



# From service quality experience to advocacy in informal paratransit: A higher-order partial least squares structural equation modelling study in Vietnam



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## Dates:

Received: 21 Sept. 2025  
Accepted: 19 Jan. 2026  
Published: 24 Feb. 2026

## How to cite this article:

Pham, T.Q. & Nguyen, H.T., 2026, 'From service quality experience to advocacy in informal paratransit: A higher-order partial least squares structural equation modelling study in Vietnam', *Journal of Transport and Supply Chain Management* 20(0), a1247. <https://doi.org/10.4102/jtscm.v20i0.1247>

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**Background:** In the context of the green transition and the sharing economy, informal paratransit such as shared rides, shared vans and shared minibuses is becoming an important part that is complementary to the formal public transport system in Vietnam. However, the majority of research in Southeast Asia only separately considers some of the service quality aspects and does not approach it from a general perspective about the service quality experience (SQE).

**Objectives:** This study aims at testing the impact of SQE on satisfaction, loyalty intention and advocacy and word of mouth (WOM) of passengers within the context of informal paratransit in Vietnam. Concurrently, it clarifies the intermediate role of satisfaction in this relationship chain.

**Method:** Service quality experience is conceptualised as a reflective–reflective higher-order construct, formed from five components, including the physical servicescape, in-vehicle amenities quality, staff assurance and empathy, price–value fairness and service system trust (SST). The survey data were collected from 333 passengers who used the informal paratransit service for the last 2 months and analysed by the two-stage approach partial least squares structural equation modelling (PLS-SEM).

**Results:** The estimated results show that SQE positively and strongly affects satisfaction. Additionally, it directly influences and has statistical meaning for loyalty intention and positive WOM. Satisfaction holds a crucial intermediate role, converting the influence of SQE to both loyalty intention and positive WOM of passengers.

**Conclusion:** SQE is the central foundation shaping customer behaviour within informal paratransit. The research extends the stimulus–organism–response (SOR) framework and expectation–confirmation theory (ECT) by modelling SQE as a higher-order construct linked with behavioural outcomes.

**Contribution:** The findings suggest that transport providers and regulatory authorities need to invest in all five SQE components and integrate informal paratransit into Vietnam's sustainable transport development system.

**Keywords:** service quality experience; SQE; informal paratransit; higher-order construct; PLS-SEM model; satisfaction; loyalty intention; advocacy; word of mouth.

## Introduction

In the context of the green transition and the rise of the sharing economy in transportation, flexible transport modes such as informal paratransit, informal public transport, intermediate public transport, shared taxi and demand responsive transport or DRT are increasingly seen as important additional solutions for the traditional public transportation system. In multiple cities in developing countries of the Global South, informal paratransit operates in parallel with formal public transport, using diverse vehicle types such as minibuses, shared taxis, three-wheeled vehicles or motorbike taxis and offering flexible services regarding route, time and fare, thereby being able to fill in gaps that bus and urban rail networks have not covered (Cervero & Golub 2007; Peters & Bhusal 2020). The informal paratransit systems are usually expected to contribute to reduce traffic congestion, save costs for passengers and support sustainable mobility targets through the more effective usage of tangible infrastructure and the decrease of energy consumption and emissions (Bhuyan & Roy 2024; Peters & Bhusal 2020). However, there are plenty of studies

**Note:** Additional supporting information may be found in the online version of this article as Online Appendix 1.

showing that the informal public transport poses significant challenges in terms of traffic safety, vehicle conditions, congestion, air pollution and difficulties in government management because of the informal characteristics, lack of regulation and spontaneous forms of competition (Cervero & Golub 2007; Ndibatya & Booysen 2020). Concurrently, the informal paratransit also plays a crucial role in creating a means of subsistence for labour that lacks necessary skills and providing relatively low transportation service prices for residents who depend on the public transportation network, thereby maintaining access to employment and service in urban and rural areas (Bhuyan & Roy 2024; Hasan, Rumon & Pramanik 2025; Peters & Bhusal 2020). In Southeast Asia, many cities record the increasing development of flexible transport modes and informal paratransit such as jeepneys, minibus taxis, shared taxis or motorbike taxis that are currently operating in a semi-formal manner. Those merely align with urban mobility demand, interprovincial travel and, in some cases, cross-border travels (Bhuyan & Roy 2024; Ndibatya & Booysen 2020; Tiglao et al. 2020).

In Vietnam, modes of informal public transport are quite diverse, including shared taxis, shared rides, shared vans, shared minibuses following flexibly fixed routes, small contract-based vehicles operating as gap-fillers for bus routes, some shared rides, shared vans, shared minibuses operating following informal mechanisms, using multiple types of vehicles ranging from 4-seat to 16-, 29- or 49-seat capacity. They combine booking through digital platforms and direct brokerage. This, hence, reflects a relatively rapid level of adaptivity of passengers to shared-journey vehicles and informal paratransit in a context where transport infrastructure remains uneven across areas (Hasan et al. 2025; Quy Nguyen-Phuoc et al. 2022). On the basis of this approach, the research uses the term informal paratransit to refer to flexible journey-sharing services, in which passengers agree to share a trip on small-medium vehicles with limited seats that operate informally, often departing from passenger-matching agreements between drivers and route organisers. Even though the relationship between service quality, customer satisfaction and customer loyalty has been tested relatively clearly in many different service sectors, most transportation studies in Southeast Asia have focused on discrete factors such as safety, price or reliability, instead of comprehensively considering passengers' service quality experience (SQE) in the context of informal paratransit (Khanh Giao & Vuong 2021; Van Lierop & El-Geneidy 2016). Research in Indonesia and the Philippines, for instance, showed that both online service quality through applications and offline service quality of informal transport, paratransit or bus services influenced significantly trust and customer satisfaction. Meanwhile, loyalty is usually formed through satisfaction rather than directly affected by dimensions of service quality (Joewono & Kubota 2007; Joewono, Matthew & Rizki 2021; Tiglao et al. 2020). Studies on high-speed railway service in Taiwan and the bus system in Seoul also presented a similar trend, where service quality affected loyalty primarily through satisfaction and perceived value of passengers instead of through every

single operational criterion (Chou, Lu & Chang 2014). In China and Japan, some studies highlighted the supportive role of trust and service recovery after incidents in reinforcing the relation between service quality and loyalty, thereby suggesting that practical SQE can include factors related to complaint management and customer relationship maintenance (Xiao & Zhou 2020). Meanwhile, in South Asia, where the informal paratransit and multimodal transport are increasingly developing, lots of studies in India and Pakistan demonstrated that although factors such as price and safety were often considered as basic conditions, it was reliability and service comfort that were directly decisive factors for passengers' satisfaction and loyalty regarding flexible transport modes and informal public transport (Farooq et al. 2025; Rahman, Islam & Hadiuzzaman 2023). After synthesising all these results, it is apparent that these studies mainly use traditional service quality scales and barely conceptualise SQE as a multidimensional higher-order construct (HOC) in the informal paratransit context. Especially in the context of Southeast Asia in general and Vietnam in particular, the number of studies that deeply explore the SQE under a form of higher-order construct for informal paratransit services is quite limited, whereas the practice of implementing flexible transport modes is increasingly diverse. In this research, the author group conceptualises SQE as a reflective-reflective HOC that provides a relatively inclusive and multidimensional reflection of what passengers feel during their journey with informal paratransit services, ranging from tangible factors to factors related to perceived psychology and trust in the system. The research is based on the stimulus-organism-response (SOR) framework and expectation-confirmation theory (ECT) so as to analyse the effect mechanism, in which SQE is viewed as an input stimulus affecting a passenger's internal psychological state, namely satisfaction, thereby leading to behavioural responses such as loyalty intention and positive referral behaviour, advocacy and word of mouth (WOM). On that basis, this study builds three core research questions, focusing on inspecting the role of SQE in determining satisfaction, loyalty intention and WOM behaviour of passengers in the context of informal paratransit in Vietnam:

- How does SQE influence a passenger's satisfaction, loyalty intention and advocacy or WOM in the context of informal public transport in Vietnam?
- How does a passenger's satisfaction play a mediating role in the relationship between SQE and above behaviours?
- Does conceptualising SQE as an HOC provide a more comprehensive explanation of service experience and customer behaviour than traditional measurement approaches based on individual service quality dimensions?

