m.s. 24%)
 - Well developed public transport (m.s. 22%)
 - Under-developed cycling infrastructure (m.s. 8%)



Assessing Resource Reachability via Isochrones

How reachable are locations (i.e. resources) in Žilina?

Isochrone map generation (*iso4app.net* online tool)

- 30-min timeframe
- City hospital (close to city centre and to transport hubs) as central point
- Limited to single bus line crossing the city (19 stops including hospital)
- Mobility combinations:
 - mono-mode: car, cycling, walking (at normal or reduced speed)
 - multi-mode: bus + walking (at normal speed)



Results



Size of areas reachable within 30 minutes by different transport modes

Reachability by "walking + bus" mode does not significantly extend "walking" mode

Cycling area large, but under-used







Reachability by pedestrian mode



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Mobility and Quality of Living in Žilina: Recommendations

- Added value of public transport in Žilina is not about "time savings" (comparable to walking time), but rather in convenience and comfort. Public transport company should further develop services in this direction.
- Opportunities in Žilina should be maximized by investing in bike infrastructure (seen the size of the area reachable by bike, the only competitor to the car)
- Considered the cost impact of car maintenance and the relatively low average income, switching to the bike use would increase economic opportunities (e.g. goods, services)





- Isochrones as useful tools for describing resource reachability from a travel time perspective. Potential for contributing to "Quality of Living" indicators to be further investigated.
- Subjective assessment of "smart use of time" would require combining the "quantitative" input provided by isochrone maps with the "qualitative" input by citizens (e.g. via surveys, similar to Numbeo approach)
- Results of the study limited to the context of Žilina. Next step would be to compare resource reachability in big, midsized and small cities by employing the same methodology.







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Thank You for Your Attention!



Time for Questions

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