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"Scootouring" the city: exploring travellers' behaviour and their environmental moral obligation

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Abstract

Purpose – This study aims to explore travellers' behavioural intentions and actual usage of e-scooters for city tour ("scootouring") in urban tourism settings. This study applying the theory of planned behaviour and examining the moderating role of environmental moral obligation.

Keywords Theory of planned behaviour, E-scooter, City touring experience, Behavioural intention, Actual behaviour, Environmental moral obligation

Paper type Research paper

1. Introduction

Transportation has always played a key role in human civilisation, enabling the movement of goods, services and people, thus driving trade and accessibility to essential services like education and health care (Dileep and Pagliara, 2023). Over time, transportation technology advanced, encompassing various modes such as road, rail, air, water and pipelines to meet diverse needs (Chen *et al.*, 2021; Sanchez-Garcia *et al.*, 2021). This evolution extended into tourism and smart city development, with transportation being essential for tourism growth and city planning (Nastjuk *et al.*, 2022; Rauf *et al.*, 2021).

A recent development of transportation in urban mobility is micromobility, which refers to lightweight vehicles like e-scooters, e-moto and e-car sharing designed for short-distance travel (Nikiforiadis *et al.*, 2021; Kim *et al.*, 2023). Micromobility provides a convenient alternative to traditional transport modes and has grown in popularity since e-scooters were introduced in 2018. Their widespread adoption has even reduced the use of conventional transport or car dependence for leisure trips in urban areas (Roig-Costa *et al.*, 2024). Moreover, Bretones and Marquet (2022) found that non-functional factors such as environmental concern or social perception together functional benefits derived from e-micromobility everyday use (affordable, convenient, practical, accessible) can be even more influential for electric mobility modal choice. Thus, cities

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around the world are investing and promoting newly emerging micromobility vehicles like shared e-scooter to meet the growing demand for sustainability.

Interestingly, Şengül and Mostofi (2021) argue that although e-scooter is a new mode of urban transportation, the role of e-scooter as an alternative of sustainable vehicle for short distance touring and its usage for fun and recreational travel purposes are still questionable. The aforementioned statement was also supported by other researchers as they claimed that e-scooters might not be as sustainable as expected because of their potential to increase the life-cycle emissions compared with other modes of transport (Felipe-Falgas *et al.*, 2022; Orvin *et al.*, 2022). Besides that, market penetration of micromobility is yet to achieve optimally among travellers due to policy setting set by the local authority, lack of charging infrastructure and high pricing (Esztergár-Kiss *et al.* 2022; Lee *et al.*, 2021). On that note, research on the usage and user behaviour of micromobility vehicle like e-scooter is perceived as important in the tourism industry and urban cities context.

From tourism term, tourists' willingness to use e-scooters during their travels is influenced by factors such as convenience, environmental concerns and prior experience with technology (Esztergar-Kiss *et al.*, 2022; Gössling, 2020). As conventional transportation contributes to CO_2 emissions, energy-efficient options like e-scooters are viewed as essential for reducing air pollution in urban environments (Dias *et al.*, 2021; Gühnemann *et al.*, 2021). Moreover, e-scooter usage is increasingly seen as part of travellers' pro-environmental behaviour, replacing walking and cycling for short trips (Nikiforiadis *et al.*, 2021). Nonetheless, Wu *et al.* (2021) note that travellers' moral beliefs about environmental responsibility don't always align with their actions.

Various tourism studies investigated determinants of intention to use e-scooters from different settings and theories. For instances on shared e-scooter, Askari *et al.* (2024) examined service quality, loyalty and environment consciousness of Chicago, USA citizens and shared e-scooter travel experience among Singaporean tourists (Cao, 2025). Meanwhile, on the private e-scooter usage, researchers have conducted stated preference experiment study on e-scooter for travel usage at five different countries (Esztergár-Kiss *et al.*, 2022). In Greece, Nikiforiadis *et al.* (2024) investigate on the satisfaction of private e-scooter usage for leisure tour purposes which derived from several internal and external determinants. Although studies on shared e-scooter seems extensive, yet researchers perceived understanding on other factors which derived from strong underpinning theory and different setting is crucial (Sheykhfard *et al.*, 2025) as certain countries might have different policies imposed on the e-scooter usage for tourism purposes.

Based on the discussion above, this study aims to examine the factors influencing tourists' behavioural intentions (BI) and actual behaviour (AB) regarding shared e-scooter usage for touring purposes. By extending the theory of planned behaviour (TPB), it explores the impact of attitudes (ATT), subjective norms (SN) and perceived behavioural control (PBC) on BI and how BI influences AB. It also examines the moderating role of environmental moral obligation (EMO) in these relationships. From practical term, this study offers insights for the tourism industry. It sheds light on travellers' adoption of shared e-scooters, filling a gap in the literature on smart tourism transportation and sustainability. The findings can help policymakers and industry stakeholders promote shared e-scooters as a sustainable and enjoyable transportation option for urban tourism.

2. Literature review

2.1 Escooters as an alternative mode of sustainable transportation for tours

Smart Tourism Destination (STD) is a model of an attractive city based on the using of Information and Communications Technologies development. The concept of a STD

involves a holistic approach to urban economic development, incorporating technological innovation, environmental sustainability, effective governance and an enhanced quality of life (Ivars-Baidal *et al.*, 2023). Lee *et al.* (2020) stated that one of the main domains of the smart city is transportation and its infrastructure. Additionally, the development of sustainable and smart urban transportation solutions is associated with the United Nations Sustainable Development Goals (SDGs) that closely related SDG 11: Sustainable cities, SDG 12: Responsible consumption, SDG 8: Decent work and economic growth as well as SDG 9: Industry, innovation and infrastructure (Mavlutova *et al.*, 2023). In brief, this integrated approach seeks to leverage advancements in technology and data to create more efficient, sustainable and livable environments.

Micromobility has gained much attention in past years, from e-car sharing, e-moto, station-based bike-sharing to e-bike-sharing and e-scooter sharing (Guo and Zhang, 2021). Precisely, e-scooters are a new addition to urban transportation systems, and their immediate impact became swiftly evident. Nikiforiadis *et al.* (2024) claimed that e-scooters together with other modes of transportation can be easily forming sustainable mobility options which against the private car usage. Moreover, urban transportation planners have embraced e-scooters as a viable alternative to conventional motorised individual transportation, particularly fuelled automobiles as well as walking (Gössling, 2020).