To answer these questions, the author group conducted a quantitative survey with a sample of 333 passengers who used informal public transport in Vietnam at least once during the 12-month period between September 2024 and September 2025. The collected data were analysed by the method called two-stage partial least squares structural equation modelling (PLS SEM), thus allowing the author group to simultaneously

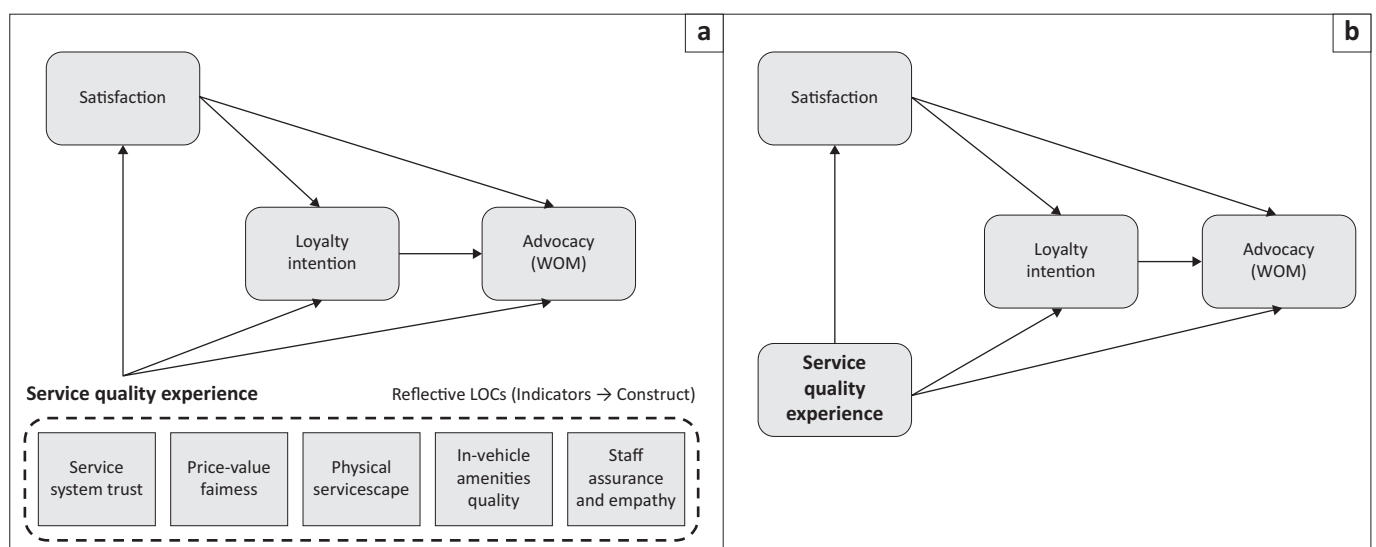
evaluate the higher-order measurement model and structural model among concepts in the same analytical framework. This approach is both suitable for the exploratory research in an emerging market like Vietnam and contributes to reinforcing more empirical evidence for conceptualising as well as measuring SQE as a multidimensional HOC in fields such as informal paratransit. The overall two-stage PLS-SEM framework is illustrated in Figure 1. As a result, it supplements modestly for research forums on transport and supply chain management related to flexible transport modes and informal paratransit in the Global South context (Bhuyan & Roy 2024; Firzan et al. 2025; Peters & Bhusal 2020). Finally, the paper is structured as follows: Section 2 presents the literature review and research model development along with hypotheses, Section 3 describes research methodology, Section 4 reports analytical findings, Section 5 has a discussion on results and suggests theoretical as well as managerial implications, and Section 6 demonstrates the conclusion, limitations and recommendations for further research.

## Literature review

### Service quality experience and higher-order constructs

Service quality experience in the context of informal paratransit, shared taxi and related ride-sharing services is formed on the foundation of synthesising many classical theories on service quality, service experience and perceived value. Foundational models such as SERVQUAL (Parasuraman, Zeithaml & Berry 1988), the servicescape of Bitner (1992) and the perceived value scale (PERVAL) (Sweeney & Soutar 2001), along with approaches on trust in the service relationships (Mayer, Davis & Schoorman 1995), provide a core theoretical foundation to form the lower-order constructs (LOCs) of SQE. At the same time, lots of recent studies on service quality in public transport and informal paratransit have also shown the demand of conceptualising

service quality at a proper level rather than merely considering each isolated dimension (Joewono & Kubota 2007; Peters & Bhusal 2020; Rahman et al. 2023; Tiglao et al. 2020). First and foremost, the SERVQUAL model was used widely with five classical dimensions including tangibles, reliability, responsiveness, assurance and empathy (Parasuraman et al. 1988). A considerable number of studies in the field like public transport, informal paratransit and ride-sharing services were based on SERVQUAL to build and inspect service quality models. Consequently, they showed the remarkable role of dimensions related to the serving behaviour of front-line employees (Chan et al. 2021; Joewono & Kubota 2007; Luke & Heyns 2020). Accordingly, this research inherits and specifies two dimensions, assurance and empathy, into an LOC called staff assurance and empathy (SAE). This structure reflects behaviours such as safe driving, polite attitude, willingness to provide support and ability to understand a passenger's demand during the entire journey (Luke & Heyns 2020; Ojekunle et al. 2021). Within the informal paratransit context, drivers and people directly providing service are regularly the main agents contacting customers. In addition, SAE serves an especially vital role because it can dominate a customer's feeling about safety, trust and decision to return to using the service. Next, the concept servicescape of Bitner (1992) highlighted the role of the physical environment in shaping general service experience. In public transport and informal paratransit, physical servicescape not only consists of vehicle interior but also includes pickup and drop-off points, waiting areas, signage, lighting and sanitation conditions. All of these things contribute to establish initially a passenger's feeling about service quality and their accessibility (Tiglao et al. 2020). Besides, the PERVAL of Sweeney and Soutar (2001) was quickly developed with the aim of emphasising that customers often experienced numerous kinds of different values in a service, including functional value, social value, emotional value and economic value. With the setting of



WOM, word of mouth.

