TEACHING MATERIAL GUIDANCE

1. Title of the material

Bike sharing use in conjunction to public transport: Exploring spatiotemporal, age and gender dimensions in Oslo, Norway

https://www.sciencedirect.com/science/article/abs/pii/S0965856420306285

2. Which section of the SUMP it is relevant to?

The article presents important data on the limitations, possibilities and potential of introducing bike sharing in the city depending on the age and gender structure of potential users, geography or the location of docking stations. Thanks to this, bike sharing can be designed in a better way so that it enjoys greater interest and constitutes an important element of urban mobility. Useful for 7.1-7.3 in SUMP.

3. Problem approached and content overview

The article presents the results of two-year research on the use of bike sharing in Oslo, taking into account social, urban and geographical conditions. The research was preceded by extensive studies of the literature on the subject, which is of additional value.

The data was analyzed using ArcGIS Pro software and then modeled using mathematical models.

As a result, the following results were obtained:

- bike sharing use is highest in the most central parts of the bike sharing network and lower towards the network's fringes that are located outside the city centre, but still within the larger Oslo centre circumnavigated by the Oslo motorway ring;
- bike sharing frequencies seem to be larger on radial routes into and out of the city centre (mainly north–south oriented) than on routes across or around the city centre (mainly east–west oriented);
- bike sharing frequencies seem larger on routes perpendicular to and away from metro/rail infrastructure than on routes parallel to these main public transport infrastructures;
- routes of shorter distance are more frequently used than longer distance routes, but the distance decay appears more linear than expected after revealing a higher parameter estimate and model fit compared to sensitivity analyses with transformed logarithmic, squared and square-rooted distance functions;
- topography is another important factor. Routes with a lower absolute elevation difference between start and end location have higher frequencies than hillier routes;
- urban density and diversity have strong positive effects on bike sharing frequencies;

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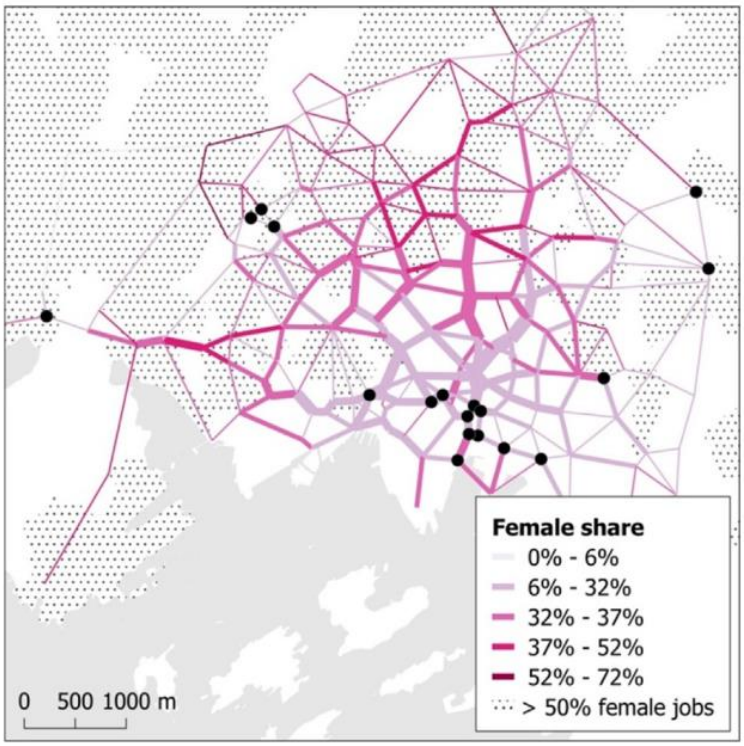
- while 58% of users are male, the share of trips by men are even higher (68%). Especially downtown areas are highly male dominated, with almost all route segments here having less than 32% female cyclists;



- uphill bike sharing routes are slightly more used by women than by men, however an additional square-transformed elevation effect shows that it is male shares that are higher on routes with the elevation gains or losses;
- restrictions on rental duration and the inflexibility of not being able to park outside designated docks, effectively prevent use outside the confined areas;
- users are often young (mean age: 30), especially on routes in university areas and away from downtown employment centres. Access-egress bike sharing routes are used more by younger people and less by middle-aged groups;

4. Who could be interested in this material?

The knowledge provided by this study has particular significance for public and private actors who want to strategically use bike sharing to achieve greater goals, rather than simply ticking the box of having a (growing) bike sharing system. To advance the performance, multimodal integration, and inclusiveness of bike sharing, policy makers, public transport authorities and bike sharing providers are advised to consider improvements targeting multimodal integration, dock expansion, rental limitations, and e-bikes.

5. What is worth mentioning as an innovative factor for the reader?

It is innovative to combine the graphic presentation of the collected data with mathematical modeling and only then to draw conclusions from it. The conclusions from the research can be very useful for a better design of the bike sharing system.

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6. Limitations

The results concern only one city from a country with a high level of environmental awareness, which may have an impact on higher than average interest in ecological and healthy means of transport.

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