Transportation policy evaluation using a land use transportation

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We are working on the evaluation of urban and transportation policies using land use and transportation microsimulation technology. In many small or mid-sized cities, the increasing use of automobiles, the suburbanization of cities, and the declining population are making it difficult to maintain public transportation services. On the other hand, the aging of the population increases the need for public transportation services, but it is difficult to supply such services when the demand is spatially dispersed. In this study, we used a simulation model to analyze the effects of the restructuring of the public transportation network that Takamatsu City is currently undertaking, assuming population changes until 2050. We also analyzed a scenario in which the city becomes more compact. This research is being conducted in collaboration with Professor Rolf Moeckel of the Technical University of Munich.

Figure 1 shows the current population distribution and the projected results for 2050, showing that the population density in the city center is decreasing, while the number of suburban areas with low density is increasing. This is based on the assumption that the current residential and commercial areas will continue to be suburbanized.

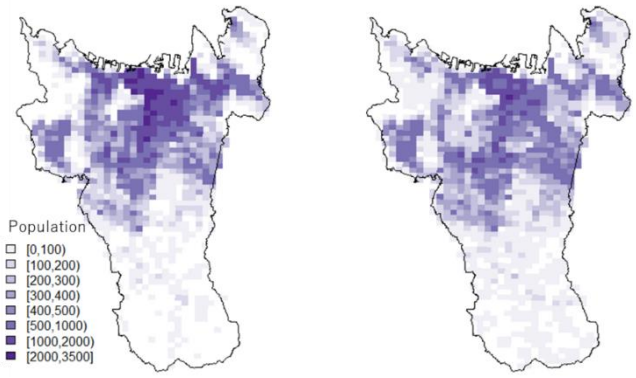

Fig. 1 Spatial distribution of population
(left: current, right: estimation for 2050)

Figure 2 shows the change in the number of passengers when the public transportation network is restructured in 2050, for the case where land use becomes suburban and the case where land use becomes compact. The number of passengers is expected to increase on the new loop bus routes, while it is expected to decrease on the suburban routes. On the other hand, in the compact case, the population is assumed to be concentrated around the suburban centers, and the number of passengers is estimated to increase on some of the suburban routes.

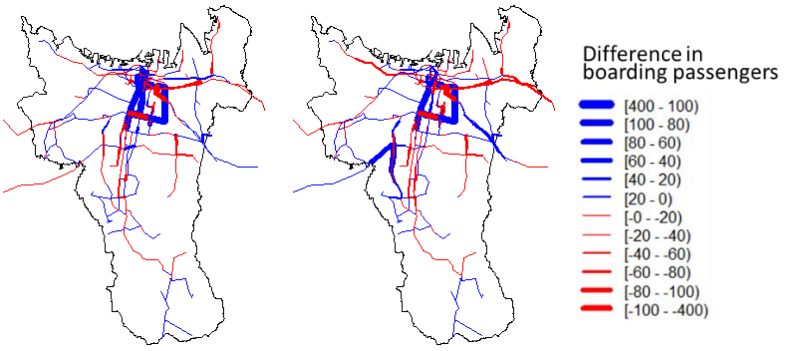

Fig. 2 Ridership change for public transport in 2050
(left: suburbanization, right: compaction)

The average ridership including rail and bus is estimated to be 13.2 in 2010, but without route realignment, it is estimated to be 7.0 in the suburbanization case and 6.5 in the compact case in 2050. It is estimated that the number of people using public transportation will decrease substantially as the population declines, although it is estimated that the number of people using public transportation will increase to 8.1 and 7.8, respectively, after the route realignment. These results suggest that in order to become a city where people can go out without being able to drive a car, we need to further reorganize public transportation and reconsider the way people live.

For more information, please refer to the following references.

Kii, M.; Goda, Y.; Tamaki, T.; Suzuki, T. Evaluating Public Transit Reforms for Shrinking and Aging Populations: The Case of Takamatsu, Japan. Future Transp. 2021, 1, 486-504. https://doi.org/10.3390/futuretransp1030026