**FIGURE 1:** Two-stage partial least squares structural equation modelling approach: (a) Stage 1 (Measurement Model – lower-order constructs) and (b) Stage 2 (Structural Model – higher-order construct).

informal public transport services, the reality indicates that passengers often evaluate a service not only based on absolute cost but also on the level of fairness between price and received value and by comparing those things with alternative modes of transport such as buses, traditional taxis and technology-based motorbikes (Bhuyan & Roy 2024; Jen & Hu 2003; Vu et al. 2024). Therefore, the research adjusts the centre of PERVAL into a price-value (PV) fairness structure that reflects level of fairness regarding ticket price and reasonability when comparing with other choices. It also presents the overall assessment of the correlation between price and received benefit. The trust aspect is also highlighted in several studies on shared service and public transport, especially when passengers must depend on the booking system, schedule information and mechanisms of guaranteeing safety to make decisions (Hartl, Penz & Schuessler 2025; Mas-Machuca, Marimon & Jaca 2021; Nguyen-Phuoc et al. 2021). Service system trust (SST) within the informal paratransit context comprises believing in transparency regarding information, personal data security if using digital platforms, the reliability of service providers and drivers, as well as the level of compliance with basic commitments like journey, pickup, drop-off time and price. When the passenger has to share their moving space with strangers, SST is able to reduce perceived risks, hence enabling them to accept and maintain using service (Nguyen-Phuoc et al. 2021; Tiglao et al. 2020). In addition to the above classical theories, a considerable amount of recent research on transport service has suggested supplementing another crucial dimension, that is, in-vehicle amenities quality. This structure also reflects the level of adequacy and quality of in-vehicle amenities such as air conditioner, seat system, Wi-Fi connection, power socket, beverage or other simple amenities that are able to make the journey more comfortable (Ittamalla & Srinivas Kumar 2021; Oubahman & Duleba 2024). Even in the context of informal paratransit, the reality shows that service providers tend to increase some basic amenities in an effort to attract customers, especially on interprovincial travel or journeys with long travel times. These amenities not only improve the instant experience but also contribute to increase perceived value and maintain positive feedback about the general service quality (Rahman et al. 2023). Despite the fact that each LOC was tested and confirmed in many independent studies, the integration of those into an HOC, which specifically is SQE, has especially important meaning in terms of both theoretical and methodological aspect. In view of theory, the approach of HOC allows conceptualising service experience in a more general direction. Within the setting of informal public transport, service quality that passengers feel is rarely decided by a single dimension such as price, safety or amenities, but it is the integrative result of numerous factors such as physical servicescape, in-vehicle amenities, serving behaviour of drivers and staff, perceived value and SST (Firzan et al. 2025; Peters & Bhusal 2020). With respect to methodology, conceptualising SQE as an HOC in the framework of PLS-SEM brings lots of benefits. This approach enables to decrease the number of observed variables that are directly brought into the structural model. It, moreover, limits

problems regarding multicollinearity among service quality dimensions that may overlap and concurrently allows testing the efficiency of the HOC for the purpose of explaining the change of outcome variables (Hair & Alamer 2022). More importantly, the usage of HOC reflects more practically because the passengers often form the overall evaluation about service quality, and then discuss satisfaction, intention to return and referral tendency, instead of assessing separately every single aspect. Based on those arguments, this study conceptualises SQE as a reflective-reflective HOC whose lower-order dimensions capture both tangible and intangible aspects of informal paratransit SQE. Such an approach both ensures the theoretical stability when based on classical models like SERVQUAL, PERVAL, trust and servicescape and increases the implications when analysing customer behaviour using informal paratransit in the context of developing economies.

### **Satisfaction, loyalty intention and referral behaviour (advocacy and word of mouth)**

Within the context of informal public transport and related ride-sharing services, satisfaction is usually viewed as a core mediating variable, explained based on the ECT. According to ECT, the level of satisfaction of passengers is established when they compare an actual service experience with their initial expectation. If the actual service experience meets or goes beyond the expectation, confirmation will happen, thereby leading to satisfaction. In reverse, if the actual service experience is lower than the expectation, passengers tend to show dissatisfaction (Fu, Zhang & Chan 2018; Wang, Lin & Liu 2021). Multiple studies within the context of shared service also present that service quality, perceived value and trust in the booking system are vital factors to confirmation. So, they influence on satisfaction and continuance intention (Arteaga-Sánchez et al. 2020; Lim et al. 2022). Furthermore, satisfaction is not only a final result but also acts as an intermediate mechanism connecting the SQE with loyalty intention and referral behaviour, advocacy or WOM. There are many studies on public transport and shared service indicating that when passengers highly evaluate service quality, they tend to be more satisfied, and thus, easily forming continuance intention, as well as willingness to recommend the service for other passengers (Quy Nguyen-Phuoc et al. 2022; Van Lierop & El-Geneidy 2016; Widiанти et al. 2015). The SOR frame enables to specify this role. According to SOR, stimuli from the service environment such as service innovation, in-vehicle amenities, SST or destination image will impact on a passenger's internal psychological state, especially satisfaction and positive emotion; then these states will lead to behavioural responses like loyalty intention and WOM behaviour (Asyraff, Hanafiah & Zain 2024; Su, Swanson & Chen 2018). In the informal paratransit context, SQE can be considered as an integrative stimulus group, reflecting how passengers show their overall perception about service and thus form satisfaction or dissatisfaction. Loyalty intention in this research is comprehended as the level of a passenger's commitment to continuing choosing informal paratransit service, instead of

switching to other alternative modes of transport like public bus, traditional taxi, technology motorbike or personal vehicle. Previous findings demonstrated that satisfaction was the strongest predictive variable to loyalty in the urban transport context, especially when combined with trust and perceived value (Khanh Giao & Vuong 2021; Mai Le & Park 2023; Van Lierop & El-Geneidy 2016). With the context that has many alternative choices regarding price and relatively similar amenities, loyalty intention shows the competitive ability of informal paratransit service on the market. On the contrary, referral behaviour, advocacy or WOM are grasped as a higher behavioural outcome, when passengers are not only satisfied but also willing to recommend the service to their acquaintances and share positive experiences through both offline WOM and online WOM, e-WOM (Hamzah et al. 2023; Quy Nguyen-Phuoc et al. 2022). Studies in the sharing economy field present that WOM is often affected indirectly by service quality through satisfaction and loyalty, trust and social value that the service carries at the same time (Arteaga-Sánchez et al. 2020). When WOM is spread broadly, the attraction of services increases, marketing cost can decrease, and a passenger's trust, therefore, is maintained; this is especially meaningful within the context of informal paratransit that is quite flexible and informal. Consequently, recommendations from current users become a form of important social proof.

## Theoretical foundations

The SOR frame, along with the ECT, creates a stable foundation to explain the relationships among variables in the research model. At the stimulus step, the entire SQE is conceptualised as an HOC forming five LOCs, including physical servicescape, in-vehicle amenities, SAE, price-value fairness and SST. At the organism step, the process of a passenger's internal cognition and emotion is reflected through confirmation and satisfaction. According to ECT, confirmation takes place when the perceived quality is suitable or exceeds initial expectation, thus leading to satisfaction (Fu et al. 2018; Wang et al. 2021). Empirical evidence in the context of carpooling indicates that confirmation acts as a mediating role between service quality and continuance intention, tightly connecting with satisfaction at the same time (Arteaga-Sánchez et al. 2020; Wang et al. 2021). The SOR frame adds an emotional perspective when pointing out that positive internal states like satisfaction, comfortable emotion or emotional attachment can be a bridge ranging from service stimuli to behavioural responses (Asyraff et al. 2024; Su et al. 2018). In relation to response, two main behavioural outcomes considered are loyalty intention and referral behaviour, WOM. Multiple studies in the public transport and shared service field prove that satisfaction is the most crucial predictive factor to loyalty, and it is also a premise of positive WOM behaviour (Hamzah et al. 2023; Mai Le & Park 2023; Quy Nguyen-Phuoc et al. 2022; Van Lierop & El-Geneidy 2016). Within the informal paratransit context, where trust between passengers and service providers is being reinforced, recommendations from satisfied customers can significantly affect a new user's decision, therefore

enabling to stabilise service and develop in an increasingly competitive environment among many diverse modes of transport. In conclusion, the combination between the SOR frame and ECT creates a relatively coherent logical flow: SQE operates as a stimulus, the process of confirming expectation and satisfaction functions as a living entity; loyalty intention and WOM are behavioural responses. This integration relatively exactly reflects both cognition and emotion procedures in service experience and is suitable for empirical proofs related to public transport, shared service and tourism in Asian countries.

