IMPACT OF STATION ACCESS FACILITIES ON ACCESS MODE CHOICE IN METRO MANILA

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This research employs a mixed-methods approach to investigate the influence of rail station access facilities on access mode choice in Metro Manila. It combines data gathered from a survey of rail users to capture user perceptions and experiences with data from observations of access facility conditions. Factor analysis is applied to the survey responses, identifying key factors impacting rail station access facility perceptions. Using mixed logit modeling, access mode choice behavior is examined with variables related to these facilities. The study not only differentiates between home-end and activity-end trips but also contributes valuable insights for transportation planners and policymakers. By understanding the factors that shape user perceptions and mode choices, strategies can be devised to enhance rail station access facilities, potentially boosting ridership, mitigating traffic congestion, and promoting sustainable transportation.

Key Words : *station access facility, rail user survey, access mode choice, mixed logit model, Metro Manila*

1. INTRODUCTION

In the face of escalating urbanization and mounting traffic congestion, the importance of efficient public transportation systems has never been more evident. This significance is underscored by the "Roadmap for Transport for Infrastructure Development for Metro Manila" from ALMEC[1)] and the "Feasibility Study on the North South Railway Project - South Line" by JICA[2)]. These research underscores the critical importance of infrastructure enhancements in Metro Manila, with a particular focus on access facilities. These studies offers valuable insights into the dynamics of rail transport in the Philippines, providing essential context for comprehending the influence of rail station access facilities on commuter choices.. Metro Manila, an expansive and densely populated urban center, is emblematic of the transportation challenges many metropolises face. Its burgeoning population and increasing traffic congestion underscore the pressing need for effective solutions.

Furthermore, the landscape of public transportation in Metro Manila is poised for transformation with ambitious rail projects. These include the Metro Manila Subway, the North-South Commuter Rail, the LRT Cavite Extension, and the Mindanao Railway Project. The introduction of these projects signals a new era of public transportation and transit infrastructure in the region, emphasizing the vital role of access facilities in shaping commuter choices.

Our research addresses the pressing issue of the intricate connection between rail station access facilities and commuters' mode choices in dynamic urban environments, such as Metro Manila. Through the amalgamation of user perceptions from a comprehensive survey and empirical assessments of access facilities, we aim to uncover the factors influencing access mode choices.

Our primary objectives are as follows:

a) Determine the key access facility factors influencing rail users' mode choices in Metro Manila.
b) Simulate the impacts of design adjustments on access mode choices among rail users.
c) Formulate policy and design recommendations for improving access to Metro Manila's rail stations.

These objectives guide our research, offering practical insights to alleviate traffic congestion, promote sustainable transportation, and potentially increase ridership in the region.

2. LITERATURE REVIEW

The recent transportation research highlights the importance of rail station access facilities in influencing urban commuters' mode choice.

Abe[3] explores urban rail users' preferences for autonomous vehicles, revealing demand elasticity factors. Chakrabarti[4] focuses on transit mode choices, providing insights into factors encouraging the shift from personal vehicles to public transit.

Ding et al.[5] study the built environment's role in travel mode choice, considering car ownership and travel distance as mediating factors. Fillone, Montalbo Jr., and Tiglao[6] provide mode choice models tailored to Metro Manila.

Mateo-Babiano[7] found that Manila's walking environment is inadequate for pedestrian needs, while Ujjwal and Bandyopadhyaya[8] developed a new method for assessing pedestrian level of service in mixed land use areas.

Hensher, Rose, and Greene's[9] applied choice analysis is instrumental in comprehending mode choices across various contexts. Hu et al.[10], Kamruzzaman et al.[11], and Ko et al.[12] expand the knowledge base on mode choice dynamics. Aloc[13] offers a historical perspective on railway transport planning in Metropolitan Manila. Lastly, Regidor, Fillone, Aloc, and Lucas[14] explore the potential benefits of a comprehensive rail transit network in Metro Manila.

While these studies provide valuable insights, a key research gap remains in understanding the combined effects of various access modes and facilities on mode choice in developing cities like Metro Manila. This gap is critical, as commuters often use a combination of access modes, and the availability and quality of different access facilities can significantly influence their mode choice. More research is needed in this area to inform policies and interventions that improve rail station access and promote sustainable transportation.

3. METHODOLOGY

The research methodology employed in this study follows a mixed-methods approach to comprehensively investigate the interplay between rail station access facilities and mode choice in the context of Metro Manila. The research design consists of two primary data collection methods: a travel behavior survey and observations of access facility conditions.

(1) Data Collection Mehods

a) Travel Behavior Survey

To capture user perceptions and preferences, a survey of rail users at select stations within Metro Manila is conducted. The survey focuses on assessing the quality and convenience of access facilities, inquiring about factors influencing mode choice, and capturing demographic information.

a) Access Facility Observation

This method involves systematic observations of the physical conditions and design configurations of pathways leading from access facilities to access modes. Key factors assessed include pedestrian level-of-service, infrastructure condition, and the accessibility of pathways.

(2) Data Analysis

a) Factor Analysis

The qualitative responses gathered from the travel behavior survey will be subjected to factor analysis. This statistical technique identifies latent factors within the survey data, thereby highlighting key elements influencing perceptions of rail station access facilities.

b) Mixed Logit Modelling

Mixed logit modeling will be applied to analyze the data obtained from both the survey and access facility observations. This approach enables the modeling of access mode choice behavior by examining parameters related to rail station access facilities, considering the level of service between rail stations and origins/destinations.

4. STUDY AREA

Our designated study area in Metro Manila provides a window into the intricacies of daily commuting. It comprises two home stations and four activity stations, serving as both the origins and destinations of daily journeys. This deliberate choice enables us to study the interplay between rail station access facilities and access mode choices in the context of home-end and activity-end commutes. Through a thorough analysis of commuter preferences and perceptions in this setting, our research aims to offer insights for the development of a more commuter-centric and sustainable transportation system in Metro Manila.

Table 1 Station classification based on passenger function with daily average passengers

Station Name	Function	Ave. Pass.
North Edsa	Home	24,166
Monumento	Home	34,012
EDSA	Activity	29,983
Recto	Activity	21,482
Cubao	Activity	12,637
Ortigas	Activity	18,337

The results of this study contribute valuable insights to transportation planners and policymakers, especially in Metro Manila. By understanding the

factors that influence rail users' perceptions and access mode choices, strategies can be developed to improve rail station access facilities. This has the potential to increase ridership, alleviate traffic congestion, and promote sustainable transportation.

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