E-scooters which are classified as Electric-Powered Two-Wheelers, have emerged as a promising alternative mode of transportation due to its features; lightweight, easy to manoeuvre with optimum acceleration (Jiao and Bai, 2020; Kim *et al.*, 2023). The environmental externalities of e-scooters are subject to debate which led to their low utilisation rates especially at urban cities (Askari *et al.*, 2024). Previous studies indicate that e-scooters contribute slightly higher CO_2 emissions per kilometre compared to alternative transportation modes, primarily due to their relatively short lifespan (Gebhardt *et al.*, 2022; Sheykhfard *et al.*, 2025). Other studies postulate that shared e-scooter has faced certain visible issues or conflicts like blocking sidewalks (Kim *et al.*, 2023), lacking regulation in e-scooter usage, safety issue (Guo and Zhang, 2021) and perceived seldomly as a complementary element of public transportation (Esztergar-Kiss *et al.*, 2022). Therefore, while e-scooters present some advantages in terms of design and accessibility, their role in promoting truly sustainable urban transport requires more critical evaluation. Rather than assuming their environmental benefit, stakeholders should focus on addressing the lifecycle emissions, governance and systemic integration needed to make e-scooters a genuinely sustainable mobility option.

Globally, e-scooter have gained popularity among urban citizens through the widespread adoption of shared services and the notable expansion of their market size in the world. Despite those negative issues, local authorities or governments have invited certain companies to facilitate the shared e-scooter supplies like Beam, Neuron and Grab Wheels in accelerating the adoption of green transportation. Evidently, this move responds to the demand for sustainable transportation and aims to mitigate traffic congestion (Orvin *et al.*, 2022). In fact, Sheykhfard *et al.*, (2025) perceived shared e-scooter is a niche mobility vehicle that not only a solution to first and last-mile transportation problems in metropolitan areas, but provides a faster way to commute longer distances within the cities. The aforementioned statement is supported as more than 220 main cities across the USA and Europe were accessible on the usage of shared e-scooter services in 2019. Furthermore, there has been a growing demand with regards to private e-scooters. The use of private e-scooters dominated the industry in 2022 accounting for close to 70% of the overall revenue (Nikiforiadis *et al.*, 2024). These researchers also found that riders of private e-scooters and

leisure travellers are more likely to perceive greater satisfaction by the use of their own e-scooters, comparing with the use of shared one.

Precisely on tourism views, these shared e-scooter services provide flexible and sustainable transportation options for short-distance travel and tour experiences, contributing to the evolving landscape of urban mobility (Esztergar-Kiss *et al.*, 2022; Nikiforiadis *et al.*, 2024). In essence, the integration of e-scooters into urban transportation systems is motivated by their potential to offer a sustainable and flexible alternative to conventional individual transportation, especially in congested areas. The evolving landscape of urban mobility emphasises the ongoing quest for efficient, eco-friendly solutions to address contemporary transportation challenges. Moreover, Orvin *et al.* (2022) stated that shared e-scooter demand for touring around the cities is more likely to be higher during holidays like summer season, weekend or days without rainfall. In fact, they also found that higher density of hotels and younger population in that country might induce higher demand.

For this study context, adoption rate of e-scooter is still at its infancy phase in Malaysia (Al Mamun *et al.*, 2024). They also added that this issue could be due to lack of consumer awareness on green issues as well as vague regulations imposed by the government lead to the e-scooter adoption rate. Under the Malaysia Road Transport Act 1987 (RTA), e-scooters are classified as "motor vehicles" and are subject to regulations similar to those applicable to cars and motorcycles. Hence, riders of e-scooters must comply with requirements such as wearing helmets, displaying number plates and adhering to speed limits. Unlike other advanced Asia countries like China and Japan, Centre of Regional Strategic Studie (2024) stated that the Malaysia's regulatory gap of e-scooter usage results in confusion among users, law enforcement and city planners regarding rights, responsibilities and legal protections. Despite the increasing attention on micromobility over the last few years, the research efforts that aim to shed light on the reasons of using e-scooters are still too limited, particularly on tourism realm. Thus, this study aims to investigate further the factors that could influence BI and AB of travellers in using shared e-scooter for city tourism purposes in Malaysia context.

2.2 Theory of planned behaviour

Ajzen's (1991) TPB extends the Theory of Reasoned Action with four key constructs: attitude (ATT), SN, BI and AB. This model has been widely adopted in tourism research due to its ability to accommodate both rational decision-making and contextual constraints (Rozenkowska, 2023; Ulker-Demirel and Ciftci, 2020). A notable advancement in TPB is the introduction of PBC, which enhances the explanatory power of the model. This construct acknowledges that BI is not shaped solely by attitudes and perceived social norms but also by an individual's resources and ability to perform the intended behaviour (Bui, 2023; Chen *et al.*, 2021).

Firstly, attitude refers to the positive or negative evaluation of the behaviour. A set of attitudes towards the behaviour, defined as a person's evaluation of a specific behaviour with regards to its favourability or attractiveness (Juschten *et al.*, 2019). Within the context of tourism and transportation, attitude encompasses an individual's assessment of a transport mode based on factors such as convenience, aesthetics and performance. For instance, tourists may favour eco-friendly transportation options such as electric buses, e-scooter and high-speed rail for its modernity, ease of use and time efficiency (Bakti *et al.*, 2020; Huo *et al.*, 2021). Overall, a positive attitude towards such features can enhance the likelihood of these transportation adoption.

The second component, SNs refer to the perceived social pressure to engage or not engage in a behaviour on certain activities (Ajzen and Fishbein, 1988). It relates to a person's opinions about whether peers and important persons in his or her life should engage in the

behaviour. Ulker-Demirel and Ciftci (2020) stated that SNs are about perceptions of people who intend to perform on certain behaviour whereby it may not reflect in reality what others think. From the transportation perspective, SN related to the perceived social pressure that comes from family members or close friends that encouraged to use public transport services (Ali *et al.*, 2023). Particularly, senior citizens may feel more inclined to use public transport when encouraged by family due to perceptions of safety and convenience (Bakti *et al.*, 2020). As such, the influence of SNs can vary across cultures and individual differences, and their predictive power may be limited when individuals prioritise personal preferences over social expectations.

Meanwhile, PBC reflects on an individual's confidence in their ability to perform a behaviour (Si *et al.*, 2020). This reflects on the degree of thoughts and beliefs on the capability of people to conduct the behaviour which can be easy or difficult for them. In transportation, this might involve the ease or difficulty of using a particular mode such as high-speed rail, busses or car-sharing (Huo *et al.*, 2021). These researchers also added that several determinants such as financial and physical capability would be the main control factors. Above all, with high perceived behaviour control and adequate resources, people may have a strong intention and tendency to perform their interests well.

Finally, BI have become a basic strategic metric or indicator to examine the success of a tourism destination (Afshardoost and Eshaghi, 2020). Researchers evaluated BI through word of mouth, the willingness to pay a premium price, the intention to use or purchase, visit and revisit a destination and brand loyalty (Al Mamun *et al.*, 2024; Galati *et al.*, 2023). Based on the literature, the researchers only focus on reusage intention and spreading WOM as the appropriate BI elements that presume to have influence on people's AB.