## Research model and hypotheses

There are multiple studies in the field of public transport, informal paratransit and shared service confirming that service quality (SQ) is one of the core factors that decides satisfaction (SA), loyalty intention (LI) and WOM of passengers. Based on SERVQUAL, dimensions such as assurance, empathy, tangible elements and reliability are often grasped as directly effective factors on satisfaction as well as intention to return or continuance intention (Chan et al. 2021; Luke & Heyns 2020; Rahman et al. 2023). Existing work on servicescape and perceived value further underscores the importance of physical environment, price-value fairness and trust for long-term usage. When combining these dimensions, SQE is conceptualised as an HOC including five LOCs: physical servicescape, in-vehicle amenities quality, SAE, price-value fairness and SST. According to the SOR frame, SQE acts as a stimulus role in forming service experience, thereby leading to satisfaction as a psycho-biological state. On the basis of ECT, when practical experience is suitable or goes beyond expectation, the process of confirmation takes place and increases satisfaction (Fu et al. 2018; Wang et al. 2021). Next, satisfaction directly affects loyalty intention and WOM behaviour, which are merely viewed as crucial behavioural responses within the context of informal paratransit (Joewono & Kubota 2007; Quy Nguyen-Phuoc et al. 2022; Van Lierop & El-Geneidy 2016). Remarkably, some recent studies have also noted that service quality can directly influence loyalty and WOM behaviour without necessarily going through satisfaction (Lim et al. 2022; Widiyanti et al. 2015). Therefore, inspecting both the direct and indirect effect of SQE at the same time is essential to clearly understand the mechanism of forming customer behaviour in the context of informal public transport. On the foundation of the above theoretical claims and empirical proofs, this study suggests seven specific hypotheses. Firstly, SQE is expected to have a positive impact on satisfaction (SA), because SQE reflects a general evaluation about service quality that passengers experience. This is demonstrated in hypothesis:

**H1:** Service Quality Experience (SQE) positively influences Satisfaction (SA).

Secondly, SQE has potential to influence on LI, when positively assessing the service quality that makes passengers willing to continue using informal paratransit service; this content is mentioned in hypothesis:

**H2:** Service Quality Experience (SQE) positively influences Loyalty Intention (LI).

Thirdly, SQE is also expected to directly affect advocacy or WOM, showing through the willingness tendency to introduce the service to others when passengers have favourable experience; this is generalised in hypothesis:

**H3:** Service Quality Experience (SQE) positively influences Advocacy or Word of Mouth (WOM).

Next, according to ECT and SOR, satisfaction is considered as a bridge between SQE and behavioural outcomes. The research expects that the more satisfied passengers feel, the higher the probability that they will continue to use the service, mentioned in hypothesis:

**H4:** Satisfaction (SA) positively affects Loyalty Intention (LI).

Simultaneously, satisfaction is also anticipated to have necessary contribution to form referral behaviour, WOM, expressed in hypothesis:

**H5:** Satisfaction (SA) positively affects Advocacy or Word of Mouth (WOM).

Finally, based on the viewpoint that SQE can affect LI and WOM through the intermediate psychological mechanism that is satisfaction, this research suggests two intermediate hypotheses:

**H6:** Satisfaction (SA) mediates the relationship between Service Quality Experience (SQE) and Loyalty Intention (LI).

**H7:** Satisfaction (SA) mediates the relationship between Service Quality Experience (SQE) and Advocacy or Word of Mouth (WOM).

Thus, the proposed synthesis model considers SQE as a multidimensional HOC, influencing on satisfaction, loyalty intention and referral behaviour, WOM of passengers within the setting of informal public transport. At the same time, it tests both direct and indirect impacts of SQE in the framework of the two-stage approach PLS-SEM.

## Research methods and design

### Research design

This research uses the quantitative research design in which data are collected through survey questionnaires and analysed by the PLS-SEM. Partial least squares structural equation modelling is particularly suitable when testing complex models that have latent constructs and multivariate relationships, and concurrently puts emphasis on the prediction of the model (Byon & Jang 2024; Sarstedt et al. 2019). With the actual sample size of 333 observations, the data satisfactorily meet the statistical power requirements in the context of PLS-SEM; the experienced rule called the 10-times rule and current sample size guidelines show that this sample size is suitable for estimating model parameters with high arrow-to and for performing stable bootstrapping (Byon & Jang 2024; Hair & Alamer 2022). In the research

model, SQE is conceptualised as a reflective–reflective HOC. To estimate the HOC, this study adopts a two-stage approach to reduce multicollinearity, enhance flexibility when synthesising LOCs and ensure a rigorous evaluation of reliability and validity at both the LOC and HOC levels (Crocetta et al. 2021; Sarstedt et al. 2019). The higher model of SQE is formed from five LOCs, including physical servicescape, in-vehicle amenities, SAE, PV fairness and SST. The dependent variables consist of satisfaction, loyalty intention and advocacy or WOM, which are suitable for the research line in terms of the service quality, pleasure and post-consumption behaviour in transportation (Ha et al. 2019; Kang et al. 2019; Wang et al. 2019).

### Measurement development

The scales adopt a reflective measurement structure and use a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The content of the questionnaires is adjusted appropriately with the context of informal paratransit in Vietnam and presented in detail in Online Appendix 1. In practical data, observed variables are coded consistently with the appendix as follows: PS1–PS5 for physical servicescape, AM1–AM4 for in-vehicle amenities quality, SAe1–SAe5 for SAE, PV1–PV4 for price–value fairness, SST1–SST4 for SST, SA1–SA5 for satisfaction, LI1–LI4 for loyalty intention and WOM1–WOM4 for advocacy or WOM. The process of building questionnaires is conducted through forward–backward translation to ensure semantic accuracy. After that, the questionnaires are reviewed in terms of the language and content according to cultural and travel behaviour characteristics in Vietnam, based on the instruction about the adaptability of the measuring tools in the context of multi-diverse culture (Beaton 2000). Next, a pilot test is implemented to test the transparency and the clarity of the research questionnaires, thereby adjusting how to express and interpret before the official survey.

### Higher-order construct modelling in partial least squares structural equation modelling

The concepts of HOCs in PLS-SEM can be estimated by two popular approaches that are repeated indicator and two-stage (Crocetta et al. 2021; Sarstedt et al. 2019). The repeated indicator approach assigns all observed variables to the lower-order concepts and to the higher-order concepts at the same time. The advantage is simple and direct, especially suitable when both the higher-order and lower-order have a reflective-reflective structure, in spite of the fact that it will increase the likelihood of multicollinearity (Sarstedt et al. 2019). The two-stage approach proceeds to estimate the factor scores of the LOCs in stage 1, then use them as indicators for HOCs in stage 2. This method helps to reduce the complexity, and it is suitable for large-scale models or when the higher-order structures have mixed nature (Cataldo et al. 2023). Because SQE in this research is modelled as a reflective–reflective HOC, we adopt the two-stage approach. This approach includes two estimations: (1) estimate the lower-order model to extract latent variable scores for LOC; (2) use these scores as indicators to estimate

HOC, thereby evaluating directly the contribution level of each LOC to SQE and mitigating the risk of multicollinearity (Sarstedt et al. 2019).

