

論文 / 著書情報
Article / Book Information

題目(和文)	実条件と認知条件を考慮したメトロマニラMRT3号線の旅客福利に関する研究
Title(English)	A Study on the Well-being of Metro Manila MRT-3 Passengers Considering Actual and Perceived Conditions
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種別(和文)	論文要旨
Type(English)	Summary

論文要旨

THESIS SUMMARY

専攻 :
Department of 土木工学 専攻

申請学位 (専攻分 博士
野): Doctor of (Philosophy)

Academic Degree Requested

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要旨 (英文 800 語程度)

Thesis Summary (approx.800 English Words)

The Metro Manila MRT-3 is an urban rail line strategically situated along EDSA, which connects the major business districts in the metropolis. Due to a number of factors, it has been facing congestion and unreliability problems for several years now, which may lead to productivity loss, health and safety risks and psychological effects for passengers.

This research study aims to investigate how the MRT-3 commute affects passenger well-being, and examine the factors that explain why people still continue to use it in spite of its negative conditions. It clarified the extent of the problem in terms of actual conditions on level of service and air quality, and passenger perception on commuting and its effects by employing various data collection methods, including observation surveys, PM_{2.5} particle count monitoring survey and a questionnaire survey on commute characteristics and perception. It explored the role of mental adaptation on moderating the effects of commuting on passenger satisfaction and commuting stress. It also developed an evaluation framework for prospective countermeasures that considers actual and perceived conditions and how they impact passenger satisfaction.

In Chapter 3, an analysis of the level of service at the MRT-3 showed that passenger waiting time has become long and variable at the roadside and platform as a result of a combination of operations policies, poor schedule adherence and excessive passenger demand, with some stations incurring longer waiting times than others. A comparison of travel times between MRT-3, ordinary buses and air-conditioned buses also revealed that the MRT-3 is the fastest among them in spite of the long waiting time.

Chapter 4 tackled the air pollution problem in MRT-3 and buses along EDSA by investigating on passengers' PM_{2.5} exposure while commuting. PM_{2.5} particle counts were measured inside different public transport modes and MRT-3 stations over a 20-day period to determine the extent of the pollution problem and conduct comparisons between them. An intra-modal comparison of PM_{2.5} particle count between five MRT-3 stations revealed that passengers are exposed to moderate to unhealthy levels of PM_{2.5} while waiting at the roadside and platform of stations, with one station having significantly higher concentrations than the others. Moreover, an intermodal comparison of PM_{2.5} particle counts between MRT-3, ordinary bus and air-conditioned bus found that MRT-3 has the lowest PM_{2.5} exposure if only in-vehicle time and concentrations inside the train are considered. However, the overall PM_{2.5} exposure is increased if waiting time at the station is included in the comparison, making the levels at MRT-3 to be slightly higher than air-conditioned bus levels. This implies that passenger waiting time at the MRT-3 station should be reduced to lessen exposure time.

Chapter 5 investigated the perceptions of daily morning peak period passengers on various service quality attributes and commute-related constructs and how they relate to each other. Nine latent factors were found to relate to passengers' commute – exogenous factors

(commuting experience): perceived crowding, predictability, perceived air quality and perceived benefits; and endogenous factors (mediators and outcome): perceived risk, perceived service quality, awareness during the commute, mental adaptation and commuting stress. The model that explains the relationships between these factors was developed using structural equation modeling, where it was found that mental adaptation plays a role in reducing commuting stress, which could partly explain why passengers endure their negative commutes every day.

In Chapter 6, the results in the previous chapters about actual and perceived conditions were synthesized to aid in identifying appropriate countermeasures and to conduct an overall discussion on passenger well-being and equity. A new evaluation framework for assessing the impacts of these countermeasures was developed using a waiting time simulation model and a passenger satisfaction model, with aggregated passenger satisfaction as an original evaluation index. Explanatory variables for the passenger satisfaction model include actual and perceived variables, with mental adaptation as a control variable. Moreover, a dynamic waiting time simulation model that captures the characteristics of MRT-3 was used to estimate how such countermeasures would affect waiting time. A sensitivity analysis was conducted to estimate how the aggregated passenger satisfaction index changes by varying some explanatory variables. It was found that increasing vehicle capacity by 25% while controlling headway regularity and passenger density would drastically reduce waiting times, and subsequently increases passenger satisfaction. Combining all the countermeasures would increase neutral and positive ratings from around 40% to 80%. This highlights the importance of investing in hard infrastructure to increase the capacity as well as considering perceived conditions to improve passenger satisfaction.

In general, regular passengers were found to have poor well-being as a result of their MRT-3 commute. It was found that many passengers suffer long and variable waiting time, frequent tardiness at work, but have various levels of commuting stress and passenger satisfaction depending on their adaptation level. This research study contributes to the growing field of commuting and well-being research, and gives a unique insight on how to approach the congestion problem in a developing megacity.

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

Note: Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1 copy of 800 Words (English).

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