

SUSTAINABLE DEVELOPMENT ON COMMUTING: EXPERIMENTAL MODELLING TO ENRICH OFFICIAL STATISTICS

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INTRODUCTION

This poster presents new developments in statistical commuting research from the sustainable development perspective. It is targeting the challenging travel time estimation.

Data integration is based on many data sources, partly big data, in order to enrich official statistics of Finland. These include public transport data from web service platforms, traffic sensor data and a road and street database by the Finnish Transport Agency (FTA).

The commuting time and distance can be calculated as a point-to-point estimate from almost every employee's home to a corresponding workplace. The new micro level database includes the following variables to be merged with other demographic data: Commuting distance and time by private vehicle, Cycling distance and time, Public transport commuting distance and time (in the whole country), Helsinki Region Public Transport commuting distance and time and Corrected commuting time for trips to and from the central Helsinki area (Piela, P. 2017).

One application of the use of new variables is presented here: an experimental model for sustainable commuting with its results. These kinds of commuting statistics form a base for other accessibility statistics to be developed further.

Keywords: network analysis, accessibility, sustainable development, big data.

OBJECT

As a case example of applying the commuting time and distance database one experimental common commuting model is presented here in short. It takes into account the sustainable development perspective by promoting walking, bicycling and public transport. It is not based on any other existing research than this study and, as such, remains experimental.

METHODOLOGY

All the models except the public transport routing apply the national route network database Digiroad.fi. However, the speed estimation for using a private car follows a rather complex estimation structure involving even traffic sensor data (Piela, P. & Pasila A. 2017).

Cycle commuting is modelled more straightforwardly in a simplified manner. This model assumes 17 kilometres per hour in any route where cycling is allowed (similar to e.g. HSL 2016).

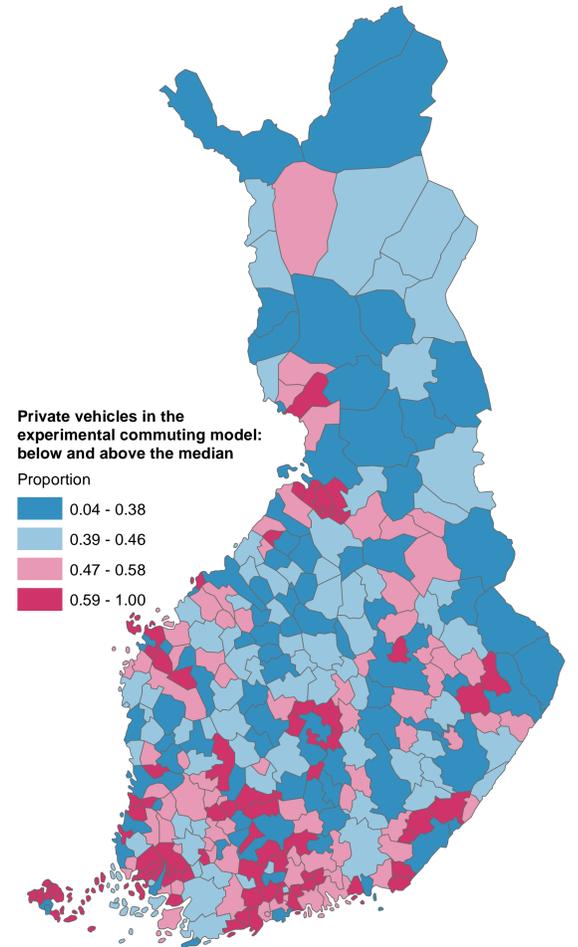
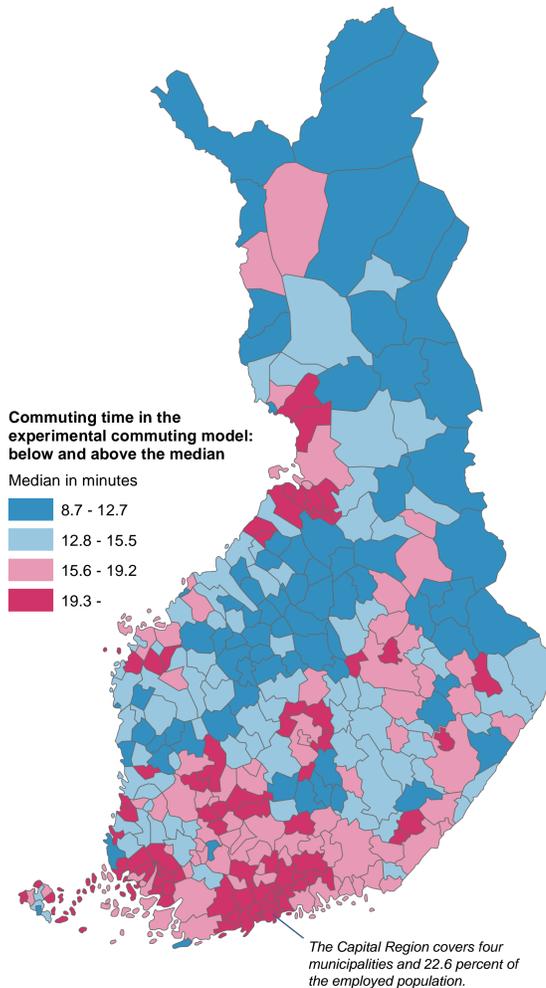
The estimation of public transport accessibility is implemented by utilising two open application programming interfaces (API): the Journey Planner of the Helsinki Regional Transport Authority (HSL) and the corresponding country-wide Journey.fi by FTA.