## Sampling and data collection

The survey participants in this research are passengers who used informal paratransit services in Vietnam, including various ride-pooling or shared-seat vehicle categories from 4–7 seat cars to 16–45 seat vehicles. The sample criteria are people who are 18 years of age or older and have used informal paratransit at least once during the 12-month period between September 2024 and September 2025. The data were collected through the online questions built on the Google Forms platform combining with direct survey randomly at some big pickup and drop-off points, so as to increase the diverse level of the survey sample. Before participating, respondents are given full information about the research objectives and guaranteed that all their private data information would be anonymous.

During the data collection process, 333 valid responses were obtained and included in the analysis. There are no excluded answers because of the lack of data or inconsistency, thereby making sure the completeness of the entire input data for analysing the PLS-SEM.

## Data analysis procedures

The data analysis procedures are processed by using SmartPLS 4.0, with the bootstrap technique that repeats 5000 resamples to estimate the reliability of the scale (Hair & Alamer 2022). Firstly, the data are screened to assess and mitigate common method bias (CMB). Secondly, this research uses the full collinearity index to evaluate the ability of CMB appearance. Additionally, inner VIF indicators for endogenous variables are all less than 3.3, thereby reinforcing evidence that CMB does not significantly affect the research outcomes.

The reflective measurement model is evaluated based on three basic criteria. Firstly, the internal reliability is determined by Cronbach's alpha and composite reliability (CR), with a minimum acceptance threshold of 0.70. Secondly, the convergent validity is tested by average variance extracted (AVE); the accepted requirement is above 0.50. Concurrently, outer loadings must be above 0.708 (Vishnoi et al. 2024). Thirdly, the discriminant validity with the square root of mean variance extracted (AVE) condition of each concept must be higher than the correlation coefficient between that concept and other concepts in the model. For the SQE-HOC, the evaluation focuses on reliability indicators, convergent value, as well as statistical significance of path coefficients from five LOCs to HOCs (Crocetta et al. 2021; Sarstedt et al. 2019). In the structural model, multicollinearity among variables is tested by inner VIF. These path coefficients are estimated with high reliability that are confirmed thanks to the bootstrap (Hair & Alamer 2022). The explaining potential of the model is reflected through  $R^2$  indicators. Meanwhile, the

effect size is estimated through  $f^2$ , ability of predictive relevance is evaluated by  $Q^2$ , and the overall model fit is tested through SRMR indicators (Afthanorhan, Awang & Aimran 2020). Eventually, the mediating role of satisfaction in the relationship between SQE → loyalty and SQE → WOM is analysed by the indirect bootstrapping method with bias-corrected confidence intervals. At the same time, the remaining direct effects are compared to identify whether the mediation is a full mediation or a partial mediation.

## Results

### Sample characteristics

The demographic profile and travel behaviour of the respondents indicate a relatively diverse sample that broadly reflects typical users of informal paratransit services in both urban and interprovincial contexts in Vietnam (see Table 1).

The descriptive results show that the gender structure of the sample is quite balanced, with 55.0% being female and 45.0% being male. The age group focuses mainly on the working-age and middle-aged population, of which 59.2% are in the 30–45 age group and 27.0% are under 30 years old; the remaining 13.8% are over 45 years old. In terms of frequency of use, passengers are distributed relatively evenly among the three groups; however, the group using the service 2–3 times in the past 12 months accounts for the highest proportion (47.7%). This suggests that the majority of respondents have a certain level of familiarity with informal transport services (informal paratransit), rather than just being first-time users. In terms of trip purposes, family travel accounts for an overwhelming proportion of 52.0%, followed by corporate travel at 21.3%, while purposes such as business trips, car rental for weddings or other reasons account for a lower proportion. This structure reflects the significant role of informal transport (informal paratransit) in domestic

**TABLE 1:** Demographic and travel behaviour characteristics of the sample ( $N = 333$ ).

Variable	Group	<i>n</i>	%
Gender	Female	183	55.0
	Male	150	45.0
Age	Under 30	90	27.0
	30–45	197	59.2
	Above 45	46	13.8
Frequency of use	First time	67	20.1
	2–3 times	159	47.7
	More than 3 times	107	32.1
Trip purpose	Business	30	9.0
	Company tourism	71	21.3
	Family tourism	173	52.0
	Wedding rental	16	4.8
	Others	43	12.9
Experience with 4-seat car	Yes	193	58.0
Experience with 7-seat car	Yes	211	63.4
Experience with 16-seat car	Yes	142	42.6
Experience with 29-seat car	Yes	84	25.2
Experience with 35-seat car	Yes	67	20.1
Experience with 45-seat car	Yes	77	23.1

tourism activities in small and medium groups. In terms of experience in using different types of vehicles, small 4-seat and 7-seat vehicles have a higher experience rate (58.0% and 63.4%, respectively) compared to large 16–45 seat vehicles with rates ranging from 20.1% to 42.6%. This pattern reflects both the common demand of small family groups and short-term business trips, and shows that there is still a significant proportion of passengers who are used to using large vehicles for large tours or long-distance group trips. In Indonesia, paratransit users are primarily found in the working-age population, with a moderate to high frequency of use and service quality is proved to be a core factor that increases satisfaction and loyalty (Joewono et al. 2021). In the Philippines, studies on two-wheeled vehicles in the informal paratransit areas recorded that the gender structure was quite balanced and the purpose of the journey was biased towards daily commute to work. They affirmed the intermediate role of satisfaction in the relationship between service quality and loyalty (Suhartanto et al. 2020). Meanwhile, in China and other Southeast Asian countries, research on the online booking systems and ride-sharing services showed that trust, service quality and perceived value directly affected passengers' satisfaction and loyalty intention (Chou et al. 2014; Mas-Machuca et al. 2021). In general, the sample structure in this research has many compatible points with the above regional evidence, especially existing in both small and large vehicles in the ecosystem of informal paratransit, as well as the characteristics of users, who are mainly from the working-age group that has a moderate to high frequency of use.

### Measurement model evaluation – Stage 1 (lower-order constructs)

The measurement model testing results for the LOCs show that all measurement scales meet the requirements in terms of reliability and convergent validity. As illustrated in Table 2, all of the scales have Cronbach's alpha indicators above 0.850, in which the highest indicator is SAE (0.916) and the lowest one is PV fairness (0.850). Simultaneously, composite reliability (CR/rho\_c) indicators all exceed the recommended threshold of 0.70 to 0.80, thereby confirming the stability and the internal consistency of the scales (Byon & Jang 2024; Hair & Alamer 2022). On the other hand, AVE indicators of the scales are above 0.50, fluctuating in the

**TABLE 2:** Construct reliability and validity – Lower-order construct reliability and validity.

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Advocacy (WOM)	0.873	0.875	0.913	0.724
In-vehicle amenities quality	0.864	0.866	0.907	0.710
Loyalty intention	0.892	0.892	0.925	0.755
Physical servicescape	0.878	0.879	0.911	0.672
Price-value fairness	0.850	0.850	0.899	0.689
Satisfaction	0.906	0.906	0.930	0.727
Service system trust	0.859	0.859	0.904	0.703
Staff assurance & empathy	0.916	0.917	0.937	0.749

WOM, word of mouth.

range of 0.672–0.755. For SQE in particular, AVE reaches 0.582; even though it is lower than other scales, it still exceeds the recommended threshold for convergent validity in studies adopting PLS-SEM (Afthanorhan et al. 2020; Hair & Alamer 2022). Therefore, it is reasonable to jump to the conclusion that all of the latent constructs in this research, including advocacy, loyalty intention, satisfaction and all components of SQE, meet the standards regarding reliability and convergent validity (Calero Valdez et al. 2023). In parallel, the discriminant validity value is tested through the standards of the Fornell–Larcker criterion and is presented in Table 3. The results demonstrate that the square root of AVE are the values on the diagonal for each construct, which are higher than the off-diagonal correlation coefficients. For example, advocacy = 0.851, loyalty intention = 0.869, satisfaction = 0.853, SAE = 0.866, all are suitable with the recommended threshold of PLS-SEM in relation to ensure discriminant values (Afthanorhan et al. 2020; Byon & Jang 2024). To have a steadier foundation for further evidence, the analysis of cross-loadings indicates that each indicator has the highest loading factor on the constructs it measures. For instance, WOM1–WOM4 variables have loading factor from 0.826 to 0.871 on advocacy; LI1–LI4 variables are from 0.862 to 0.880 on loyalty intention; and SA1–SA5 variables are from 0.836 to 0.877 on satisfaction. This confirms that only indicators are suitable for the original construct of their own, thereby making sure the indicator-level discriminant validity (Afthanorhan et al. 2020). In conclusion, the analysis findings in stage 1 show that LOCs in this research meet all reliability, convergent validity and discriminant validity standards.

