There is an increasing interest in incorporating spatial dependency among decision-makers in understanding travel mode choice effects, especially the uptake and use of non-motorized modes (walking and bicycling). Such spatial dependency may be caused by the spillover of neighborhood-level proximity-based unobserved effects. This is because more information regarding consumer preferences can be extracted if the individuals are asked to rank alternatives based on a preference ordering, instead of being asked to pick only the most preferred one. In particular, the additional information from a preference ranking can be exploited to achieve a certain desired precision in choice model estimation with a much smaller sample size, making ranked data surveys much more cost-effective than single-choice surveys. This is particularly important when investigating built environment, demographic, and mode level of service attributes in an emerging autonomous world, because sample sizes for such analyses are based on stated preference experiments that typically collect information from only a small sample size of individuals.

The project will examine the implications of the results for the use of non-motorized modes, especially the potential of AV modes to capture share away from walking and bicycling modes and possible countermeasures to offset any such effects in mega-regions. In addition, interaction effects of neighborhood-level and individual-level effects will be carefully studied, as will likely effects on vehicle miles of travel and traffic congestion in mega-regions.