

PERCEIVED USEFULNESS AND BEHAVIORAL INTENTION TO USE SMALL ELECTRIC PUBLIC TRANSPORTATION OF SECONDARY CITIES IN THAILAND

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ABSTRACT

Small electric public transportation systems are now seen as an essential part of creating sustainable mobility infrastructures due to Thailand's secondary city growth and the increasing need to lessen environmental effects. This conceptual study seeks to integrate existing knowledge and present a framework elucidating the relationship between perceived utility and the behavioral intention to utilize tiny electric public transportation in Thailand's secondary cities. An examination of both domestic and international literature indicates that perceived usefulness encompasses three principal dimensions: (1) perceived service quality, which includes safety, convenience, cleanliness, and reliability; (2) perceived relative advantage over existing services, such as cost-effectiveness, environmental sustainability, and enhanced comfort; and (3) perceived risk, which involves apprehensions regarding safety, system reliability, and unfamiliarity with the technology.

The results show that passengers' propensity to use small electric public transportation services rises when they believe that these services provide better quality, more safety, and an improved travel experience. This study presents an integrated conceptual framework that can underpin future empirical research and offer critical insights for policy development and strategic planning of small electric public transportation systems in Thailand's secondary cities. The framework seeks to facilitate the creation of secure, effective, and sustainable mobility solutions.

Keywords: Perceived Usefulness, Behavioral Intention, Small Electric Public Transportation, Secondary Cities

INTRODUCTION

Thailand's public transportation infrastructure is under mounting pressure due to rapid urban expansion, increased private vehicle use, and intensifying environmental challenges. These challenges are especially pronounced in secondary cities, where infrastructural deficiencies, limited access to public transportation, and insufficient system integration have heightened the demand for more adaptable and sustainable mobility solutions. Compact electric public transportation options, such as microtransit vehicles and e-tuktuks, which have been implemented in many nations (Buenavista et al., 2024; Base et al., 2024; Siriket & Luksamee-Arunothai, 2023), have emerged as viable alternatives. This trend aligns with Thailand's transportation decarbonization policy, which indicates that the transport sector accounts for roughly 32% of the country's total CO₂ emissions and underscores the adoption of electric vehicles as a strategic approach to achieving the Net Zero objective (Pipitthanathunyathorn et al., 2025). Likewise, numerous Asian nations, such as the Philippines, China, and Indonesia, have accelerated the transition to electric public transportation to reduce pollution, alleviate traffic congestion, and lower energy costs (Wu et al., 2019; Buenavista et al., 2024). These accomplishments collectively highlight the significant potential of tiny electric public transit as a sustainable mobility solution for Thailand's secondary cities.

Examining the determinants of individuals' intention to use electric public transportation has emerged as a pivotal focus in modern transportation research. Common theoretical frameworks in this field are the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), which assert that perceived usefulness (PU) and perceived ease of use (PEOU) significantly affect behavioral intention (BI) (Davis, 1989; Wu et al., 2019). Empirical research on the adoption of electric public transportation, including autonomous shuttles, e-jeepneys, e-tuktuks, and microtransit, consistently reveals that perceived advantages such as cost efficiency, safety, environmental sustainability, and convenience are pivotal factors influencing users' attitudes and decisions to embrace these services (Golbabaee et al., 2022; Base et al., 2024; Zulueta et al., 2024). Furthermore, environmental concern has been recognized as a significant factor that enhances the perceived usefulness of green technologies and positively influences the intention to adopt electric vehicles (Wu et al., 2019). In the Thai context, Siriket and Luksamee-Arunothai (2023) discovered that the simplicity of use and physical attributes of cars greatly influence the decision to utilize micro transit services like MuvMi. Research on e-Tuktuk and e-jeepney services indicates that service quality, including safety, reliability, and convenience, significantly impacts users' behavioral intentions (Base et al., 2024; Zulueta et al., 2024).

This conceptual article seeks to examine the theoretical underpinnings and empirical data concerning perceived usefulness and the intention to utilize small electric public transportation, specifically within the context of Thailand's secondary cities, an area where systematic research is scarce. This research synthesizes pertinent studies to identify the principal elements affecting the acceptance of electric public transit, which include usability, safety, service quality, environmental concern, and support from policies and urban environments. The essay presents a cohesive conceptual framework intended to underpin future empirical research. This framework is anticipated to enhance the design and implementation of efficient and sustainable small electric public transportation systems in Thailand's secondary cities.

OBJECTIVE

To develop the conceptual framework, the antecedent and consequent of the perceived usefulness and behavioral intention to use small electric public transportation.

