

Investigation of System Boundaries of a Tradable Credit Scheme

Master's Thesis of Alexandra Lang

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Revolutionizing the transport sector could address a multitude of current problems: the climate, equity in transport, and space within cities. Figure 1 shows the space allocation and emissions for different modes of travel, which indicates a big potential. One possible way to revolutionize transportation sustainably is a Tradable Credit System (TCS), which envisions that mobility must be paid for through a new, separated, currency. This master thesis has the goal to find a boundary for the TCS system proposed by Bogenberger et al. (2021), which is shown in Figure 2.

Since the literature in the field currently does not provide any recommendations or background for this topic, this thesis worked with information from other research areas: a survey, car dependency, and accessibility. Accessibility had the greatest influence on the results, but was impacted by the survey in its approach.

The paper concludes with a utility value analysis comparing different options for a boundary: No boundary, the Munich Metropolitan Region, the extent of the public transport of Munich, Munich City, and a neighborhood in Munich. The utility value analysis can be seen at the bottom of the poster. Through the values and the weights, a score is calculated for each considered boundary. The boundary with the highest score is then proposed as the boundary for this use case.

Important for this analysis was the input through the accessibility approach, since this gave valuable insight into the access to different travel options. Another valuable source was the MiD survey from 2017 (Belz et al., 2020).

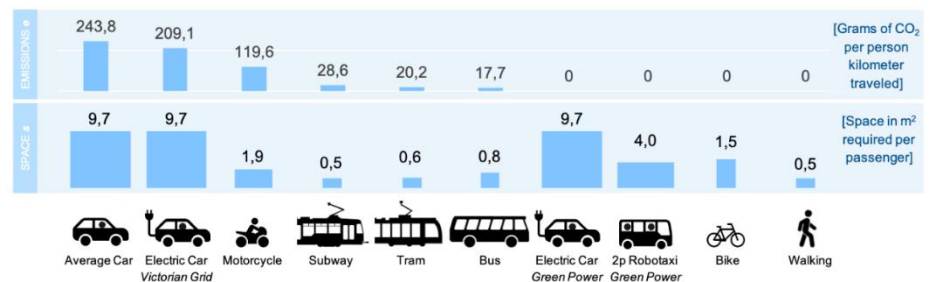


Figure 1: Space allocation and emissions of different modes of travel (Bogenberger et al., 2021)

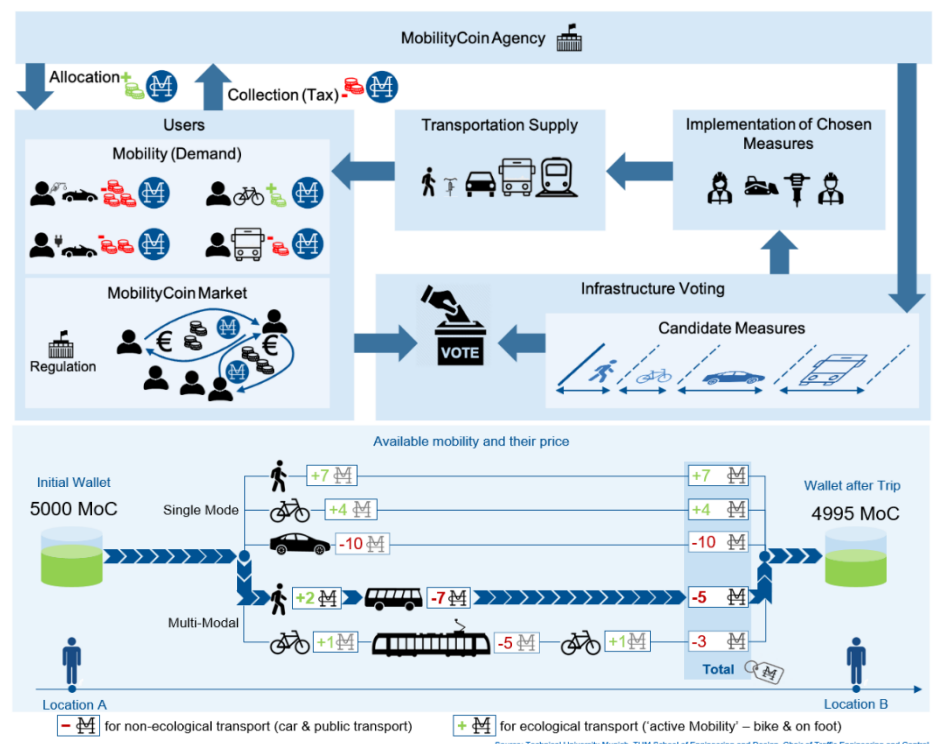


Figure 2: MobilityCoin by Bogenberger et al. (2021)

	Access to ...		Car unfriendliness	Full Trips	Time Deviation	Juris-dictions	Score
	PT	Cycling					
Weight [%]	27%	16%	10%	20%	22%	5%	100%
No boundary	4	4	1	10	2	0	4.26
Munich Metropolitan Region	6	4	3	9	3	3	5.17
MVV Network	7	6	3	7	5	5	5.9
Munich City	9	5	6	6	7	9	7.02
Neighborhood	8	7	4	2	8	7	6.19

Utility Value Analysis used for determining the boundary of the MobilityCoin for the city of Munich

Sources:
BOGENBERGER, KLAUS; PHILIPP BLUM; FLORIAN DANDL; LISA-SOPHIE HAMM; ALLISTER LODER; PATRICK MALCOLM; MARTIN MARGREITER; NATALIE SAUTTER (2021). "MobilityCoins – A new currency for the multimodal urban transportation system".
BELZ, JANINA; THORSTEN BRAND; JOHANNES EGGS; BERND ERMES; ROBERT FOLLMER; DANA GRUSCHWITZ; JETTE KELLERHOFF; TIM PIRSIG; MARTIN ROGGENDORF (2020). "Mobilität in Deutschland - Regionalbericht Stadt München, Münchner Umland und MVV-Verbundesraum".

Through this analysis, it emerges that for the study area of Munich, within the scope of this thesis, the most suitable boundary is the Munich city boundary. For further research, the transition into the system should be investigated further, and car dependency should be pursued further to validate the boundary through a second perspective.