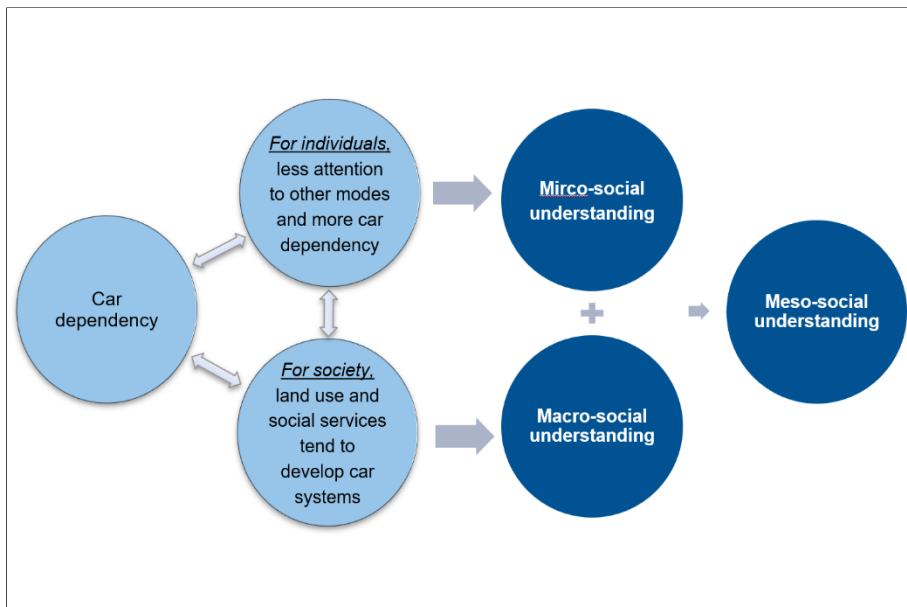


# Quantification of car dependency in Munich

## Master's Thesis of Yu Feng

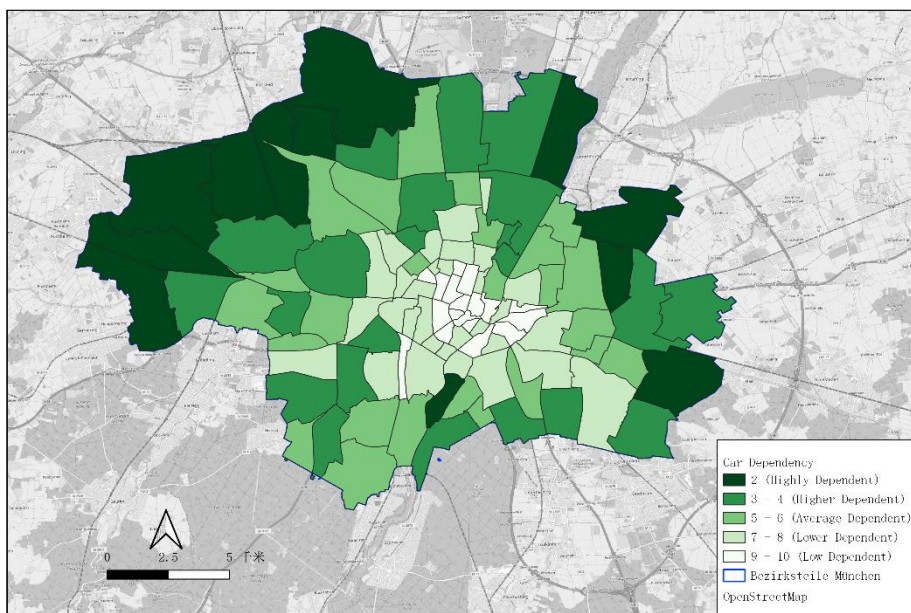
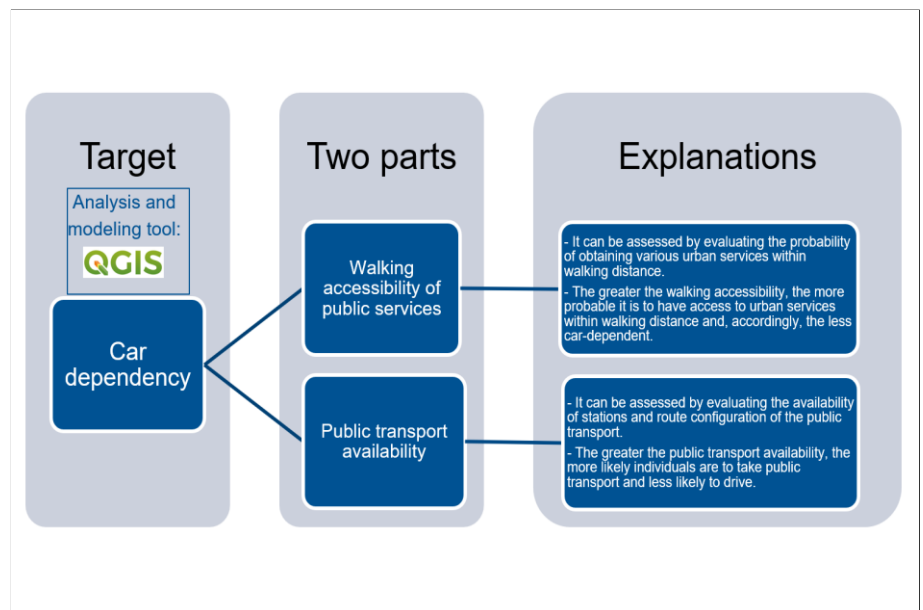
### Mentoring:

Dipl.-Ing. Philipp Blum  
Dr. ETH Allister Loder



Due to the rapid expansion of motor traffic, various adverse effects caused by it are manifested in traffic congestion, traffic accidents, air pollution, greenhouse effect and unequal distribution of social resources. Therefore, scholars of transportation planning are putting forward a new idea, namely, the MobilityCoin System. It is necessary to quantify the degree of car dependency in a city in order to enable the MobilityCoin system to be implemented in different neighbourhoods of the city according to local conditions. Through a comparison of different literatures, it is found that there are two levels of understanding on the concept of car dependency: at the micro level, individual dependency on cars is dominant; At the macro level, land use and social service planning favors the development of car-led transportation systems. After analyzing the literature, the theoretical system including micro, macro, and meso-social understandings was selected as the guiding ideology.

After selecting the guidance method, a quantitative analysis of the car dependency in Munich can be carried out by using the geographic information processing software QGIS. In this thesis, car dependency could be evaluated as two parts. First, for walking accessibility of public services, it is calculated by making an assessment of the possibility of getting different urban services within walking distance. It represents the development of car dependency on a micro level. The higher the walking accessibility, the more likely it is that people will be within walking distance of public service addresses, and the lower the car dependency. For public transport availability, it is calculated by the coverage rate of public transport stations within the block and the number of public transport routes with stops within the block. It represents the development of car dependency on a macro level. The higher the degree of public transport availability, the lower people's willingness to use cars to travel. Finally, the two parts are spatially coupled to obtain the heat map of car dependency in Munich.



Through the analysis of the heat map of car dependency in Munich, the following information can be obtained: First, the city centre of Munich shows a much lower degree of car dependency than the suburban areas. Secondly, in the north of Munich, residents are generally more likely to travel by car than in the south. As a result, it can be concluded that there is a very vital relationship between car dependency and social service resources and transportation planning in urban areas. The reasons for this phenomenon often lie in: because the city centre already has the capacity of many industries to develop commercially, which tends to attract more investment resources and social welfare, public transportation planning and urban service outlets are more concentrated here; Underappreciated suburban areas lack the necessary social resources and have to rely on cars to travel long distances to maintain social connections. For city decision-makers, the most important issue is to narrow the huge gap between the city centre and the suburban areas.