Theoretical Background

1. Sociodemographic Ability to Use Public Transportation

An individual's ability to use public transportation services is influenced by socio-demographic factors, including age, gender, income, educational level, household size, private vehicle ownership, and economic standing. These attributes directly affect travel patterns and public transportation utilization behavior. Kafi et al. (2024) assert that the essential ability of individuals to utilize public transport services is a pivotal determinant of travel decisions, especially in Southeast Asia, where income inequality and infrastructural deficiencies are significant.

Several studies demonstrate how important demographic considerations are in influencing how people use public transportation. For example, advancing age is frequently linked to a heightened demand for transportation systems that are secure and user-friendly, whereas younger and working-age demographics typically favor travel alternatives that are more rapid and adaptable (Limtanakool et al., 2006). Income is a pivotal factor influencing travel options; persons with higher earnings generally prefer private vehicle usage, whereas those with lower incomes tend to depend on public transportation. Jakobsson et al. (2011) discovered that gender disparities and family configurations affect travel frequency and patterns, highlighting that women prioritize safety more than males.

Individual capability is particularly important in the setting of small electric public transit in Thailand's minor cities. These localities frequently encounter limitations associated with household income levels and restricted access to transportation infrastructure. The effectiveness and affordability of new mobility services are especially important to low-income and older populations. Consequently, comprehending socio-demographic factors in public transportation access is crucial for developing electric transit systems that correspond with the structural constraints and distinctive traits of local communities.

2. Public Transport Provision Capability

External factors that enable the utilization of public transportation significantly influence travel behavior, especially through the elements that comprise public transport provision capacity. This competency includes service availability, accessibility, and quality, as defined by Michie et al. (2011). Kafi et al. (2024) assert that the availability of transport services influences customers' actual access to public transportation an especially critical consideration in developing nations where transportation networks are often fragmented and inequitable. Multiple studies highlight that the availability and frequency of services are fundamental to consumers' mode choice decisions; regular and punctual operations significantly enhance the desire to utilize public transport (Dell'Olio et al., 2011; Borhan et al., 2019). Research on e-Tuktuks and contemporary jeepneys in the Philippines indicates that inconsistent service frequency and schedule unpredictability serve as substantial obstacles to user acceptance (Base et al., 2024; Zulueta et al., 2024).

In addition to the provision of safe walkways, boarding locations, and infrastructure that efficiently links to key routes, accessibility is another important spatial determinant (Murray & Stimson, 1998). Transport for London (2010) indicates that an ideal walking distance to encourage public transport utilization is between 400 and 500 meters. In Thailand's secondary cities, where pedestrian pathways and infrastructure are frequently inadequate, accessibility emerges as a fundamental criterion for service design. According to earlier studies (Eboli & Mazzulla, 2009; Hu et al., 2015), users' happiness and propensity to utilize public transportation are significantly influenced by factors such as safety, comfort, cleanliness, information availability, and dependability. Research conducted in Asia demonstrates that

electric vehicles offer a more comfortable experience, produce reduced noise, and are more ecologically sustainable elements that augment customers' perceived utility.

The capacity of public transport provision serves as an external structural aspect influencing the viability of adopting electric public transport. It acts as a vital catalyst for promoting behavioral changes towards the adoption of tiny electric public transit in secondary cities.

3. Sustainable Public Transportation

Green transportation denotes transportation systems engineered to mitigate environmental effect, decrease carbon emissions, and foster enduring sustainable mobility. This notion includes the use of clean-energy cars, the development of efficient transportation system designs, and infrastructure that facilitates environmentally sustainable travel practices. Adlim et al. (2025) assert that green mobility is a crucial strategy for advancing Sustainable Development Goals (SDGs) 11 and 13 by reducing carbon emissions and improving quality of life in educational and urban environments. The fundamental elements of green transportation encompass: (1) the utilization of electric vehicles (EVs) that produce minimal greenhouse gas emissions (Ghosh, 2020); (2) the incorporation of renewable energy sources, such as solar or hydropower, for EV charging (Mikalsen, 2021); (3) efficient and multimodal public transportation systems that diminish reliance on private vehicles (Oeschger et al., 2020); (4) supportive infrastructure for walking, cycling, and EV usage, including dedicated bike lanes, pedestrian pathways, and EV charging stations (Sun et al., 2020); and (5) governmental policies that advocate for emission reduction, such as EV tax incentives or limitations on private car usage in urban environments (Banister, 2008).

In Thailand, the advancement of tiny electric public transit in secondary cities closely adheres to the tenets of sustainable transportation. These technologies help reduce air pollution, lower noise levels, and provide safe, clean mobility options for local people, thereby advancing national objectives for sustainable and environmentally responsible urban growth. Additionally, it underscores the importance of sustainable natural resource management and addressing environmental challenges, such as pollution. Chuwichian, P, Soonthornpipit, H, Kulawanich, A, Yoowattana, P, Pongpeng, T, (2025).

