Aggregate four-step models and disaggregate agent-based models, but what is in between?

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- Shared mobility services are penetrating the European cities

- Introduction of such services in cities calls for proper evaluation of them, to avoid inefficiency & ineffectiveness

- Modelling of shared mobility requires agent based approaches (based on existing pertinent literature)

- However, many cities, especially small & medium sized cities, continue to use the traditional strategic 4-step modelling approach

- Need for an intermediate modelling approach, which can be integrated to the existing models of the cities

Aggregate four-step models and disaggregate agent-based models, but what is in between?
Intermediate modelling approach – This is what is in between!

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Narayanan et al. (2021)
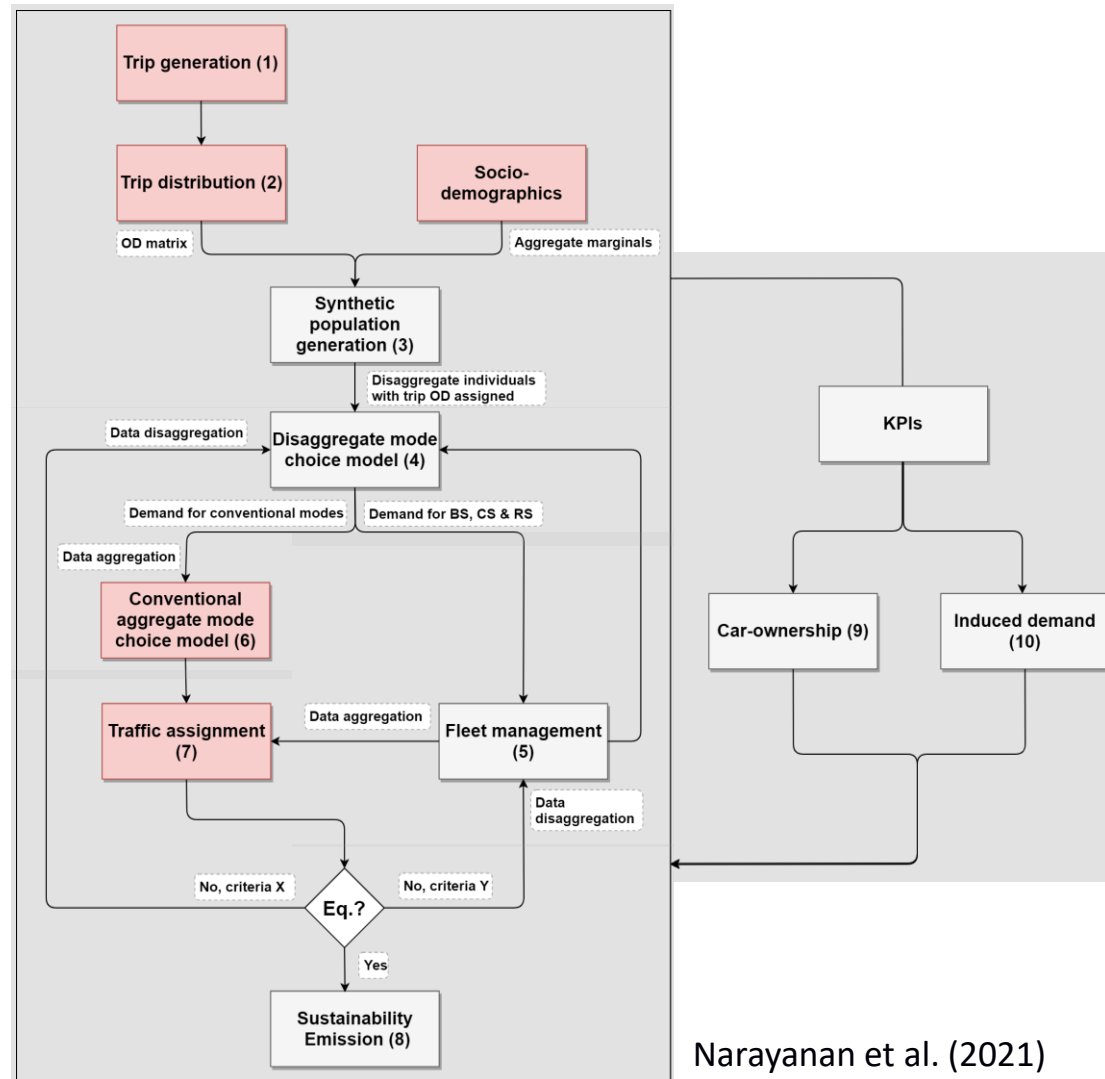
BS: Bike-Sharing

CS: Car-Sharing

RS: Ride-Sharing

Red colour shaded boxes indicate the existing components in the traditional four-step transport modelling approach

M O M E N T U M

Step	Type
3. Synthetic population generation	Iterative proportional updating algorithm and data-driven sampling and statistical matching procedure for enrichment
4. Disaggregate mode choice model	Multinomial logit model based on smoted household survey data
5. Fleet management	Optimization methods, machine learning tools and service simulator (Aimsun Ride)
8. Emission calculation	Simplified COPERT model based on EMEP
9. Car-ownership	Multinomial logit model
10. Induced demand estimation	Nested logit model
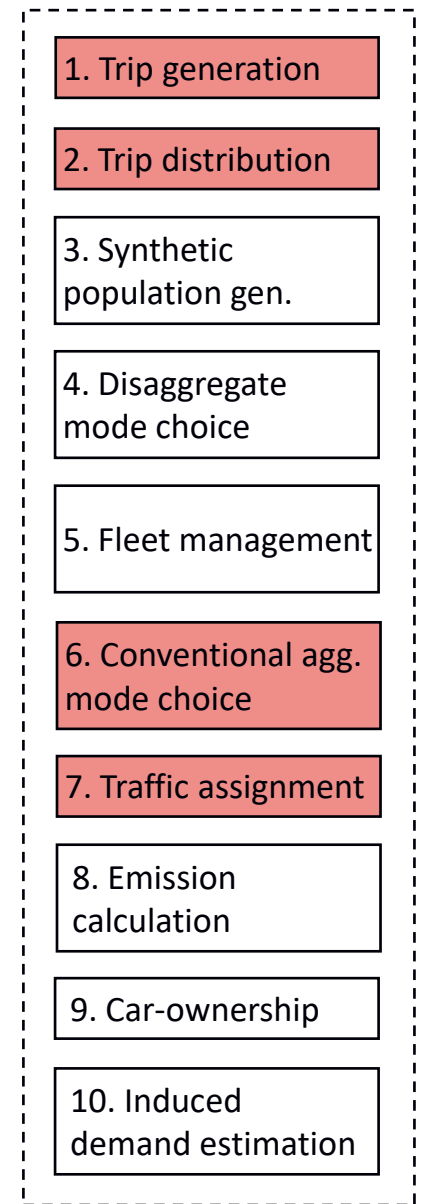
COPERT - COmputer Programme to estimate Emissions from Road Transport
EMEP - European Monitoring and Evaluation Programme for air pollutants

1. Trip generation

2. Trip distribution

3. Synthetic population gen.

4. Disaggregate mode choice

5. Fleet management

6. Conventional agg. mode choice

7. Traffic assignment

8. Emission calculation

9. Car-ownership

10. Induced demand estimation

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- An intermediate modelling approach between the traditional strategic and the agent and activity based approaches, by adopting the disaggregate modelling principle from agent and activity based approach

- Cities can integrate our new models into their existing simulation system, without the need to build something from scratch or buy a new software

- Individual model codes are available in a GitHub repository

- More models than what is presented now

Thank you for your attention!

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MOMENTUM GitHub public repository