### Re-evaluate the second-order model – Stage 2 (higher-order construct reflective–reflective, two-stage)

The analysis results in stage two show that the second-order variable SQE is stably measured through five LOCs. The outer loadings fluctuate from 0.886 to 0.916, all exceeding the recommended threshold of 0.70 with the reflective model (Hair & Alamer 2022). The synthesis indicators also confirm reliability and convergent value at the HOC level, when Cronbach's alpha = 0.947, CR = 0.959 and AVE = 0.824. These findings present that SQE fully meets the criteria of a reflective–reflective HOC when being implemented according to the procedure of two-stage in PLS-SEM (Byon & Jang 2024; Sarstedt et al. 2019). In addition, the collinearity

**TABLE 3:** Discriminant validity (Fornell–Larcker criterion) – lower-order construct.

Construct	WOM	AM	LI	PS	PV	SA	SST	SAe
WOM	0.851	-	-	-	-	-	-	-
AM	0.757	0.843	-	-	-	-	-	-
LI	0.802	0.737	0.869	-	-	-	-	-
PS	0.799	0.782	0.744	0.820	-	-	-	-
PV	0.766	0.752	0.761	0.796	0.830	-	-	-
SA	0.824	0.746	0.813	0.799	0.788	0.853	-	-
SST	0.761	0.707	0.738	0.794	0.820	0.776	0.838	-
SAe	0.798	0.788	0.780	0.782	0.782	0.798	0.797	0.866

WOM, word of mouth; AM, in-vehicle amenities quality; LI, loyalty intention; PS, physical servicescape; PV, price-value fairness; SA, Satisfaction; SST, service system trust; SAe, staff assurance & empathy.

test in the inner model shows that all variance inflation factors are below 5; meanwhile, the highest is 4.768 with SQE → advocacy. This is absolutely suitable with the standards of PLS-SEM and not creating any barriers for explaining path coefficient interpretation indicators (Afthanorhan et al. 2020; Hair & Alamer 2022).

### Structural model results

The results from the bootstrap analysis with 5000 resamples only point out that all the paths in this model have statistical significance. The standardised path coefficients and significance levels are summarised in Figure 2 and Table 4. Service quality experience is strongly impactful on satisfaction ( $\beta = 0.861, p < 0.001$ ), and it concurrently significantly affects loyalty intention ( $\beta = 0.499, p < 0.001$ ) and advocacy (WOM) ( $\beta = 0.458, p < 0.001$ ). Moreover, satisfaction plays a mediating role, continuing to transfer the influence from SQE to loyalty intention ( $\beta = 0.383, p < 0.001$ ) and advocacy ( $\beta = 0.216, p = 0.001$ ), thus reflecting a hierarchical mediation mechanism which is often seen in transportation service behaviour models (Byon & Jang 2024; Calero Valdez et al. 2023). The adjusted  $R^2$  coefficients for the three endogenous variables demonstrate a very good explanatory power: advocacy = 0.772, loyalty intention = 0.723 and satisfaction = 0.741 (see Table 5). All of these values exceed common thresholds in PLS-SEM applied studies (Hair & Alamer 2022). Regarding the effect size ( $f^2$ ), the

relationship from SQE to satisfaction yields  $f^2 = 2.865$ , which far exceeds the conventional 0.35 threshold for a large effect in PLS-SEM; therefore, it can be classified as very large. This implies that SQE accounts for a substantial additional portion of the variance in satisfaction, thereby reinforcing SQE's central role in the model. Meanwhile, the SQE → loyalty ( $f^2 = 0.233$ ) and SQE → advocacy ( $f^2 = 0.194$ ) relationships are medium effects. Satisfaction shows a significant mediating role with  $f^2 = 0.138$  for loyalty and  $f^2 = 0.065$  for advocacy, and loyalty → advocacy has  $f^2 = 0.057$ , reflecting a small but

TABLE 4: Path coefficients (Bootstrap results, 5000 resamples).

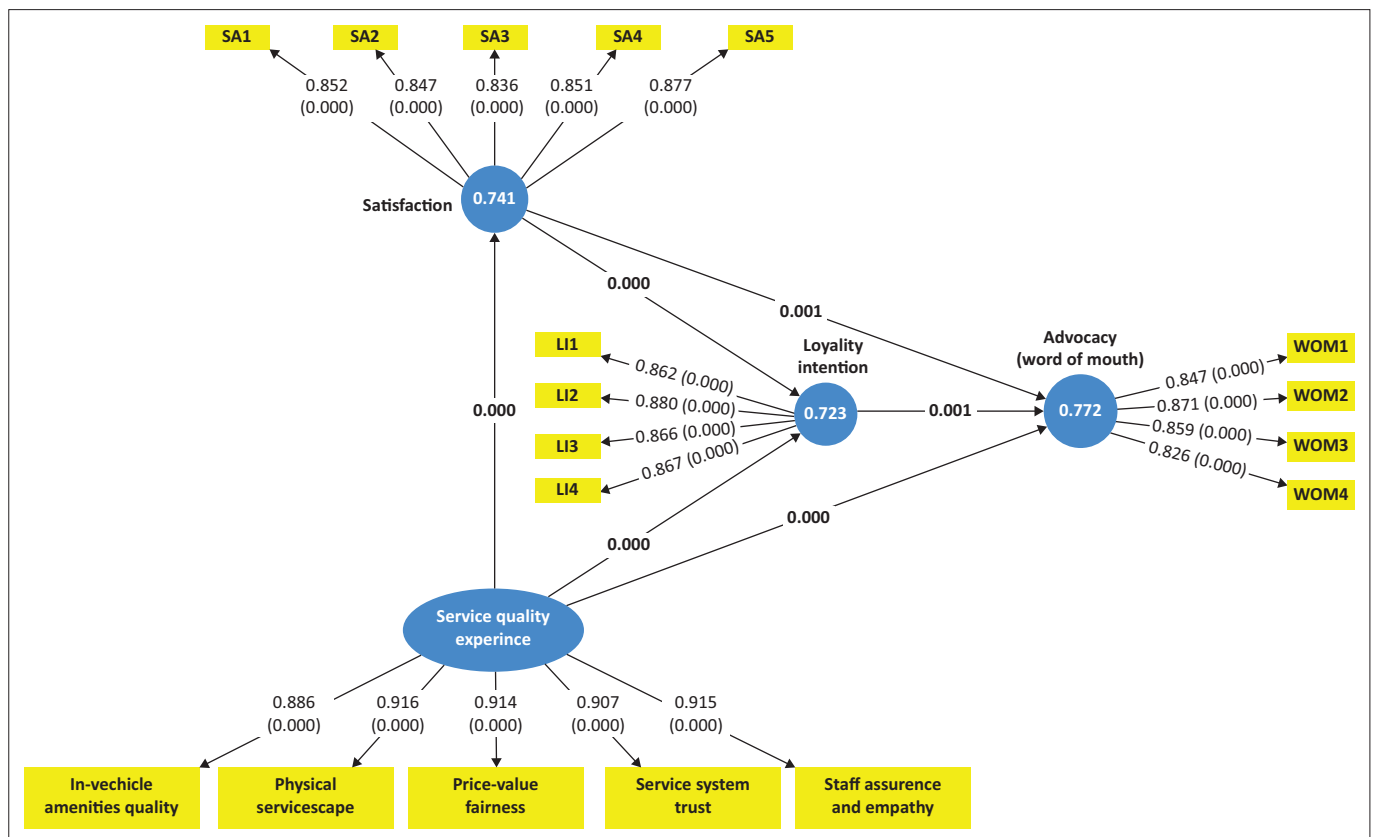
Path	$\beta$ (O)	Mean (M)	s.d.	t	p
Loyalty intention → advocacy (WOM)	0.216	0.219	0.063	3.408	0.001
Satisfaction → advocacy (WOM)	0.255	0.252	0.075	3.374	0.001
Satisfaction → loyalty intention	0.383	0.383	0.082	4.651	0.000
SQE → advocacy (WOM)	0.458	0.457	0.073	6.227	0.000
SQE → loyalty intention	0.499	0.499	0.078	6.363	0.000
SQE → satisfaction	0.861	0.861	0.017	49.268	0.000