Here, every employed whose commuting distance is less than 1,000 meters is expected to walk to the workplace (70 meters per minute similar to HSL 2016).

The appropriate maximum cycling time to a work place is given as 30 minutes. For the given cycling speed this means bicycle commuting for those having commuting distance between 1,000 meters and 8,500 meters.

Other commuters will use the public transport option if it takes less than the drive time to work plus 30 minutes, and given that it is available. All the rest are expected to drive to their workplaces.

RESULTS



Method	Median	Q1	Q3	Proportion
Altogether	17.6	10.2	27.5	1.000
Walking	1.4	0.0	8.9	0.110
Cycling	13.3	8.1	24.5	0.427
Public tr.	41.0	35.0	46.0	0.093
Private car	22.8	16.7	34.3	0.368

The result table shows the basic commuting time statistics from this model. The commuting time by municipalities is visualised in the figure above. The median time is 17.6 minutes. It is about six minutes higher than in the model where everyone are using a private car.

In this model, 36.8 percent use private cars. The corresponding proportion by municipalities is visualised in the next figure.

However, there is considerable missingness in the public transport data. The coverage of Journey.fi is expected to become better in the future. This might affect to the proportions.

Without the cycling option the proportion of public transport users would be 33.0 percent. Also the selection limit of public transport is a sensitive variable.

BICYCLE COMMUTING STATISTICS IN YOUTUBE

This research contributed *VeloFinland and Walk This Way 2017* seminar by a YouTube video on bicycle commuting. It can be found by a keyword "Tilastokeskus". It is in Finnish but with English subtitles.

Cycle commuting time median in Finland is 27 minutes. In other words: *half of the population can cycle to their workplace within half an hour:*

<https://www.youtube.com/channel/UC7i21PII1N0yedcqFDpwdA>



CONCLUSION

Indeed, this model gives plenty of possibilities for further research. Especially limits of the use of public transport or walking or cycling compared to driving could even be taken into account locally.

Figures here show differences by municipalities for simplicity. More relevant, an underlying factor, is the area type. The detailed urban-rural classification plays a key role in analyzing the commuting time and distance (Piela, P. & Pasila, A. 2017).

Generally, this poster gives an example of implementing the new commuting statistics database. But the main target is to motivate comments for developing better commuting modelling by plausible transport models.

REFERENCES

- Piela, P. & Pasila, A. (2017). *Statistics on commuting: merging big data and official statistics*, Statistics Finland.
- Piela, P. (2017). Sustainable development on commuting: merging new data to enrich official statistics, *Proceedings of ISI2017*, Marrakech.
- HSL (2016). *Journey Planner*, Helsinki Region Transport Authority, available at: <https://www.hsl.fi/en>
- FTA (2016). *Journey.fi*, Finnish Transport Authority, available at: <https://opas.matka.fi/>



Administrative secretary Anne Myllynen is arriving to Statistics Finland's city bike station. Anne uses a bicycle and train for commuting. She has used a city bike numerous times to cycle through the city centre from the railway station to Statistics Finland.