4. Motivation for Choosing Environmentally Friendly Public Transportation

The motivation to utilize public transportation encompasses various psychological elements, such as beliefs, social conventions, and perceived behavioral control. Ajzen (1991) posits that behavioral intention is influenced by three key determinants: attitude toward the behavior, subjective norms, and perceived behavioral control. Research on green transportation and electric vehicles (Wu et al., 2019; Base et al., 2024) reveals that customers frequently make decisions based on perceived advantages, including energy efficiency, environmental sustainability, and enhanced travel convenience. An affirmative disposition towards these features directly augments the inclination to utilize such services. Social norms function as a significant motivator, especially in Asian countries characterized by robust communal influence. Kafi et al. (2024) emphasize that social support and environmental values substantially increase persons' incentive to utilize electric public transit.

Hu et al. (2015) illustrate that perceived behavioral control influences users' intentions to utilize public transport when they perceive the service as easily accessible and manageable, such as through frequent vehicle arrivals, conveniently situated stops, or user-friendly booking systems. Empirical research on micro transit systems in Thailand, including MuvMi, confirms that user-friendliness is a pivotal factor in service acceptance (Siriket & Luksamee-Arunothai, 2023).

Motivation variables reflect a set of psychological dynamics that influence people's decisions to use electric public transportation. These elements closely interact with perceived usefulness, socio-demographic capacity, and public transport provision competence to influence behavioral intentions toward the adoption of environmentally friendly mobility services.

METHODOLOGY

This study uses a qualitative research approach to identify relevant factors and explain their interrelationships by doing a thorough literature review and document analysis. The literature was integrated into the study according to established inclusion criteria. A preliminary systematic review was performed to collect concepts and theoretical frameworks concerning socio-demographic capabilities in public transport utilization, eco-friendly public transportation, and motivational factors affecting individuals' choices to utilize green transport services, from both Thai and English sources. The examined literature included both quantitative and qualitative investigations, unrestricted by geographical study sites in Thailand's secondary cities, journal articles, conference papers, master's theses, doctoral dissertations, and other pertinent academic and empirical sources were gathered to discuss the perceived utility and behavioral intention to use small electric public transportation. These documents provided the basis for integrating current knowledge and examining how perceived utility and behavioral intention influence the adoption of small electric public transit.

RESULTS

One crucial strategic solution to new mobility and environmental issues is Thailand's secondary cities' shift to small electric public transportation systems. Secondary cities frequently encounter restricted travel alternatives, disjointed transport systems, and inadequate infrastructure; hence, comprehending passenger behavior is crucial for formulating policies and services that correspond with local requirements. This study conceptualizes perceived usefulness as a crucial antecedent affecting the behavioral intention to utilize small electric public transportation, consisting of three dimensions: perceived service quality, perceived relative advantage, and perceived risk, all of which significantly influence user decision-making.

1. Perceived Service Quality refers to passengers' evaluation of the standards, efficacy, and provision of electric public transport services, encompassing convenience, safety, cleanliness, punctuality, and reliability. Previous research consistently indicates that service quality is a significant factor influencing perceived usefulness, which represents the value passengers obtain from the service (Eboli & Mazzulla, 2009; Dell'Olio et al., 2011). Studies on e-Tuktuk and contemporary jeepney services in the Philippines indicate that comfort, safety, and reduced noise levels are distinguishing characteristics that improve service perceptions relative to traditional modes (Base et al., 2024; Zulueta et al., 2024). In Thailand, microtransit services such as MuvMi demonstrate that enhanced accessibility, clearly designated pickup locations, and app-based reservation systems elevate perceived service quality (Siriket & Luksamee-Arunothai, 2023). Moreover, the performance of service professionals has been shown to positively affect user satisfaction in public van services (Songjarern, Kongpan, & Sansuk, 2022). In general, superior service quality elevates perceived utility and directly increases passengers' desire to embrace the service.

2. Perceived Relative Advantage denotes the degree to which customers regard electric public transit as preferable to current alternatives, like minibuses, motorcycles, or private automobiles. Research from the Philippines and China demonstrates that customers acknowledge the environmental

