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学位論文題名	A Study on Transport Gap Indicator for Transport Planning in Rural Tourism Areas under Perspective of Mobility as a Service - A case in Hokuto City, Yamanashi Prefecture, Japan - (MaaS 導入を見据えた地域観光地交通計画のための交通需給ギャップ指標の研究-山梨県北杜市を事例に)
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【論文の内容の要旨】

Transport gaps might result from gaps in transport supplies to meet the accessibility needs and transport demands of a community. The lack of transport supplies is viewed as synonymous with low accessibility, such as long waiting time, long access distance, low service frequency, and high travel cost, which in turn influence user's perceptions of ease of access, comfort, and availability of a particular service. The transport gaps are more critical in rural areas, where are characterized by low population density, scattered facilities, and insufficient traditional public transport services. Transport gap improvement then becomes the primary priority to facilitate the accessibility needs or demands of locals and tourists, and to promote the local economic development, as well as reducing or suspending the de-population.

Although previous studies on transport gaps highlighted the need to enhance transport services in areas with transport gaps, empirical studies using the transport gap as an indicator for transport planning for an area are rarely found. Recently, the growth of ridesharing, mobility on-demand, on-demand bus, and Mobility as a Service created more alternative services and improved gaps in public transport provision. Although the

role of these services in satisfying individual demands is widely acknowledged in the literature, studies on their impacts on transport gap reduction in an area are rarely found. Many important questions from the planning perspective are thus waiting for answers, such as: what level of transport gap needs to be addressed? what transport services are required to fulfill transport gaps and how are their potential impacts on transport gap reduction? This study aims to identify transport gaps and use the identified transport gap as an indicator for evaluating the potential impacts of transport services and suggesting policies for improving transport gaps in rural tourism areas.

The study carried analyses for both transport supplies and demands in each traffic analysis zone (TAZ) based on accessibility indicators. Firstly, the transport supply is measured from indicators representing the supply of public transport and private transport. Service coverage and frequency are used to quantify the public transport supply while available cars and road density are utilized for determining the private transport supply. The transport demands are measured by the number of trips generated and attracted by local and nonlocal residents/visitors from and to each TAZ. Secondly, a measurement model based on the standardized score is used. The standardized scores of transport supply and of transport demand are relatively compared to identify areas with transport gaps. Furthermore, the important performance analysis model is used to identify areas, where are strongly required to enhance transport services. Thirdly, the assumptions of “policy scenarios” for target areas are made. The study quantifies the potential impacts of policy scenarios on both transport demands and supplies. As a result, the new transport supply and demand indices are determined under the impacts of scenarios. Fourthly, the study adjusts the measurement model to compare transport gaps with and without policy scenarios to point out the impacts of policy scenarios.

The analytical results in Hokuto city, Yamanashi prefecture, Japan show that areas with high transport supplies, such as bus frequency, train frequency, and service coverage, tended more transport demands for both local and nonlocal residents. The number of trips made by nonlocal residents is more related to accessibility indicators. Moreover, overall accessibility, that is determined by the log of a summary of the utility of all transport modes available in an area, is negatively related to the number of trips by cars and positively associated with public transport demands. Under impacts of policy scenarios, nonlocal residents are more sensitive to policies than residents. For example, the number of trips by local and nonlocal residents increased around 8% and

25% when 100% of private vehicles is used for ridesharing, respectively while transport demands are less sensitive to bus frequency improvement.

On the other hand, transport supply in some residential and tourism areas was insufficient (gap) compared to the demand and were more critical on peak hours and on weekends. The potential impacts of policy scenarios on transport gap reductions are different. The transport gaps are significantly removed by ridesharing services while increasing bus frequency is less effective in improving transport gaps. The findings suggest that ridesharing has a higher potential for transport gap reduction through enhancing the service availability, service coverage, and overall accessibility.

In this study, considering the transport gap as a primary indicator for transport planning is a significant academic contribution to literature. Quantifying the effects of different transport services on the transport gap is another contribution. The study helps planners and policymakers formulate management and improvement policies for transport gaps. Further studies aim to develop the threshold of transport gap as a technical or strategic tool for transport planning and to quantify the impacts of policies on transport gap reduction from an intermodal perspective.