TPB is a well-known theory that has been used to examine the adoption of green products and services like e-motorbike, (Kresnanto and Putri, 2024), green glamping (Hanafiah *et al.*, 2025) and e-scooter (Al Mamun, 2024; Sheykhfard *et al.*, 2025). However, on the integration of TPB in e-scooter research, Sheykhfard *et al.*, (2025) claimed that this theory is less tested in developing countries, where local conditions and demographic may differ. Meanwhile in Malaysia, Al Mamun (2024) found all TPB constructs have small positive affect of willingness to purchase private e-scooter among youth presumably due to the early stage of e-scooter in the market and consumers not having a real personal experience of this micromobility vehicle. By taking TPB as an appropriate theoretical model, this study aims to fill the important literature gap, particularly in shared e-scooter for touring purposes and developing country context which perceived such studies remain recent and scarce.

2.2.1 Hypotheses development – theory of planned behaviour. The interplay of TPB constructs; attitude, SNs and PBC impacted individuals' intentions is commonly tested in various settings in tourism and hospitality research area. Ali *et al.* (2023) found that positive attitudes of travellers significantly influence their BI to ride on public transportation under certain situation. Positive attitudes that shown by travellers were because of good accessibility and infrastructure of the transportation itself. From the perspective of transportation technology, researchers confirmed that traveller's usage intention of using high-speed train and e-scooter are significantly affected by their positive attitudes (Hou *et al.*, 2021; Jing *et al.*, 2019). They postulate that travellers have demonstrated a positive attitude and a willingness to reuse the transportation services, despite their relative unfamiliarity with the advanced technology of the vehicles. From the e-scooter perspective, Al Mamun *et al.* (2024) argue that the intention to use the micromobility vehicle in South East Asian countries for short-distance travel are commonly due to several factors like weather, economy and culture, which young generation are more inclined to use it. By taking into consideration of low adoption rate of e-scooter in Malaysia (Al Mamun *et al.*, 2024), this study presume that Malaysians are still perceived

least benefits of using e-scooter in which led particularly for environment protection. Hence, this study postulates:

H1. Attitude positively influences behavioural intentions.

It is no doubt that SN is an effective predictor of BI. Individuals tend to consider the opinions of people they deem important as reference points (Ajzen, 1991; Wang *et al.*, 2021). Juschten *et al.* (2019) found that SN has greater influenced on BI as compared to attitude and PBC among hikers in Alpine destination. They believe that it could be derived from cultural influence of the social surrounding particularly in traditionally collectivist cultures such as those in many Asian countries.

In the transportation context, SNs perceived as important aspect to motivate people for using any mode of transportation. Pan and Truong (2018) stated that travellers are more likely to fly with the airlines if they obtained positive recommendation from their close family and friends. Other researchers believe social support and togetherness in encouraging others on the benefits of using electronic and technology transportation would lure people to have positive future intention (Bakti *et al.*, 2020; Huo *et al.*, 2021). Precisely on e-scooter, recent study found that SNs that related with peer and media influences have a positive effect on e-scooter usage intention, which females are less affected in their choice to use or not use (Syekhfard *et al.*, 2025). Meanwhile, several researchers also highlight the concept of "social pull", which implies that individuals experience a sense of personal identification and feeling of belongingness with the community of e-scooter riders are important aspects in influencing people to use e-scooter as an alternative transportation for city tour (Huang, 2021; Kazemzadeh and Sprei, 2022). Overall, social pressure which could derived from family and friends' encouragement and media exposure, particularly on social media platforms perceived as important mediums to affect people to use e-scooter as an alternative transportation for tourism purposes. Based on the above discussion, this study proposes hypothesis as below:

H2. Subjective norm positively influences behavioural intentions.

PBC is about the set of internal or external elements that might assist or hinder individual's behaviour based on their capabilities to perform a certain activity (Ali *et al.*, 2023). Attributes such as cost, capability and convenience play important role to influence positive perceived behaviour control that led to positive BI (Bakti *et al.*, 2020). Wang *et al.* (2021) suggest that capability of people in protecting environment is depending on external controls such as incentives, a proper infrastructure of the tourist sites and distribution of signboards. Individual will have positive intentions if they able to perform accordingly with the external support systems. Nonetheless, perceived behaviour control perceived as least influence on intention to purchase e-scooter among youth due to high cost (Al Mamun *et al.*, 2024). Low price offer to purchase and good promotional efforts that highlight benefits of e-scooter, particularly on environment protection could influence individuals to use and purchase this vehicle. Following those observation, this study suggests a hypothesis:

H3. Perceived behaviour control positively influences behavioural intentions.

TPB is proposed to explain the essential components of AB that derived from three main factors and individual's BI (Ulker-Demirel and Ciftci, 2020). It is assumed that people will behave in a certain way if they are convinced of a specific, and beneficial, if people close to them appreciate and accept their behaviour; and if they are sure they have the necessary resources, abilities and opportunities to behave in a certain way (Boguszewicz-Kreft *et al.*, 2020; Bui, 2023). BI could

lead individuals to perform the AB and be loyal to certain products or services (Widjaja *et al.*, 2020). In the context of e-scooter, Al Mamun *et al.* (2024) claimed that the disparity between users' BI and their AB remains minimal. This phenomenon is likely due to the nascent stage of market penetration, particularly in urban settings such as Malaysia where many individuals have yet to gain direct personal experience with this form of micromobility. Based on the discussion of previous literatures, the hypotheses contend a significant and positive influence exists between variable within the TPB model. Henceforth, this study constructs a path hypothesis as follow:

H4. Behavioural intentions positively influence actual behaviour.

2.3 Environmental moral obligation

In general, moral obligation refers to an individual's internal sense of responsibility to engage in or avoid certain behaviours, regardless of any external consequences (Ajzen, 2002). Roh and Park (2019) stated that individuals may self-regulate or internalise social norms, leading them to voluntarily restrict behaviours in which conflict with their convenience orientation and perceived compatibility. The concept of moral obligation has been broadly discussed in behavioural theories such as the TPB and the Norm Activation Model (NAM). From the perspective of TPB model, earlier Bang *et al.* (2014) claimed that moral obligation adds significantly to the prediction of BI of volunteerism especially if they have positive capability and strong financial sources. Meanwhile, morality features are commonly related with altruistic reasons for pro-environmental behaviour that derived from NAM (Wu *et al.*, 2021). They also added that personal norm is closely related with moral obligation, which emphasises on the cognitive and emotional activation of moral standards in response to environmental situation and consequences. Moreover, Fenitra *et al.* (2022) state that whenever people feel that they did something wrong, their moral obligation to do something to stop or reduce on certain damages, particularly on environment will go up.

