

# ABSTRACT OF DOCTORAL THESIS

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**V. Thesis' title:** Analysis of factors affecting urban rail transit usage in major cities of Vietnam and proposed measures to increase the number of users

**VI. Training institution:** University of Science and Technology - The University of Da Nang.

## **VII. Summary of thesis content**

### **1. Rationale of thesis**

The rapid urbanization process in Vietnam is putting significant pressure on urban transport infrastructure, leading to congestion, pollution, and energy consumption. In this context, public transport (PT) is considered a key solution, with urban rail transit (URT) playing the role of the “backbone” due to its large passenger capacity, safety, reliability, and environmental friendliness. However, in major cities such as Hanoi and Ho Chi Minh City, the share of PT usage remains low, at around 10–15% of total travel demand, mainly from buses, while the URT system is still in its early development stage. Some newly operated lines, such as the Cat Linh–Ha Dong line in Hanoi or Metro Line 1 (Ben Thanh–Suoi Tien) in Ho Chi Minh City, have begun to attract passengers but have yet to reach their full potential and expected targets.

According to the railway network plan for the period 2021–2030, with a vision to 2050, Hanoi is expected to develop 14 lines (~619 km) and Ho Chi Minh City 12 lines (~510 km). These aim to expand and modernize the public passenger transport network, while effectively connecting urban cores with suburban areas, satellite towns, and inter-provincial economic corridors. However, to make these goals a reality, an approach from the user perspective is required, focusing on two main groups: (1) potential passengers (those who have never used URT) – identifying motivating factors and barriers to encourage their use; and (2) current passengers – identifying factors that maintain loyalty and promote long-term commitment to using URT.

Currently, domestic studies on URT usage behavior are still limited, particularly with no research providing a comprehensive analysis of both usage intention and loyalty, while also considering the influence of the physical servicescape at stations and on trains. This gap

calls for a study with a solid theoretical foundation and practical relevance, providing scientific evidencesr policy-making and solutions to enhance URT usage in major cities.

Based on this analysis, the doctoral dissertation titled “*Analysis of factors affecting urban rail transit usage in major cities of Vietnam and proposed measures to increase the number of users*” is necessary and holds both theoretical and practical significance.

## **2. Research objectives**

The general objective of the study is to examine the factors influencing the intention to use URT among people who have never used the service, as well as the factors affecting loyalty among current URT users. Based on these findings, the study aims to propose appropriate policies and measures to increase usage intention and strengthen user loyalty, thereby contributing to raising the share of URT usage.

## **3. Subject and scope of the research**

Research subject: The research subject includes the factors influencing usage intention and loyalty toward URT services, as well as the relationships among these factors in the context of public transport in Vietnam.

Survey subjects include two groups of passengers:

- (1) Potential passengers (those who have never used URT)
- (2) Passengers who have already used or are currently using URT

Scope of the research: The study focuses on the URT systems in Hanoi and Ho Chi Minh City.

## **4. Research methodology**

This study applies a quantitative, explanatory research approach. The research model is based on the Behavioral Reasoning Theory (BRT) for the group that has not used urban rail transit (URT), and the Stimulus–Organism–Response (SOR) theory for the group of existing users. Data were collected through direct questionnaire surveys, using convenience sampling with quality control of responses. Data analysis was conducted using SPSS and SmartPLS, following steps including descriptive statistics, reliability testing of measurement scales (Cronbach’s Alpha, Composite Reliability), assessment of convergent and discriminant validity (AVE, HTMT, Fornell–Larcker), and structural equation modeling (SEM) to test causal relationships among variables.

## **5. General layout of the thesis**

The dissertation consists of two main parts, namely the Introduction and the Conclusions and Recommendations, and five chapters arranged as follows:

Chapter 1: Literature Review

Chapter 2: Theoretical Foundations, Model Development, and Research Methodology

Chapter 3: Analysis of Factors Affecting Usage Intention toward the URT System

Chapter 4: Analysis of Factors Affecting Passenger Loyalty toward the URT System

Chapter 5: Measures to Increase the Number of URT Users

## **6. Research findings of the dissertation**

- The dissertation developed and validated two research models suitable for analyzing URT usage behavior in the Vietnamese context. The first model analyzes usage intention among people who have never used URT based on Behavioral Reasoning Theory (BRT). The second model analyzes loyalty among passengers who have already used URT based on Stimulus–Organism–Response (SOR) theory. The measurement scales and research models were found to satisfy the requirements of reliability, measurement validity, and suitability for the empirical data.

- The dissertation identified the factors affecting citizens' intention to use URT in Hanoi and Ho Chi Minh City. The results show that attitude toward URT and reasons for using URT are important factors that increase usage intention. Compatibility value plays a supportive role by strengthening the reasons for using URT, while perceived barriers may reduce citizens' positive attitudes. The comparison between Hanoi and Ho Chi Minh City reveals certain differences in the strength of the effects, reflecting differences in transport characteristics, travel habits, and the development context of URT between the two cities.

- The dissertation also identified the factors affecting loyalty among passengers who have used URT. The results indicate that the physical servicescape at stations and onboard trains influences passengers' perceived safety, perceived security, and satisfaction. Among these factors, satisfaction plays a central role in forming and maintaining loyalty. In particular, onboard satisfaction has a stronger effect on loyalty than station satisfaction, indicating that the direct travel experience is a key factor in retaining passengers.

- Based on the research findings, the dissertation proposes groups of measures to increase the number of URT users. For non-users, the measures focus on enhancing reasons for using URT, improving attitudes, increasing compatibility value, and adjusting interventions according to the specific characteristics of each city. For current users, the measures focus on improving satisfaction, enhancing the physical servicescape onboard trains and at stations, and strengthening perceptions of safety and security. These measures contribute to attracting new users, retaining current passengers, and improving the operational efficiency of URT systems in major cities of Vietnam.

## **7. Scientific and practical significances**

- *Scientific Significance:* This study expands the understanding of URT user behavior in Vietnam by developing and validating a theoretical model, clarifying the factors that influence usage intention and loyalty. The findings provide empirical evidence to support behavioral theories within the specific context of Vietnam.

- *Practical Significance*: The study results offer a scientific basis for formulating policies and solutions for the development of URT, focusing on improving service quality, enhancing passenger experience, and encouraging sustainable usage.

## **8. New contributions of thesis**

The study develops and validates a model of URT user behavior based on consumer behavior and transportation behavior theories, tested in Vietnam - where the service is still new and habitual use has not been widely established. The main contributions include:

(1) Adding theoretical and methodological foundations to research on public transport user behavior, particularly regarding the intention to use and loyalty to URT in the context of a new service.

(2) For potential passengers, applying the BRT to comprehensively analyze the formation process of behavior, from motivating and against reasons to attitudes and behavioral intentions.

(3) For current users, focusing on analyzing the effects of the physical servicescape at stations and on trains on perceived safety, satisfaction, and loyalty.

(4) Developing measurement scales and survey questionnaires suited to the Vietnamese context to assess factors influencing intention to use and loyalty toward urban rail transit, and to inform solution directions based on empirical findings and international experience.

**PhD student**

**Pham Truong Son**