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学 位 論 文 内 容 の 要 旨

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学 位 論 文 題 名

The relationship of social vulnerability and COVID-19 and its impacts on travel behavior and expenditure activities of commuters in Metro Manila, Philippines

(社会的脆弱性と COVID-19 との関係性がマニラ在住の通勤者の交通行動と消費活動へ与える影響)

The COVID-19 pandemic has caused overwhelming economic and health costs to nations across the globe. While no country was free from the impacts of the pandemic, some populations were disproportionately affected and suffered severe consequences compared to others. Moreover, factors such as economic wealth, nature of work, and available transportation to name a few, also caused individuals to have varying responses to the imposition of lockdowns and community quarantine. In consideration of these scenarios, travel behavior and mobility during the pandemic could be different, not only at a national level among the different classes of world economies, but as well as at the community level among different socioeconomic groups.

In addition, travel activities have also significantly changed as we adapt and live through this pandemic. In order to mitigate risks of contracting the virus by traveling, various factors such as trip purpose and trip mode have been carefully considered. Such changes in travel choices also have corresponding implications on the commuter's expenditure activities. Analyzing these scenarios can provide evidences on whether there was a change or shift in the importance of trips or travel modes as influenced by COVID-19.

Based on these backgrounds, this research aims to provide a multifaceted perspective on the various impacts and effects of COVID-19 in relation to the travel behavior and expenditure activities of residents in Metro Manila, Philippines. Metro Manila provides an interesting setting on how travel activities have been affected by COVID-19 in the case of mega cities of developing countries. This study can be viewed as a preliminary analysis of regional trends on urban mobility in developing countries as influenced by a pandemic.

Firstly, to analyze the relationship of social vulnerability and COVID-19, data was collected from an online questionnaire survey, ordinal logistic regression analysis were performed. Results showed that gender, household crowding, lack of vehicle access and type of occupation can contribute to virus exposure, therefore increasing the risk of contracting COVID-19. Furthermore, multiple linear regression analysis was also applied to mobility data collated from Google and Apple. Results from the investigation support the hypothesis that traveling to groceries or retail stores can increase the risk of exposure to the virus, while staying at home and walking as transport mode, lessens the risk of contagion.

Secondly, by using the multinomial logit model on the survey data, the importance of trip purposes and modal choice before and during the pandemic was identified, then the model parameters were calibrated by maximizing the likelihood function. Results were compared and showed that trip to

work became less important after the pandemic has started, while the importance of trip to groceries has increased. As for transport modes, the importance of using private vehicles decreased, while that of public transport has relatively increased. These outcomes provide empirical evidence of how trip factors, such as purpose and mode, have been influenced by COVID-19 and has then changed in importance compared to pre-pandemic times.

Findings from this research provide a perspective of COVID-19 impacts in a developing country. Moreover, results can be used by policymakers as a guide in formulating pandemic response strategies which considers the most vulnerable groups, and to prioritize developments directed towards essential trips and mass transport, while considering the mobility restrictions necessary during a pandemic.

The thesis includes five chapters. Chapter 1 discusses the background, literature review, objective and scope, and significance of this research. Chapter 2 first provides an assessment of how the pandemic has affected mobility as influenced by socioeconomic characteristics, as well as travel behavior before and during COVID-19. Founding on the results of Chapter 2, Chapter 3 presents a more in-depth evaluation of how the importance of trips has changed as influenced by the pandemic, and among different social groups. Chapter 4 explores the probability of trip activities based on trips before and during COVID-19. Finally, Chapter 5 summarizes the thesis objectives and findings, and discusses the limitations and future directions of the research.