Precisely, EMO can be seen as a specific application of both constructs; moral obligation and personal norm within the environmental context. It represents the internalised sense of duty to engage in environmentally responsible behaviour, typically driven by altruistic values and concern for ecological outcomes (Wu *et al.*, 2021). In this regard, EMO serves as a critical bridge between the moral-emotive emphasis of NAM and the cognitive-rational structure of TPB. It introduces a moral dimension that supplements TPB constructs by accounting for internally driven motives that extend beyond SNs, PBC or personal utility. For instance, a tourist may choose to use an e-scooter for sightseeing not merely because it is convenient or socially approved, but because they feel a personal ethical responsibility to minimise their environmental impact (Esztergar-Kiss *et al.*, 2022; Guo and Zhang, 2021). As such, this sense of obligation reflects a deeper, value-based commitment to sustainable behaviour, one that is not fully captured by TPB's original framework. Above all, EMO enriches the TPB by addressing the motivational influence of personal ethics, particularly in pro-environmental behaviours where individual actions are often shaped by deeply held beliefs about right and wrong.

For this study context, EMO refers to an individual's sense of responsibility to use e-scooters for touring purposes, which simultaneously contributes to environmental protection. As discussed earlier, e-scooter would be one of the best micromobility solutions in urban city area to reduce air pollution and traffic congestion (Dias *et al.*, 2021; Gühnemann *et al.*, 2021). Wu *et al.* (2021) suggests that individuals with strong personal norms and heightened awareness of environmental consequences are more likely to experience a sense of EMO. In this regard, EMO can serve as a motivational factor that

extends beyond the traditional TPB components by capturing the influence of internal moral drivers. Therefore, this study proposes that incorporating EMO into the TPB framework can enhance its explanatory power, particularly in predicting tourists' intentions and AB regarding e-scooter use. This integration addresses a theoretical gap by acknowledging the role of moral and normative influences in shaping sustainable transportation choices within the tourism context.

2.3.1 Hypotheses development – the moderating role of environmental moral obligation. Based on researcher's knowledge and literatures, the assessment of moral obligation role as the moderating variable still receives limited attention from researchers in tourism field. Most of the business management and consumerism scholars use moral obligation as the moderator especially when their studies related with environment and social responsibility. A recent study found that moral obligation significantly moderated social entrepreneurial role model and entrepreneurial intention (Maziriri *et al.*, 2020). The result indicates a need social moral obligation to enhance entrepreneurship intention among South Africa citizens in which important to alleviate their standard of living. In tourism context, Raza *et al.* (2024) incorporated moral obligations as the moderator in eco-tourism study. The study reveals a positive influence between environmental attachment and tourist's pro-environmental behaviour during high moral obligations.

Precisely on TPB framework perspective, researchers perceived personal feelings of moral obligation are needed to be considered while examining individual's intention and AB, which essential to increase the TPB's predictive power (Chen and Tung, 2014). In the context of transportation and tourism, Ali *et al.* (2023) who used the extended TPB framework found personal norm and environmental concern factor shows that respondents place high belief on moral obligations to protect environment and prefer using public transportation for traveling in Japan. On the food delivery attitude research, Roh and Park (2019) examined the moderating effect of moral obligation level between life compatibility and food delivery application usage intention. Both researchers found that married people who has high moral obligation perceived food delivery application eased their life and they tend to use the application again in the future.

As we discussed earlier on the SN, social pressure found play significant role to influence BI. Wu *et al.* (2021) posit that the adoption of pro-environmental BI and AB largely depends on the moderation effect of moral obligation together with social influence. They agreed that travellers are more likely to morally behave if they perceived others are not engaging in positive behaviour ways. On the other hand, Bang *et al.* (2014) found moral obligation only moderated the relationship between perceived behaviour control and volunteer intention to participate in events. The researchers suggest that volunteers would rejoin the event as volunteers if they have the capability in term of time availability in the future. Contrarily, they also postulate that the respondents might not associate moral obligation feelings on the sporting event due to their main service is a short-term entertainment and not specifically to assist others during the event.

For this study context, the researchers presume that e-scooter is an innovative mode of transportation in which important for environment protection and also to enhance tour experience among travellers in city area. With high environment obligation feelings, hence, travellers who might have positive attitude, strong social influence and PBC will have positive BI to use e-scooter in the future. Thus, in light of the aforementioned discussion, we suggest three hypotheses on the environment moral obligation role as the moderating variable as follows:

H5a. Environment moral obligation moderates the influence of attitude on behavioural intentions.

H5b. Environment moral obligation moderates the influence of subjective norms on behavioural intentions.

H5c. Environment moral obligation moderates the influence of perceived behavioural control on behavioural intentions.

3. Methodology

3.1 Research design

This study adopts a cross-sectional research design, which involves data collection at a single point in time to examine relationships among variables. The data collection took a four-month period from October 2023 to January 2024. It is grounded in the positivism paradigm, emphasising objectivity, measurement and hypothesis testing.

3.2 Sampling and participants

The study population includes the local and foreign tourists who had experienced using e-scooters for touring purposes at selected urban areas and tourism destinations in Malaysia. The study respondents were purposely selected using the screening questions. The inclusion criteria include: the respondents have prior experienced riding e-scooter for touring purpose in Malaysia, and also the respondents must be 18 years old and above. This method of pre-qualification through screening questions allowed the researchers to restrict participation to a clearly defined and relevant population. In fact, this controlled approach ensured that this study exclusively captured insights from tourists with firsthand experience of using e-scooter that relevant to the research objectives.

3.3 Instrumentation

The main instrument for this study is an online survey questionnaire. The survey items adapted from a study conducted by Ali *et al.* (2023), Jing *et al.* (2019) and Wu *et al.* (2021). The items were paraphrased in both English and Malay using simplified language and basic terminology to minimise potential ambiguities. The survey instrumentation is divided into five parts: Part (A) consists of the respondent's demographic profile. Meanwhile, Part (B) covers attitudes (four items), SNs (four items), PBC (four items). Next, Part (C) relates to BI on e-scooter usage (six items). Part (D) focuses on the AB of e-scooter usage for touring purposes (five items). Finally, Part (E) on the EMO (four items). This survey used a five-point Likert scale. The questionnaire was measured on a scale from 1 to 5 (1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree). The items of survey questionnaire were vetted through by the university's Research Ethic Committee for approval.

3.4 Data collection procedure

The online self-administered survey was distributed via Google Form. The data was collected face-to-face at several tourism attractions in Malaysia, particularly in Kuala Lumpur city centre. To increase respondent reach, the survey link was additionally circulated via social media platforms using a snowball sampling technique, aiming to ensure broad dissemination and encourage active engagement from diverse respondent groups. The researchers identified the potential respondents by searching through hashtags and geolocation to ensure the eligibility of respondents and to avoid potential bias. Although two

distribution methods were used, all responses were collected through the same online platform using a standardised instrument, ensuring consistency and validity of the data. As participation was voluntary, the data collection took a four-month period with a total of 350 valid respondents participating in this study. Based on Kock and Hadaya (2018), they stated that the "10-times rule" method is widely used for minimum sample size estimation in Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis. Through this method and considering eight pointing arrows in the research framework, the estimated sample size for this study is 80. Hence, 350 valid respondents are considered adequate for this study.