WOM, word of mouth; SQE, service quality experience; s.d., standard deviation.

TABLE 5:  $R^2$  adjusted and effect size ( $f^2$ ).

Endogenous construct	$R^2$ adjusted	Predictor → Outcome	$f^2$
Advocacy (WOM)	0.772	Loyalty intention → advocacy	0.057
		Satisfaction → advocacy	0.065
		SQE → advocacy	0.194
Loyalty intention	0.723	Satisfaction → loyalty	0.138
		SQE → loyalty	0.233
Satisfaction	0.741	SQE → satisfaction	2.865

WOM, word of mouth; SQE, service quality experience.



WOM, word of mouth.

FIGURE 2: Bootstrap results (5000 samples) for the reflective-reflective higher-order construct model.

significant effect (Afthanorhan et al. 2020; Hair & Alamer 2022). Overall, the structure of results reinforces and supports the centre point of this study: service quality experience not only directly affects loyalty intention and forms advocacy or WOM behaviours but also indirectly goes through satisfaction. This is consistent with recent empirical evidence in the transportation field and digital services when using PLS-SEM (Byon & Jang 2024; Calero Valdez et al. 2023).

## Discussion

The analytical results once again affirm the central role of SQE in forming satisfaction, loyalty intention and advocacy or WOM of passengers when they use informal paratransit services in Vietnam. This proves that service quality, under a general experience perspective, has a foundational role in the valuable relationship chain of service quality within the context of informal paratransit. The findings also indicate that satisfaction holds a core intermediate role, transferring the impact from SQE to loyalty intention and advocacy. Specifically, the intermediate influence stream from SQE to loyalty intention through satisfaction reached  $\beta = 0.383$  ( $p < 0.001$ ), and the one from SQE to advocacy through satisfaction reached  $\beta = 0.255$  ( $p = 0.001$ ). These figures reinforce the claim of ECT. Accordingly, satisfaction reflects the level of match between initial expectation and practical experience, thereby shaping passengers' next behaviours (Oliver 2014). On the other hand, the results indicate that loyalty intention also directly affects advocacy with  $\beta = 0.216$  ( $p = 0.001$ ), although the level of impact is lower compared to satisfaction's influence. This suggests that passengers are willing to refer the service to others even when their loyal commitment has not been really strong yet. In the context of informal paratransit, where passengers have many alternative choices such as contract-based vehicles, high-quality cars, bus rapid transit (BRT) or ride-hailing services, the role of satisfaction seems to be more important than loyalty intention in driving advocacy behaviour. In other words, only a good experience on a few trips is enough to encourage passengers to share their word-of-mouth behaviour, even when they still maintain multichoice behaviour among different modes of transport. The adjusted  $R^2$  indices for three internal variables reflect the strong explanatory power of the research model. When put into comparison with other studies in the public transport field in Asia, this level of explanation can be relatively high. For example, the research on high-speed railway in Taiwan showed that the adjusted  $R^2$  of satisfaction only reached average and mainly depended on tangible factors such as hygiene, comfort and punctuality (Chou et al. 2014). Meanwhile, within the environment of informal paratransit in Vietnam, the concept of SQE is built from several aspects of service, adjusted from the foundational model like SERVQUAL, PERVAL and research on trust. Hence, the conceptual structure becomes richer in dimensions and considerably fosters the predictive capacity for satisfaction, loyalty intention and advocacy. Another notable

characteristic of this study lies in the design of the SQE measurement scale as a reflective–reflective HOC, consisting of five components: physical servicescape, in-vehicle amenities quality, SAE, price–value fairness and SST. It simultaneously remedies the limitations of numerous previous studies which merely considered service quality from separate dimensions. The modelling of SQE as a second-order construct is compatible with the methodology recommendations in PLS-SEM, enabling to support cutting down on the number of direct predictive indicators, limiting multicollinearity. It, moreover, is able to test the efficiency of a higher-order abstract structure (Hair & Alamer 2022). When placing the research results in the ASEAN regional picture, it can be seen that there are both similarities and notable differences. In Indonesia, paratransit service primarily serves daily commute demand, and the passenger's satisfaction and loyalty much depend on reliability and operational efficiency, for example, frequency, waiting time and accessibility (Joewono et al. 2021). In the Philippines, studies in passenger motorbikes in informal paratransit regions obviously demonstrate the intermediate role of satisfaction in the relationship between service quality and loyalty. This result is quite similar to the findings of current research (Suhartanto et al. 2020). While in China and some Southeast Asian countries, research on ride-booking platforms, ride-hailing services and carpooling models shows that trust, service quality and perceived value all directly affect satisfaction as well as loyalty intention (Chou et al. 2014; Mas-Machuca et al. 2021). This study supplements some typical cases in Vietnam, where tangible factors like physical servicescape and in-vehicle amenity quality exist in parallel with intangible factors like SST and empathy, thereby creating a dual-effect mechanism on the passenger's satisfaction, loyalty intention and advocacy. From the theoretical perspective, these findings contribute to reinforce the SOR frame. In this model, SQE serves as an external stimulus role; satisfaction and loyalty intention reflect the organic state, that is, the internal psychological and cognitive state; besides, advocacy and WOM express behavioural response. The finding of a strong intermediate role of satisfaction is also compatible with the argument of social exchange theory (SET). Accordingly, the passenger tends to compare perceived benefit and cost before making a decision to make commitment with the service (Blau 2017). At the same time, SQE affects all factors, including satisfaction, loyalty intention and advocacy, which suggests a hierarchical mechanism during the process of forming experience and behaviour, in which SQE not only stops at evaluating cognition but also spreads to emotion, commitment and WOM or advocacy.

