報告番号	甲　第 12877 号

主　論　文　の　要　旨

論文題目　**Shared Autonomous Vehicles: Preferences, Opportunities, and Future Implications**
(共有自動運転車の利用意向・可能性・展望に関する研究)

氏　　名　郝 明阳

論　文　内　容　の　要　旨

In recent years, the transformation in transportation mobility has seen an acceleration in numbers of studies establishing a sustainable, smooth and cost-efficient system by applying automated concepts to the conventional car-sharing system. The development from a personally owned vehicle-oriented scheme to shared automated transit provides us informative images to the optimal stage of the transportation mobility. The shared autonomous vehicle, which benefits from both of the features of ride-sharing services and autonomous technologies, is about to alter the automobile industry and the shape of the society at the same time. Ant it is anticipated to offer cleaner, safer, and cheaper mobility services when autonomous vehicles are finally implemented on the roads.

This study contributed to the following three main sections: 1) research on features, demand and performances studies of shared autonomous vehicles by reviewing the spotlighted studies in the field. Then, gaps and future research directions are provided for stakeholders from both business and academia side. 2) Services that provided by shared autonomous vehicles (such as child tracking, large trunk, multi-users and etc.) other than the ones from conditional taxi or ride hailing services are evaluated. The relationship between different clusters of users and their preferred services are examined. 3) The future expectation of demand and supply of shared autonomous vehicles are calculated by applying discrete choice model. In addition, the performance of shared autonomous vehicles are assessed through agent based simulation.

In the first section, the study aims to find the gaps in impacts and features, demand and

performance studies of shared autonomous vehicles by a systematic approach when looking at the research aspects of car sharing in autonomous vehicles and shared autonomous vehicles. This is the first attempt to review shared autonomous studies. According to our study, emergency transportation management, flexible transportation planning and benefits to all levels of transportation modes are regarded as the potential features of shared autonomous vehicles. From the scope of demand studies, mode split analysis, before-and-after studies, users' behaviors and reduction of car ownership, preferences studies considering cross-national and gender-related studies are interesting to be explored. Moreover, combining a new transportation mode with shared autonomous vehicles and implementing new operation modes such as DRS, real-time management and private vehicle sharing scenarios could be the future research directions from the perspective of performance study of SAVs systems.

In the second section, the evaluation of people's intentions regarding shared autonomous vehicle services appears to be critical prior to the promotion of this emerging mobility on demand approach. Based on a stated preference survey in Nagoya, Japan, the preference for shared autonomous vehicle services as well as willingness to pay for these services were examined among 1036 respondents in order to understand the relationship between people's socioeconomic characteristics and their preferred shared autonomous vehicle services. For this purpose, k-modes clustering technique was selected and six clusters were obtained. Six groups with respect to different interests on shared autonomous vehicle services are clustered. The result of correlation analysis and discussion of willingness to pay on services provided insightful results for the future shared autonomous vehicle services. This study not only aids in revealing the demands of customer different clusters, but also states the prospective needs of users for stakeholders from research, policymaker and industry field, who are preparing to work on promoting shared autonomous vehicle systems, and subsequently, develops an optimum transportation mode by considering both demand and services as a whole.

Lastly, the research focuses on people's intention for use of shared autonomous vehicles as well as the ownership and shared use of their private vehicles in Meito Ward, Nagoya area of Japan. A nested logit model is established for the mode choice with person trip survey data while the multinomial logit model of autonomous vehicle ownership and shared use is developed with stated preference survey data. The former provides demand forecast for shared autonomous vehicles while the latter for the supply. Two scenarios (limited and unlimited user) are considered in this study to reflect the degree of shared autonomous vehicle acceptance in different phase. 11 - 28 % of trips will be attracted by shared autonomous vehicles based on the model. According to the agent-based simulation, 40 - 70% of the shared autonomous vehicle supply can be put on market while satisfying the expected income of shared autonomous vehicle providers. In addition, efficiency can be achieved by shared autonomous vehicles since more than 94% of the trips provided by them have waiting time lower than 1 minute.