3.5 Pilot study and reliability analysis

A pre-test and pilot study were conducted to verify and confirm the reliability and validity of the measurement items. The pre-testing stage served as assessors to ensure the content validity of the items. Opinions and constructive feedback were provided by the assessors, and the feedback was applied to improve the questionnaires. The survey was shared with selected reliable officers working with Tourism Malaysia and Universiti Teknologi MARA (UiTM) for structure and clarity assessment. The pilot study involved 30 respondents with similar characteristics to the target population. Based on their feedback, minor wording adjustments were made to enhance clarity and relevance, particularly for tourism-related items. No items were removed or added. Additionally, all individual Cronbach's alpha values exceeded the recommended threshold of 0.70, supporting the acceptability of the items for subsequent analysis.

3.6 Common method bias and data analysis

In addressing potential common method bias (CMB) concerns, Harman's single factor test was applied wherein respondents evaluated all survey items concurrently. The analysis revealed a total variance of 42.28%, falling below the critical threshold of 50%, thereby indicating no substantial issue with CMB (Podsakoff *et al.*, 2003). Following this, the study proceeded to examine its model and hypotheses using PLS-SEM analysis. This study opted for the PLS-SEM approach based on its advantages over the covariance approach. The benefits of this soft-modelling approach include its ability to account for the theoretical, measurement, distributional and practical considerations. Moreover, the PLS-SEM approach suits the researcher's prediction-oriented objective does not require normal data distribution and accommodates small sample sizes. This involved two sequential stages encompassing measurement and structural model assessment (Hair *et al.*, 2019).

4. Analysis and results

4.1 Demographic profile

A total of 350 usable responses were valid for analysis. Out of 350, 189 respondents (54.0%) are male, and the remaining 161 (46.0%) are female. Most are between 25 and 34 years old ($n = 140$, 40.0%). Most of their occupation is working in the private sector ($n = 123$, 35.2%). On the ownership of e-scooters, a significant portion of respondents with 87.3% ($n = 305$), stated that they do not own one, while the remaining respondents, 12.7% ($n = 45$), reported owning an e-scooter. Finally, the highest frequency of riding an e-scooter for touring purposes occurred once a year, constituting 50.0% ($n = 175$), followed by once a month at 31.3% ($n = 109$), once a week at 9.3% ($n = 32$) and the remaining 9.4% ($n = 34$) of respondents were seldomly ride e-scooter for touring reasons. Result of demographic profile as illustrated in Table 1.

Table 1. Result of demographic profile

Variables	Frequency (n)	%
Gender		
Male	189	54
Female	161	46
Age		
18–24 years old	129	36.9
25–34 years old	140	40.0
34–44 years old	81	23.1
Nationality		
Malaysia	305	87.1
Non-Malaysia	45	12.9
Types of occupation		
Professional	59	16.9
Government	71	20.3
Private sector	123	35.2
Students	81	23.1
Self-employed	16	4.6
Have you own e-scooter?		
Yes	45	12.7
No	305	87.3
Frequency of riding e-scooter for touring purpose		
Once a week	32	9.3
Once a month	109	31.3
Once a year	175	50.0
Other	34	9.4

Note(s): n = 350
Source(s): Authors' own work

4.2 Measurement model assessment

The assessment of the reflective measurement model begins with an evaluation of indicator loadings (Figure 1). As shown in Table 2, the indicator loadings range from 0.717 (BI6) to 0.913 (ATT3 and MO3), exceeding the recommended threshold. However, item MO5 was removed due to a loading value below 0.70. The remaining loading indicators are considered adequate and fit the degree of reliability.

Following this, internal consistency was evaluated using composite reliability. The composite reliability values for the six constructs range between 0.885 and 0.932, surpassing the acceptable threshold of 0.70 (Hair *et al.*, 2019). They also add that the values ranging from 0.7 to 0.9 are "satisfactory to good", while values of 0.95 and higher are problematic, as they indicate that the respective items are redundant.

Next, convergent validity was assessed based on the average variance extracted (AVE). According to Fornell and Larcker (1981), AVE values above 0.50 indicate acceptable convergent validity. Hair *et al.* (2019) state the values should be higher than 0.50, indicating that the constructs explain at least 50% of the variance of its items. In this study, the AVE values range from 0.658 to 0.773, confirming the constructs' convergent validity. A summary of the measurement model assessment is provided in Table 2.

Additionally, discriminant validity was examined using the heterotrait–monotrait ratio of correlations (HTMT). Henseler *et al.* (2016) suggest that HTMT values should remain below

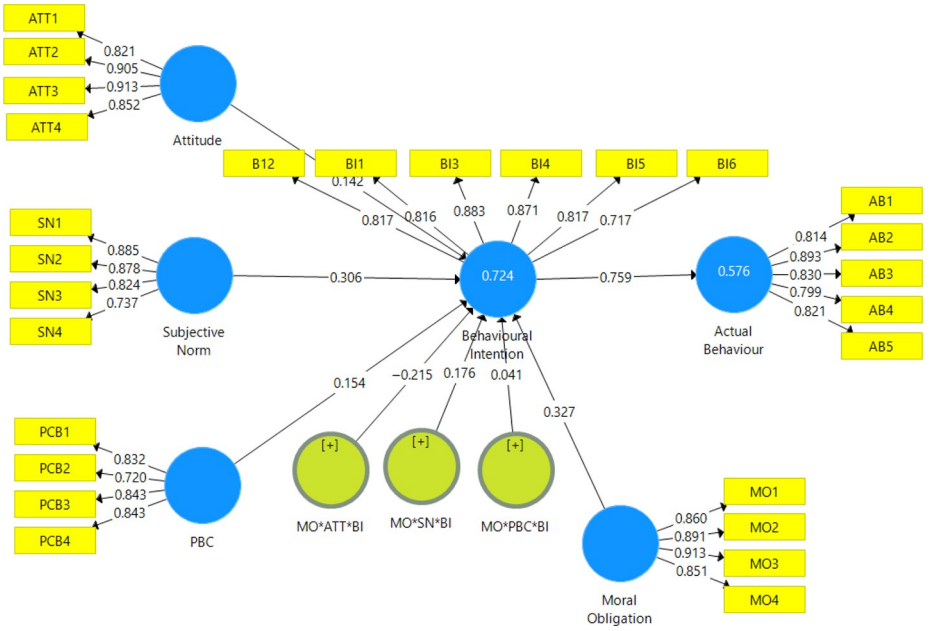

Figure 1. Measurement model

0.90 to establish discriminant validity. The results indicate that all constructs have HTMT values below this threshold, confirming the absence of collinearity issues and verifying the model's discriminant validity. Based on the Table 3, the HTMT scores ranged between 0.678 and 0.842 which indicates that the discriminatory validity of the model is confirmed.