## Implications

### Managerial implications

The research findings suggest numerous managerial implications for the providers involved and informal paratransit service organisations, including the transport enterprises, route-based transport cooperatives, contract-based vehicle operators and digital platforms that connect

trips. Firstly, SQE is found to have highly strong impacts on satisfaction and significantly affect loyalty intention as well as advocacy. This means that the operational units need to systematically invest in all five components of service quality, rather than only focus on price or some individual in-vehicle amenities. With the aim of upgrading the physical servicescape, comprising the technical state of the vehicle, spaciousness and cleanliness, comfort of the seat, air conditioner system and luggage arrangement, these factors will directly affect the passenger's tangible experience. At the same time, the in-vehicle amenity quality such as Wi-Fi connection, beverage and mobile device charging port, if provided properly, will increase the perceived value that passengers feel during the whole journey. Staff assurance and empathy also need to be focused on, because safe driving skill, polite attitude, ability to explain the route and problem-solving skills of drivers or route operators all have important contributions to the passenger's safe feeling and satisfaction. Therefore, training soft skill, serving attitude and complaint processing competence for route operating staff can support reinforcing the passengers' trust and long-term engagement intention. On the other hand, the factor PV fairness needs to be guaranteed through the transparent price policy, clear information regarding costs, surcharges and cancellation terms, to reduce perceived risk and prevent unexpected surprises related to price. Last but not least, SST can be built by adopting the transparent technological solutions such as an online booking system, customer responses mechanism and publication on journey evaluation. When the SST is maintained, not only does satisfaction increase but the probability of referring the service from passengers to others is also higher. In the face of strongly intensive competition with application-based booking services, higher-quality vans and other modes of public transport, the strategy focusing on enhancing SQE, rather than price competition, will be useful for the informal paratransit providers to build a more stable competitive advantage and maintain loyal customer bases.

### Policy implications

This study also brings some vital implications for the governmental administration in the transport field. First and foremost, the empirical results affirm the role of the informal paratransit as an additional key linkage for the public transport, contributing to decreasing traffic congestion on interprovincial routes and better connecting areas that are not covered by urban bus or railway routes. As a consequence, the governmental authorities need to build a clear and stable legal framework for this type of transport, which ensures both safety and the passenger's benefit, as well as creation of the favourable conditions for the operation of businesses and family-run businesses. Secondly, SQE being proved to have a strong impact on satisfaction and loyalty intention shows that the government can encourage businesses to switch gradually from price competition to service quality competition. Simultaneously, the policy of digital technology implication encouragement in booking management, journey monitoring and complaint processing will contribute to enhance trust in the system, which is suitable for the smart urban development

orientations. Thirdly, the integration of informal paratransit into sustainable transport planning is also an essential aspect. Experiences from Thailand present that paratransit and forms of carpooling can play a role as feeder services connecting to urban rail or BRT when supported by the proper policies (Phun, Kato & Chalermpong 2019). If pick-up and drop-off points for informal transport services are arranged near interprovincial stations, train stations and public transport hubs, Vietnam can create efficient solutions for passengers to change means of transport more easily and reduce pressure on the personal vehicle system.

### Theoretical implications

In terms of theoretical perspective, this study contributes at least three critical suggestions. Firstly, the research identifies the value of measuring SQE as a reflective-reflective second-order construct in the field of transport, instead of the approach that only uses individual dimensions of SERVQUAL or discrete component variables. This conceptualising allows linking both tangible and intangible dimensions of service quality into a unified structure, suitable with the nature of informal paratransit service experience. Secondly, the findings regarding the strong mediating role of satisfaction contribute to expand the scope of the implication of ECT within the context of shared service and informal paratransit. The research shows that satisfaction is not only a simple intermediate variable but also a decisive linkage in the effective chain from SQE to loyalty intention and advocacy. This suggests that in the future, further research can continue to break down the components of the expectation confirmation process, for example, tangible quality confirmation, safety confirmation or PV fairness confirmation. Thirdly, the research model showing that passengers consider perceived value relative to price before deciding to commit to the service opens up multiple avenues to integrate additional variables such as perceived risk, hedonic motivation or social influence into future models so as to clarify the behavioural decision mechanism. In conclusion, this study not only provides empirical proofs for the Vietnamese market but also serves an important role in the international discourse regarding service quality, satisfaction and loyalty in the field of share-riding and informal paratransit.

## Conclusion and future research directions

This research tests the role of SQE as a reflective-reflective second-order construct within the setting of informal paratransit in Vietnam. The data analysis from 333 passengers presents that SQE has highly strong impact on satisfaction with  $\beta = 0.861$  ( $p < 0.001$ ) and significantly influences loyalty intention with  $\beta = 0.499$  ( $p < 0.001$ ) as well as on advocacy with  $\beta = 0.458$  ( $p < 0.001$ ). Satisfaction holds the core role in converting the effect from SQE to behavioural outcomes. With regard to the academic aspect, the study contributes three main points. Firstly, it affirms the value of measuring SQE as a multidimensional second-order construct, instead of only considering discrete dimensions. Secondly, it also

expands the implications of the SOR and ECT frameworks by demonstrating the relationship chain SQE → satisfaction → loyalty intention and advocacy in the context of informal paratransit. Thirdly, this research reinforces the theoretical claims of SET when showing that passengers consider benefits and costs before making decision to maintain their commitment with the service. From a practical standpoint, the findings recommend that service providers should invest coherently in all five components of SQE, from infrastructure upgrading, in-vehicle amenities and staff training to transparent policy establishment and maintaining system trust. For managers, the need for a clear regulatory framework for informal paratransit and for integrating this mode of transport into sustainable transport planning is particularly vital for reducing traffic congestion and supporting smart urban development. However, the research still has some certain limitations. For instance, the sample size was not very large, the survey scope only focused on a single country and did not deeply exploit the electronic WOM (e-WOM) data or regional cultural differences. In the upcoming time, the research can be expanded in the direction of measurement invariance of composite models (MICOM) and multi-group analysis to make comparison among countries such as ASEAN, South Asia and East Asia. Additionally, integrating e-WOM data from digital platforms and modelling the influence of factors related to AI-driven ride-sharing services, such as flexible pricing, algorithmic transparency and intermediary regulatory structures, are also promising directions. The longitudinal research design and using multi-data sources will be able to enhance the causal inference capability and better control deviation because of the measurement source. Eventually, the adjustment of SQE scale to be suitable for different local contexts and the expansion into researching modal shift behaviour will support advancing the generalisation and predictive relevance of models of the shared mobility ecosystem.

## Acknowledgements

We, the authors of this study, want to express sincere thanks to the Socio-Economic Research Institute and the School of Business and Economics of Duy Tan University for their unstoppable support during our research period. We also highly appreciate the cooperation of the Faculty of Statistics – Informatics of Da Nang University of Economics. With these valuable, precious contributions, this study will definitely be successful. Especially, the authors also would like to express a deep gratitude to all participants who volunteered, spent time and were ready to share opinions for our survey. Thus, it is very essential to make this research become feasible. All of the individuals and organisations agreed to be recorded and mentioned in this study.

## Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## CRedit authorship contribution

Tin Q. Pham: Formal analysis, Investigation, Methodology, Writing – review & editing. Ha T. Nguyen: Conceptualisation, Data curation, Methodology, Project administration, Resources, Software, Supervision. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

## Ethical considerations

Ethical clearance to conduct this study was obtained from the Duy Tan University Research Ethics Committee (No. 097-CN-UREC).

## Funding information

The research was sponsored by Duy Tan University through the support of the Socio-Economic Research Institute and the School of Business and Economics. The sponsor unit does not participate in this research, data collection, analysis, result interpretation or preparation of the article.

## Data availability

The data that support the findings of this study are available on request from the corresponding author, Ha T. Nguyen. The data are not publicly available because ensuring the confidentiality of all participants is required.

## Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency or the publisher.

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