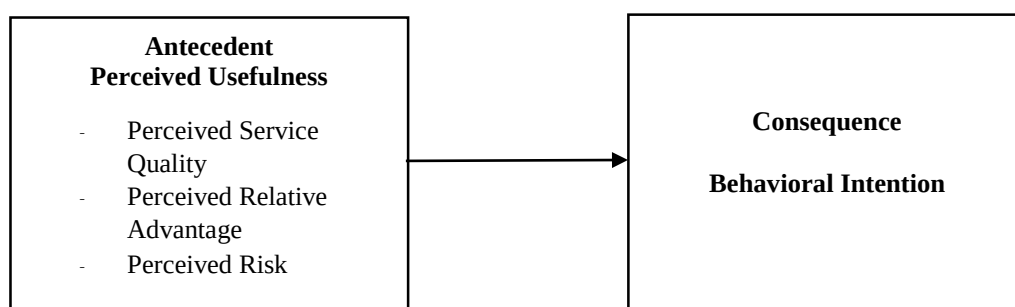
advantages, improved safety, decreased travel expenses, and increased comfort linked to electric vehicles, promoting a transition from conventional transportation methods (Buenavista et al., 2024; Wu et al., 2019). In Thailand's secondary cities, where current systems frequently face challenges with cleanliness, reliability, and safety, the perception of electric transport as a contemporary, silent, low-emission, and more agreeable alternative markedly increases its popularity.

3. Perceived Risk denotes the level of uncertainty passengers attribute to utilizing small electric public transportation, including apprehensions regarding battery depletion, the safety of compact vehicles, inconsistent service frequency, or unfamiliarity with technology. Prior studies indicate that perceived risk adversely affects attitudes and behavioral intentions (Wu et al., 2019). Local information suggests that passengers are apprehensive regarding vehicle durability, route reliability, and maintenance. Kafi et al. (2024) assert that perceived risk constitutes a motivational factor; elevated perceived risk diminishes consumers' sense of control over the trip experience, thereby decreasing their intention to utilize the service.

4. Behavioral Intention to Use Electric Public Transport denotes an individual's preparedness, dedication, or probability of opting for electric public transit. The Theory of Planned conduct (Ajzen, 1991) and the Technology Acceptance Model (Davis, 1989) emphasize that behavioral intention is a strong psychological predictor of actual conduct. It embodies a synthesis of beliefs, attitudes, environmental perceptions, benefit evaluations, and risk assessments. In secondary cities, behavioral intention is influenced not only by perceived convenience but also by passengers' perceptions of the service's reliability, safety, quality, and suitability for populations with infrastructural limitations. Consequently, intention is reinforced when users recognize distinct functional advantages and when perceived risks remain within acceptable levels.

Consequently, the researcher has delineated the conceptual framework for the study, as illustrated in Figure 1

Figure 1
Conceptual Framework



CONCLUSION AND FUTURE WORK

An integrated conceptual framework for comprehending the behavioral dynamics related to small electric public transportation use in Thailand's secondary cities is proposed by this study. At the core of this approach is perceived utility, which encompasses perceived service quality, perceived relative advantage, and perceived risk, all of which that jointly affect people' decision to use electric

public transportation. A synthesis of domestic and foreign studies indicates that when users regard electric transport services as superior in quality, convenience, safety, and cost-effectiveness compared to existing options, their desire to utilize these services significantly rises. On the other hand, perceived risks such as worries about safety and the unpredictability of service continue to be significant obstacles that could deter adoption. These findings corroborate previous studies highlighting the significance of service quality and safety in influencing the uptake of electric transportation solutions in developing contexts.

The conceptual analysis indicates that secondary cities encounter structural obstacles, such as inadequate infrastructure, disjointed transit systems, and unequal access to public services. Thus, small electric public transit systems possess significant potential to enhance quality of life and mitigate environmental impacts. The creation of such systems must include demographic features, technical accessibility, and transit service opportunities, as these elements enhance perceived utility and reduce perceived hazards. Policy and service design must be customized to local contexts, prioritizing accessible service sites, suitable route planning, and dependable information systems to guarantee user confidence and safety. The synthesis indicates that behavioral intention will be optimized when electric public transport systems concurrently fulfill user expectations regarding quality, value, and safety.

This study indicates multiple gaps in future research that necessitate more exploration. This includes the impact of social and cultural variables, environmental attitudes, and travel experiences on user behavior in secondary cities. Furthermore, integration of electric transportation with alternative mobility systems via multimodal strategies is still inadequately investigated within the Thai environment. Empirical studies assessing actual behavioral intentions and pilot testing service models in practical settings would provide significant insights and enhance the evidence base for effective policy formulation.

Future developments in small electric public transit should focus on improving user experience and minimizing perceived hazards. This may entail real-time tracking technologies, vehicle designs adapted to secondary-city environments, driver training initiatives, and seamless integration with user-friendly digital payment systems. Further policy-oriented studies on governmental incentives, financial support mechanisms for operators, and long-term environmental effect assessments are also advised. These initiatives will facilitate the integration of tiny electric public transportation as a sustainable and essential element of mobility systems in Thailand's secondary cities. The conceptual ideas articulated herein establish a crucial basis for forthcoming strategic planning in research, service development, and public policy.

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