4.3 Structural model assessment

The analysis began with a collinearity test to assess potential multicollinearity issues among the independent variables. The results indicated that the variance inflation factor (VIF) values for the structural model ranged from 1.375 to 2.519, suggesting no strong multicollinearity concerns among the predictors (Hair *et al.*, 2019). Following this, the proposed hypotheses were tested by evaluating the path coefficients (β) using a bootstrapping approach with 5,000 subsamples. As summarised in Table 4, the hypothesis testing results reveal that only two direct paths in the research model are statistically significant and supported.

The findings reveal mixed effects on travellers' BI towards shared e-scooter usage for touring purposes. Firstly, Attitude (ATT) negatively influenced BI (β = 0.142, t = 1.304, *p*-value = 0.193), leading to the rejection of *H1*. The result may suggest that tourists are ambivalent or unfamiliar with e-scooter use in Malaysia, resulting in neutral or cautious attitudes. Factors such as lack of infrastructure, perceived risk and low emotional involvement with shared e-scooters could have weakened the influence of attitude on intention to use the micromobility vehicle.

Table 2. Result of measurement model

CODE	Items	Outer loading	Cronbach's alpha	Composite reliability	AVE
Attitude					
ATT1	Riding shared e-scooters for touring enhances my overall travel experience	0.821	0.896	0.928	0.763
ATT2	I believe using shared e-scooters for tours is a positive way to explore urban areas	0.905			
ATT3	I believe adopting the shared e-scooters for touring is desirable	0.913			
ATT4	Using shared e-scooters for touring enhances my perception of exploring new places with excitement	0.852			
Subjective norms					
SN1	My friends and family encourage me to consider shared e-scooter tours as a preferred way of exploring urban areas	0.885	0.851	0.900	0.694
SN2	People who are important to me expect that I should use the shared e-scooters for tour experience	0.878			
SN3	People around me use shared e-scooter in urban areas for tour experiences	0.824			
SN4	If people around me use shared e-scooters, I will also use it	0.737			
Perceived behavioural control					
PBC1	I feel confident in my ability to use shared e-scooters for touring	0.832	0.826	0.885	0.658
PBC2	I have enough resources (money) to use the shared e-scooters when travelling	0.720			
PBC3	I believe I have the necessary skills to navigate shared e-scooter tours	0.843			
PBC4	I have enough opportunities to use e-scooters for tour experience	0.842			
Behavioural intention					
BI1	I would use shared e-scooter in the future for touring purposes	0.816	0.903	0.925	0.675
BI2	I plan to use shared e-scooter in the near future for touring purposes	0.817			
BI3	I intend to use shared e-scooter for touring purposes whenever available	0.883			
B14	I would recommend the e-scooter touring ride at the selected city to family and friends	0.871			
BI5	I would say positive things about shared e-scooter touring ride to other people	0.817			
BI6	I think shared e-scooter is worth buying for tour purposes in the future	0.717			
Actual behaviour					
AB1	I often use shared e-scooter when touring because it is easy for me	0.814	0.890	0.918	0.693
AB2	I have been using an e-scooter for touring experience purposes in a sustainable way	0.893			

(*continued*)

Table 2. Continued

CODE	Items	Outer loading	Cronbach's alpha	Composite reliability	AVE
AB3	I chose shared e-scooter for touring, if it is convenient	0.830			
AB4	I always talk about the benefits of e-scooter for touring to families and friends	0.799			
AB5	I often use shared e-scooter for touring to avoid traffic congestion	0.821			
Environment moral obligation					
EMO1	I feel more obligation to use e-scooter for saving environment	0.860	0.902	0.932	0.773
EMO2	I feel moral obligations to use shared e-scooter for tour purpose to reduce the air pollution	0.891			
EMO3	I feel moral obligations to use shared e-scooter for tour purpose for the preservation of natural resources	0.913			
EMO4	I feel moral obligations to use shared e-scooter for betterment of the society	0.851			

Table 3. Results of heterotrait–monotrait ratio of correlations (HTMT)

Result of HTMT for each variable	ATT	SN	PBC	EMO	BI	AB
ATT						
SN	0.784					
PBC	0.842	0.808				
EMO	0.762	0.678	0.842			
BI	0.820	0.823	0.840	0.820		
AB	0.697	0.836	0.789	0.743	0.831	

Table 4. Path coefficient (β), T-value and significance level

Relationship	β	*t*-values	*p*-values	Decision
ATT → BI (*H1*)	0.142	1.304	0.193	Rejected
SN → BI (*H2*)	0.306***	4.040	0.001	*Supported*
PBC → BI (*H3*)	0.154	1.593	0.112	Rejected
BI → AB (*H4*)	0.759***	18.016	0.000	*Supported*

Note(s): ****p*-value < 0.000; ***p*-value < 0.005

SNs were significantly associated with BI (β = 0.306***, t = 4.040, *p*-value = 0.001), supporting *H2*. This indicates that social influence plays a key role, where tourists may be encouraged by friends, family members or online trends to adopt shared e-scooter for tourism experiences. The visibility and popularity of such experiences on social media or user generated content platforms may further reinforce this effect.

Furthermore, PBC showed no significant impact on BI (β = 0.154, t = 1.593, *p*-value = 0.112), resulting in the rejection of *H3*. This could be due to contextual barriers such as inadequate infrastructure, unfamiliar traffic conditions or uncertainty about operational rules which may limit users' confidence in their ability to safely use shared e-scooters while touring.

On the other hand, BI demonstrated a strong positive relationship with AB, supporting *H4* (β = 0.759***, t = 18.016, *p*-value = 0.000). This confirms that intention remains a strong predictor of actual usage behaviour, aligning with the core premise of the TPB where intention translates into real-world action when opportunities and motivations align.

In the proposed research model, 72.4% of the variance in the BI was explained by the three TPB factors. Meanwhile, BI explained 57.6% of the variance in the AB. In terms of effect size, the changes in attitude have a small effect on BI (f^2 = 0.023). Similarly, changes in the PBC as the predictor have a small effect on BI (f^2 = 0.027). Another dimension of TPB, SN, moderately affected the BI (f^2 = 0.153). Interestingly, this study discovers that BI influence AB in large effect value (f^2 = 1.358). Model fit was assessed using SRMR. The SRMR value for the saturated model was 0.059 and for the estimated Model 0.069, both below the recommended threshold of 0.08 (Henseler *et al.*, 2016), indicating an acceptable model fit.

To further assess predictive accuracy, this study evaluated the Q^2 values of the inner model, as suggested by Hair *et al.* (2019). A Q^2 value greater than zero indicates the model's predictive relevance for a given construct. The results show a Q^2 value of 0.467 for BI, suggesting that ATT, SN and PBC collectively possess moderate predictive power (46.7%)

over BI. Similarly, AB, as an exogenous variable, demonstrated a moderate predictive relevance with a Q^2 value of 0.383 (38.3%). These findings confirm that the proposed model holds substantial predictive utility in explaining e-scooter usage behaviour among urban travellers.

4.4 Moderating effect of environmental moral obligation

Within the research framework, additional analysis was conducted to examine the moderating role of EMO in the relationships between attitude, SNs, PBC and BI. The results of the simple moderation analysis are presented in Table 5.

The results from the PLS-SEM moderation analysis indicate that EMO does not significantly moderate the relationships between attitude, SNs, PBC and BI. Specifically, all three hypothesised moderation effects (*H5a*, *H5b* and *H5c*) were statistically insignificant, as their *p*-values exceeded the conventional threshold for significance ($p < 0.05$). These findings suggest that while TPB constructs influence BI, the presence of moral obligation does not amplify or weaken these relationships in the context of shared e-scooter usage in tourism. This lack of moderation may imply that EMO is not a salient factor in this specific behavioural context. Tourists may perceive shared e-scooter usage more as a convenient, trendy or fun recreational mode of transportation rather than one strongly tied to environmental or moral responsibility.

5. Discussion and conclusion

5.1 Discussion

This study tests an integrated research model that aims to examine how the three main TPB constructs (ATT, SN and PBC) including moral obligations influence the traveller BI and their AB from the perspective of e-scooter usage for touring experience. In brief, two hypotheses are empirically supported, while other two direct construct hypotheses are not supported. The first hypothesis posited a negative influence of attitude towards BI among travellers who are used shared e-scooters for touring purposes. The finding aligned with previous studies that assessed on the attitude of volunteer (Bang *et al.*, 2014) and attitude of e-scooter (Gaspar *et al.*, 2023) user on BI. The positive e-scooter users' attitude did not affect on their future BI due limited time, lack of infrastructure and distance coverage during tour in urban cities. The result also confirms an argument by Al Mamun (2024) which micromobility vehicles usage in Malaysia is still at infancy stage. Besides lack of awareness on green issues, uncertain policies imposed by government especially on infrastructure development, vehicle and equipment standards also might halt people to adopt e-scooter for leisure and touring purposes in city centre of Malaysia. In short, although e-scooter usage provides excitement and enjoyment, these positive experiences alone fail to drive tourists' intention to use the vehicle again.

Table 5. Path coefficient (β), T-value and significance level (moderation analysis)

Relationship	β	*t*-values	*p*-values	Decision
ATT → EMO → BI (*H5a*)	−0.215	1.472	0.142	Rejected
SN → EMO → BI (*H5b*)	0.176	1.431	0.153	Rejected
PBC → EMO → BI (*H5c*)	0.041	0.289	0.773	Rejected

Note(s): 99% confidence interval: ****p*-value < 0.000; 95% confidence interval: ***p*-value < 0.005

The second hypothesis was supported in which SN encompassing the influence of family and friends, emerge as influential factors shaping individuals' intentions in e-scooter usage. The result is consistent with previous studies that found SN have a positive and significant effect on BI (Juschten *et al.*, 2019; Syekhfard *et al.*, 2025). These studies indicate that social pressure, particularly in collectivist societies play a significant role in shaping individuals' BI. The stronger the pressure feels from their significant others such as family, friends or even social media online users, the more likely he or she would intend using e-scooter. Besides that, the authors believe Malaysian are similar like Chinese people who are still influenced by traditional collectivism education that relates to social pressure from close family members and friends that determine their future intention. The finding confirms as both citizens perceived a sense of personal identification and feeling of belongingness with the community are important aspects in influencing people to other alternative transportation (Huang, 2021; Pan and Truong, 2018). By considering the influence of close family and friends, the result provides another insight that touring around urban cities would be great if they could have ride experience together, which, in turn, could significantly shape individuals' intentions and AB regarding e-scooter usage.

Interestingly, this study found a positive PBC could not influenced BI of e-scooter usage among travellers. Statistically, the finding is aligned with Pan and Truong (2018), which mentioned that the importance of factors like cost, convenience and availability in determining PBC are not able to affect BI of low-cost carrier passengers. This study also confirmed the result found previous studies (Ali *et al.*, 2023; Al Mamun *et al.*, 2024; Jing *et al.*, 2019) whereby people's intention might hinder due to certain external restrictions. From this study perspective, certain factors such as financial and usage capability were perceived as important, but these elements did not influence traveller's BI as they might see the cost of renting shared e-scooter in urban city area is quite expensive. Although they have the capability to navigate the micromobility vehicle, travellers probably felt that the cost of renting e-scooter also is not worth it with the short duration of trip. Additionally, the ease of use and simplicity of operating e-scooters may reduce the importance of perceived control, shifting the focus towards external factors such as social encouragement or cost considerations in shaping intention. Moreover, when perceived ease is high across respondents, PBC may lose its discriminating power, making other variables like SNs or perceived value more influential in predicting intention.

The final direct path hypothesis states that BI significantly influence the AB of travellers to use shared e-scooters for touring purposes. The result of this study is similar with previous studies conducted, asserting that an individual's BI serve as a reliable predictor of AB (Boguszewicz-Kreft *et al.*, 2020; Bui, 2023). BI directly guide users in choosing products or services, affecting the actual consumption. As travellers express their intention to integrate e-scooters into their touring activities, this study supports the idea that BI play a pivotal role in shaping AB. Contrarily, this study's finding opposes with Al Mamun *et al.* (2024), possibly due to respondent tabulation which most of them are Generation-Z that more enthusiastic e-scooter group. Beyond the environment concern, the young generation nowadays feel motivated to adopt this micromobility vehicle as it offers more fun touring experience that integrate with new smart technology.

On the moderating role of EMO, the results show interesting findings on its effect between TPB constructs and BI. Notably, this presence study found EMO insignificantly moderated the relationship between attitude, SN, PBC and BI, which consistent with Bang *et al.* (2014). The travellers might not associate their EMO on future intention although they show a positive attitude and faced social pressure from family and friends. The respondents only wanted to enjoy the city tour with wonderful e-scooter ride experience as they

presumably lack environment awareness and perceived the micromobility vehicle provides least positive impacts towards environment and social. Hence, keep highlighting the e-scooter adoption benefits within the sustainable tourism settings are essential to encourage more travellers to use this trendy smart micromobility vehicle beyond amazing e-scooter touring ride experience. Tourism destinations should leverage on contemporary platforms such as digital travel apps, social media, eco-tourism packages and gamified rewards to highlight both the environmental benefits and enjoyable experiences of e-scooter use.

Furthermore, this study confirms EMO has no moderating effect on the influence of PBC towards BI of shared e-scooter. The result is contradicted with Wang *et al.* (2021) as they found that PBC positively influenced BI if an individual's moral obligation on environment is higher. In this study context, EMO did not able to persuade people to shared use e-scooter although they have enough capability in term of financial and skills in handling the micromobility vehicle. This is also could be due to e-scooter sharing service perceived as the new alternative mode of transportation in Asia countries in which they are not really eager to use it for touring purposes around the city. The absence of a moderating effect from EMO suggests that such internalised values may not significantly shape BI in short-term, leisure-based tourism settings. Unlike utilitarian or habitual transport choices, e-scooter usage for city tours is often perceived as an experiential and novelty-driven activity. As such, travellers may prioritise convenience, cost, fun and social experience over environmental considerations.

To address the interplay between hedonic and normative motivations in sustainable travel, it is essential to reflect on the potential tensions and synergies between individuals' pursuit of pleasure and their adherence to moral norms. While EMO is theorised to enhance the explanatory power of the TPB by incorporating internalised ethical concerns (Wu *et al.*, 2021), its limited predictive power in certain contexts such as tourists' e-scooter usage. The hedonic motivations like seeking for enjoyment, convenience and novelty could outweigh normative considerations when individuals are in leisure-oriented settings. This implies that promoting e-scooter adoption in tourism may require strategies beyond moral appeals such as emphasising safety, affordability, group experiences and ease of use particularly in collectivist societies where social norms outweigh internalised environmental concerns.

5.2 Study implications

This study makes several theoretical contributions by advancing the understanding of urban micromobility and its role in tourism, particularly in the context of shared e-scooter usage for city tour experience. Firstly, this study enriches the TPB by applying its constructs; attitudes, SNs and PBC in influencing the shared e-scooter usage for tourism purposes, which a relatively underexplored area. It also highlights SNs as a crucial factor particularly in collectivist societies, thereby extending TPB's applicability in different cultural contexts, Malaysia setting.

Furthermore, this study advances TPB by demonstrating how its predictive power varies in the context of short-term, experience-driven travel behaviour. The limited role of PBC and the non-significance of EMO suggest that in urban micromobility tourism, external and situational factors such as social norms and experiential motivations may outweigh internal control or moral considerations. These findings refine the TPB by emphasising the importance of contextualising its constructs when applied to temporary and hedonic behavioural settings like tourism.

Another theoretical contribution of this study extends to the TPB literature by investigating the role of EMO as a moderating variable in the research model. However, findings suggest that EMO does not play a prominent role in shaping perceptions and BI

towards e-scooter usage for touring. Despite contemporary concerns regarding environmental impact among travellers, individuals do not perceive e-scooter usage as significantly contributing to environmental protection, especially in the short term. This investigation contributes to the growing literatures on the relationship between moral obligation and pro-environmental behaviour, which offering a significant understanding of e-scooter usage for tour experience.

Given the growing popularity of e-scooters as a mode of urban transportation, this study offers valuable insights for policymakers, urban planners and tourism stakeholders in the context of smart tourism. Firstly, policymakers and tourism stakeholders should leverage the growing appeal of e-scooters as a viable urban micromobility solution, particularly for short-distance tours. Despite the minimal impact of EMO, e-scooters are still perceived as an exciting transportation option especially for tourists seeking a unique city exploration experience.

In addition, the findings emphasise the importance of developing urban infrastructure, including pathways and rental services to enhance the e-scooter experience for tourists while contributing to the sustainable development of urban transportation systems. By expanding charging stations, creating dedicated e-scooter lanes and adjusting pricing models, urban cities can enhance the convenience of e-scooter use for tourists. Embracing the emerging trend of e-scooter usage, governments and local authorities are encouraged to formulate policies that facilitate the integration of e-scooters into urban mobility frameworks, aligning with SDGs.

Furthermore, tourism stakeholders, including travel agents and tour operators are advised to capitalise on the appeal of smart micromobility vehicles by incorporating e-scooters into travel packages. Offering e-scooter tours provides travellers with a unique and exhilarating experience while navigating cities with ease and flexibility. Collaboration with transportation companies to accommodate e-scooters during travel, such as offering "Fly n Ride" or "Ride n Ride" packages, enhance the overall travel experience for tourists.

5.3 Limitation and future research

Although the study's objectives have been fulfilled, this study has limitations and provides several recommendations for future research. Firstly, it is difficult to acquire an ample number of responses since it is tough to persuade responses from travellers physically at destinations and via online platforms. The researchers only managed to obtain the valid data from 350 respondents in which adequate within the time period. Hence, larger sample size is recommended to justify the findings and arguments in the future on certain target populations. Future research is suggested to collect a larger sample size especially from foreign travellers to ensure a representative population distribution, which is important to generalise the findings. In particular, the sample was predominantly composed of local travellers, which may limit the generalisability of the findings across different cultural or demographic groups. The underrepresentation of international tourists and certain age categories may have influenced the strength or direction of specific behavioural predictors in this study. Foreign travellers may possess different BI and usage patterns due to varying levels of familiarity with local transport, risk perceptions, cultural expectations and sustainability motivations which could offer valuable comparative insights in future studies.

Future research could make several extensions of the current study. The application of the TPB model has received divine attention from tourism and hospitality scholars in examining the influence of people's perception and behaviour. Empirically, this study examined the factors of BI and AB of e-scooter usage for touring purposes. Future studies might consider

using the research framework or model to investigate other smart transportation or electronic vehicle settings such as ehailing cars, smart buses or high-speed trains. Moreover, this study also suggests researchers have a look on the moderating effect of other variables that might provide another interesting finding. For instance, future research could examine moderators such as perceived safety, past e-scooter experience, environmental awareness or urban familiarity. These variables may shape how travellers respond to social influence or perceived control, especially in unfamiliar or short-term tourism environments. Researchers also might consider conducting the multi group analysis via PLS-SEM to have two or more results such as e-scooter users' category (own vehicle and shared), gender and moral obligation level. This method would add value by revealing whether key relationships in the model differ significantly between groups. For example, gender-based comparisons might show whether males and females differ in how SNs or perceived control influence their intention. Similarly, comparing users of shared versus personal e-scooters could highlight how ownership status shapes behavioural motivations, offering more targeted insights for tourism and mobility planning.

Ethics statement

With the submission of this manuscript, I would like to undertake that all authors of this research paper have directly participated in the planning, execution or analysis of this study. The contents of this manuscript are not now under consideration for publication elsewhere. In addition, there are no directly related manuscripts or abstracts, published or unpublished, by any authors of this paper. This study instrument was approved by the university's Research Ethics Committee (Ref: FRGS-EC/1/2024/WAS01/UITM/03/1).

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